adani

Power

Ref: APL/REL/EMD/MoEFCC/EC/208/05/23
Date: 23.05.2023

To,
Additional Principal Chief Conservator of Forest
Ministry of Environment, Forests & Climate Change,
Integrated Regional Office, Aranya Bhawan, North Block
Sector 19, Naya Raipur, Atal Nagar,
Chhattisgarh 492 002

Sub: Submission of Six-Monthly Environment Clearance (EC) Compliance Status Report for 2x685 MW Raipur Thermal Power Plant at village Raikheda, Gaitara and Chicholi in Tilda Block of Raipur District, Chhattisgarh.

Ref: Environment clearance vide letter no. J-13012/62/2008-IA.II (T) dated 09.05.2011 and its subsequent amendment vide letter dated 10.06.2015, 13.06.2013, 18.11.2014, 04.02.2015. EC Transfer from Raipur Energen Ltd. to Adani Power Ltd. dated 24.04.2023.

Dear Sir,

With reference to the above, please find enclosed herewith Six-Monthly Environment Clearance (EC) compliance status report along with environmental monitoring reports as Ambient Air, Water Quality, Noise level, Soil quality, CAAQM data, Met. data, Greenbelt development, Fly ash data & CSR progress report etc. for the period of **October'2022 to March'2023** in soft copy (**e-mail**).

This is for your kind information and record please.

Thanking You,
Yours faithfully,
for Adani Power Limited

(Santosh Kumar Singh)
Head – AESG

Encl.: As above

CC: Member Secretary,
Central Pollution Control Board,
Parivesh Bhavan, East Arjun Nagar,
New Delhi – 110 032

Regional Officer
Chhattisgarh Environment Conservation Board,
Commercial Complex,
Chhattisgarh Housing Board Colony,
Kabir Nagar, Raipur – 492 099, Chhattisgarh

Member Secretary,
Chhattisgarh Environment Conservation Board,
Prayavas Bhavan, North Block, Sector-19,
Naya Raipur – 490 009, Chhattisgarh

Adani Power Ltd
Adani Corporate House
Shantigram, S G Highway
Ahmedabad 382 421
Gujarat, India
CIN: L40100GJ1996PLC030533

Tel +91 79 2555 4444
Fax +91 79 2555 7177
www.adanipower.com

SIX MONTHLY COMPLIANCE REPORT OF ENVIRONMENT CLEARANCE (EC)

FOR

1370 (2x685) MW
Raipur Thermal Power Plant

At

Village Raikheda, Gaitara and Chicholi,
Tilda Block, Raipur District, Chhattisgarh

Submitted to:

Integrated Regional Office, Raipur
Ministry of Environment, Forests & Climate Change,
Central Pollution Control Board, New Delhi &
Chhattisgarh Environment Conservation Board, Naya Raipur

Submitted by:

Environment Management Department

Adani Power Limited
Village Raikheda, Block Tilda,
District Raipur, Chhattisgarh

Period: October'2022 – March'2023

Adani Power Limited, Raipur

1370 MW (2x685 MW) Coal Based Thermal Power Plant

Table of Content

*****

Adani Power Limited, Raipur

1370 MW (2x685 MW) Coal Based Thermal Power Plant

INTRODUCTION

Adani Power Limited, Raipur (formerly known as Raipur Energen Limited) has set up a coal based Thermal Power Plant of capacity 2x685 MW at village Raikheda, Gaitara and Chicholi in Tilda block of Raipur District, Chhattisgarh.

Environmental Clearance has been granted by Hon'ble MoEF&CC to M/s GMR Energy Ltd. vide letter No. J-13012/62/2008-IA. II (T), dated 09/05/2011. It was subsequently amended vide letter dated 13.06.2013, 18.11.2014. 04.02.2015 and 09.12.2015.

The company has been taken over by M/s Adani Power Ltd. (APL) & name of the company has been changed from M/s GMR Chhattisgarh Energy Limited to M/s Raipur Energen Limited (REL) with effect from 20th August 2019 as 100% subsidiary of M/s Adani Power Limited. Raipur TPP has also obtained transferred EC vide letter No.J-13012/62/2008-IA.II (T), dated 05.11.2019.

Environment Clearance is transferred from Raipur Energen Limited to **Adani Power Limited** vide letter no. J.13012/62/2008-IA.II (T), dated 24.04.2023. Under the Hon'ble NCLT vide its order dated 08.02.2023 sanctioning the scheme of amalgamation of Raipur Energen Limited with Adani Power Limited. Subsequently.

Raipur Thermal Power Plant has a well-established Environmental Laboratory with equipped monitoring equipment, which used to monitor and test environmental parameters.

The company has adopted three peripheral villages and executing most of the CSR works which is supported by the Adani Foundation, in those villages in the field of their livelihood, infrastructure development, cleanliness, community health and education.

Raipur Thermal Power Plant has engaged NABL Accredited Lab for their service of sampling, monitoring and analysis of Environmental parameters as per statutory guidelines.

*****

Adani Power Limited, Raipur

1370 MW (2x685 MW) Coal Based Thermal Power Plant

Compliance Status of Environmental Clearance

vide letter No. J-13012/62/2008-IA. II (T), dated: 09th May 2011 and amendment dated: 13.06.2013, 18.11.2014, 04.02.2015, 09.12.2015, 05.11.2019 & 24.04.2023.
EC Transfer from Raipur Energen Ltd. to Adani Power Ltd. 24.04.2023.

Sl. No.	Conditions of EC	Compliance Status
A.	**Specific Conditions**	
(i)	Vision document specifying prospective plan for the site shall be formulated and submitted to the Ministry within six months.	Complied. The Vision document of Adani Power Limited was already submitted to MoEF&CC, Regional Office (WCZ), Nagpur vide our office letter Ref: REL / MoEF&CC/EC/2020/ May/29, dated: 29th May 2020. Environment Clearance is transferred from Raipur Energen Limited to **Adani Power Limited** vide letter no. J.13012/62/2008-IA.II (T), dated 24.04.2023. Under the Hon'ble NCLT vide its order dated 08.02.2023 sanctioning the scheme of amalgamation of Raipur Energen Limited with Adani Power Limited.
(ii)	In case source of fuel supply now proposed to be run on imported coal from South Africa for running the power plant is proposed to be changed to domestic coal at a later stage, the project proponent shall apply for such a change in environmental clearance along with necessary documents as required under EIA notification, 2006 (and its amendments). In such a case the necessity for holding public hearing again or otherwise will be determined by the Ministry in consultation with the Expert Appraisal Committee (Thermal Power).	Being complied. Use of 100% domestic coal sourced from tolling linkage and open market. Talabira-1 Mine is not under operation as Mining Plan was expired and the revised mining plan is due for approval. Sulphur and Ash content of blended coal being used (procured from Market & E-Auction).
(iii)	Provision for installation of FGD shall be provided for future use.	Space provision for FGD have been provided in the plant layout. As per the guidelines of CPCB vide letter No. B-33014/07/2017/IPC-II/TPP/15848, dated 11.12.2017. However as per MoEF&CC's Notification dated 5th Sep 2022, Raipur TPP is falling under Category "C" Non- retiring TPPs and the timelines for compliance of SO_2 emission is upto December 2026. Accordingly, the work is under progress for compliance as per CPCB direction.
(iv)	Stack of 275 m height shall be installed and provided with continuous online monitoring equipment's for SO_x, NO_x, $PM_{2.5}$ & PM_{10}. Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions	Complied. Stack Height is 275 meters. On-line continuous emission monitoring system (CEMS) has been installed for PM, SO2 & NOx. Monitoring of Hg in stack emission is also carried out by authorized

Sl. No.	Conditions of EC	Compliance Status
	from stack may also monitored on periodic basis.	laboratory by MoEF&CC. The exit gas velocity is ensured more than 22m/sec. The latest Environment Monitoring report is enclosed herewith as **Annexure - II.**
(v)	High Efficiency Electrostatic Precipitators (ESPs) shall be installed followed by installation of Bag Filter and it shall be ensured that particulate emission does not exceed 50 mg/Nm^3.	Complied. High efficiency Electrostatic Precipitators (ESP) has been provided to meet revised emission standard of <50 mg/ Nm3. The monitoring report for stack emission is enclosed in **Annexure - II.**
(vi)	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.	Complied. Dust extraction system has been installed in coal crusher, AHP & coal bunkers. Dust suppression system through dry fog method has been installed at coal conveyor transfer points. Water spray system has also been installed in coal yards for dust suppression.
(vii)	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.	Being Complied. As per the Office Memorandum, MoEFCC dated; 11.11.2020, all the Thermal Power Plants (including Captive Power Plants) having Environmental Clearance can **change the Coal Source** (from imported to domestic, domestic to domestic, and domestic to imported) including Lignite, directly through e-auctions/short term linkage/long term linkage/other linkage options of Ministry of Coal or any organization recognized for allotting coal linkages, **without seeking the amendment in Environmental Clearance.**
(viii)	Transport of coal to the plant site shall be strictly by rail. The project proponent shall therefore immediately take up the matter with the Railways. Status of implementation shall be submitted to the Regional Office of the Ministry from time to time.	Being Complied. The transportation through rail is started. Avenue plantation all along the road has already been done inside the plant premises. Compliance status of conditions mentioned in Environmental Clearance and it's time to time amendments is also kept in public domain at the website of holding company https://www.adanipower.com/Downloads
(ix)	Existing de-generated water bodies (if any) within 5.0 Km of the site shall be regenerated at the project proponent's expenses in consultation with the state govt.	Complied. Raipur TPP has regenerated around 6 numbers of Water bodies in nearby villages including 2 numbers of ponds are deepened and beautification has been done in consultation with state government.
(x)	The proponent shall sponsor a detailed study regarding water availability in Mahanadi River for all competing sources	Complied. Water allocation is from Mahanadi River and maintained by WRD, Chhattisgarh. Raipur TPP has

Sl. No.	Conditions of EC	Compliance Status
	such as drinking, agriculture, industrial, minimum flow of water in the river during the lean season etc. through institutions like IIT, Delhi/IIT Roorkee. The draft terms of reference shall be submitted within three months which shall be finalized by the Expert Appraisal Committee. The preliminary report on the above study shall be submitted within one year.	no role in regulating the water flow downstream & distribution
(xi)	The project proponent shall undertake proactive water harvesting measures and water storage for a larger period not less than 30 days storage shall be developed. The rainwater harvesting system shall be put in place before commissioning of the plant. Central Groundwater Authority. Board shall be consulted for finalization of appropriate rainwater harvesting technology design within a period of three months from the date of this clearance and details shall be furnished. The design of rainwater harvesting shall comprise of rainwater collection from the built up and open area in the plant premises. Action plan and road map for implementation shall be submitted to the Ministry within six months.	Complied. Rainwater harvesting pond established within Plant premises of Raipur TPP and photographs of the same is enclosed as **Annexure III.**
(xii)	Hydrogeology in and around the project area shall be reviewed annually from an institute. organization of repute to assess impact of surface water and ground regime (especially around ash dyke). In case and deterioration is observed specific mitigation measures shall be undertaken and reports. data of water quality monitored regularly and maintained shall be submitted to the Regional Office of the Ministry.	Complied. The Hydrogeological Investigation Report for FY 2022-23 has been carried out. Copy of the report is enclosed as **Annexure IV.**
(xiii)	No ground water shall be extracted for use in operation of the power plant even in lean season.	Being Complied. Ground water is not used for operation of plant.
(xiv)	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.	Complied. No water bodies have been disturbed during construction activity & operational activity of the plant.
(xv)	Water requirement shall be optimized to around 32 MCM and shall accordingly	Complied. Water requirement is being restricted to 25 MCM. COC is being maintained more than 5.0.

Sl. No.	Conditions of EC	Compliance Status
	adopt higher COC of at least not less than 5.0.	
(xvi)	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.	Complied. Raipur TPP has revisited and optimized water requirements by reusing and recycling approaches, the water allotment has been reduced from 37 to 25 MCM per annum by Water Resource Department, Government of Chhattisgarh.
(xvii)	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 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	Complied. Six nos. piezometers constructed around periphery of the ash pond for ground water monitoring. Seasonal monitoring of ground water level and quality is being done and monitoring data is being submitted to the MOEF&CC, CPCB & CECB regularly. The ground water analysis data is enclosed as **Annexure II**.
(xviii)	Monitoring surface water quality in the region 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.	Complied. Seasonal monitoring of Surface water is being done. The monitored data is being submitted to MOEF&CC, CPCB & CECB regularly. The surface water analysis data is enclosed as **Annexure II.**
(xix)	Additional soil for levelling 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. Excavated Soil being utilized within the project site to the extent possible.
(xx)	The project proponent shall undertake measures and ensure that no fugitive fly ash emissions take place at any point of time.	Complied. All the preventive measures have been ensured to mitigate fugitive emission from fly ash. List of Pollution Control Equipment/Devices installed to restrict fugitive as emission within prescribed limits is enclosed as **Annexure V.**
(xxi)	Utilization of 100% Fly Ash generated shall be made from 4th year of operation. Status of implementation shall be reported to the Regional Office of the Ministry from time to time.	Complied. Fly ash is being supplied to nearest cement industries and brick manufacturer Fly Ash generation and utilization Status is attached as **Annexure VI.**
(xxii)	Fly ash shall be collected in dry form and storage facility (silos) shall be	Being Complied.

Sl. No.	Conditions of EC	Compliance Status
	provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry form. Mercury and other 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.	– Fly ash is being collected in dry form and unutilized fly ash is being disposed in dedicated ash storage ponds. – As per MoEF&CC Office Memorandum dated 28th August 2019, utilization of fly ash in low lying areas has been permitted and the existing condition in Environmental Clearance may stand replaced, accordingly organization has started utilization of fly ash in low lying areas and land reclamation. – Mercury and heavy metals are being monitored in bottom ash. No effluent is emanated from ash pond.
(xxiii)	Ash pond shall be lined with HDPE/LDPE lining or any other suitable impermeable media such that no leachate takes place at any point of time. Adequate safety measures shall also be implemented to protect the ash dyke from getting breached.	Complied. Ash ponds is constructed with LDPE/HDPE & in the way that no leachate takes place any point of time.
(xxiv)	For disposal of Bottom Ash in abandoned mines (if proposed to be undertaken) shall be done after obtaining due permission from DGMS and after ensuring that the bottom and sides of the mined-out areas are adequately lined with clay before Bottom Ash is filled up. The project proponent shall inform the State Pollution Control Board well in advance before undertaking the activity.	Noted. Compliance assured.
(xxv)	Green Belt consisting of 3 tiers of plantations of native species around plant and at least 75 m width shall be raised. Tree density shall not less than 2500 per ha with survival rate not less than 80 %.	Complied. Plantation / Greenbelt development is being developed as per guidelines & in consultation with forest department for local species. Greenbelt Report is enclosed as **Annexure VII.**
(xxvi)	At least three 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 co-ordination with the district administration.	Being complied. The Company undertakes various CSR activities as per framework of CSR Rules under the Companies Act. Community services in three nearby villages namely Raikheda, Chicholi & Gaitera is conducted with focus and Sontara, Gaurkheda and Murra village area also covered. The outreach is also expanded to other nearby villages namely Khamariya, Konari, Tulsi, Tarashiv, Bartori, Chatod and Samoda. The thematic area of work in villages is improving quality of education, access of health care and sanitation, empowerment and livelihood thought SHGs, individual income

Sl. No.	Conditions of EC	Compliance Status
		generation & community vocational training centre and community development. CSR Progress Report with details is enclosed as **Annexure VIII.**
(xxvii)	The project proponent shall also adequately contribute in the development of the neighbouring villages. Special package with implementation schedule for providing potable drinking water supply in the nearby villages and schools shall be undertaken in a time bound manner.	Being complied. The Company is undertaking CSR activities within 10 km radius area with focus on project affected and Railway siding villages namely Sontara, Gaurkheda, Khamariya, Konari Murra, Tulsi, Tarashiv, Bartori, Chatod located on western and northern boundary of the proposed plant. The development work in these villages is implemented in planned and time bound manner.
(xxviii)	A time bound implementation of the CSR shall be formulated within six months and submitted to the Ministry. While identifying CSR activities it shall be ensured that need based assessment for the nearby villages within study area shall be conducted 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 shall be undertaken. Development of fodder farm, fruit bearing orchards, vocational training etc. can form a part of such programme. Company shall provide separate budget for community development activities and income generating programmes. Vocational training programme for possible self-employment and jobs shall be imparted to identify villagers free of cost.	Being complied. CSR Plan for the villages is made as per local need and CSR activities are identified by social work professionals employed exclusively for CSR through the company in consultation with communities and their representatives. Poorest of the poor families are identified basing village Panchayat's statistics and special interventions have been planned for their upliftment. Separate budget has been allocated for community development activities with income generation activities. Vocational training is being provided to youth for self-employment free of cost. We have started Pratibha Centre for local youths. To increase access of youth to educational and employment opportunities through helping them become aware of and to prepare for these. To prepare youth to become self-reliant through education and employment opportunities at Pratibha centers. CSR Progress Report with details is enclosed as **Annexure VIII.**
(xxix)	An amount of Rs 33.16 Crores shall be earmarked as one-time capital cost for CSR programme as committed by the project proponent. Subsequently a recurring expenditure of Rs 6.63 Crores per annum shall be earmarked as recurring expenditure for CSR activities. Details of the activities to be undertaken shall be submitted within six months along with road map for implementation.	Time bound implementation of CSR activities have been carried out & CSR budget has earmarked for CSR activities in nearby project villages. CSR Progress Report with details is enclosed as **Annexure VIII.**
(xxx)	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	Complied. Social Audit has been carried out by Indian Institute

Sl. No.	Conditions of EC	Compliance Status
	institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time	of Social Welfare and Business Management, Kolkata. The same is submitted to ministry along with previous compliance report.
	General Conditions:	
(i)	The treated effluents conforming to the prescribed standards only shall be re-circulated and reused within the plant. Arrangements shall be made that effluents and storm water do not get mixed.	Complied. The treated effluents conforming to the prescribed standards are being re-circulated and reused within the plant. Plant layout has been designed so that effluents and storm water do not get mixed. The analysis report is enclosed as **Annexure II.**
(ii)	A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt plantation.	Complied. A well-equipped Sewage Treatment Plant is installed and commissioned within premises.
(iii)	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 location plant layout shall be submitted to the Ministry as well as to the Regional Office of the ministry.	Complied. Drawings & other details are already submitted to the MoEFCC, Delhi as well as Regional Office of MoEFCC.
(iv)	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.	Complied. Approval for storage facilities for auxiliary liquid fuel such as LDO/ HFO/LSHS has been obtained from Department of Explosives, Nagpur and the same has been submitted. Sulphur content in the liquid fuel well within 0.5%. Disaster Management Plan also is in place.
(v)	First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.	Complied. Raipur Thermal Power Plant is fully operational. All temporary structures constructed during Project phase for facilitating contract workers are now removed.
(vi)	Noise levels emanating for turbines shall be so controlled such that the noise in the work zone shall be limited to 85 dBA from the source. For people working in the high noise area, requisite personal protective equipment like earplugs/earmuffs 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	Complied. Engineering control for noise such as acoustic enclosure, silencer have been installed in the turbine. Other than engineering controls, PPEs like earplugs, earmuffs etc. are also provided to workers in high noise area. Noise level monitoring report is enclosed as **Annexure II.**

Sl. No.	Conditions of EC	Compliance Status
	treatment for any hearing loss including shifting to non-noisy, less noisy areas.	
(vii)	Regular monitoring of ambient air ground level concentration of SO_2, NOx, $PM_{2.5}$ & PM_{10} 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.	Complied. We installed three nos. of stationary AAQMS station at periphery of the plant for Ambient air quality monitoring. Environment Monitoring Data as part of the six-monthly compliance is being submitted to MoEFCC and is also made available at company's website. **https://www.adanipower.com/Downloads** The ambient air quality monitoring report is enclosed as **Annexure II.**
(viii)	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 completion of the project.	Complied during construction phase.
(ix)	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 Quality concerned within seven days from the date of this clearance letter, informing that the project has been accorded environmental clearance an 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 at http:..envfor.nic.in	Complied. Copies of the advertisement published in local daily Newspapers after obtaining EC and details of the same already submitted to ministry with previous compliance reports.
(x)	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad, Municipal Corporation, urban local Body and the Local NGO, if any, from whom suggestions, representations. If any, receive while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.	Complied. The environment clearance letter is available at website of Adani Power. https://www.adanipower.com/Downloads
(xi)	An Environmental Cell comprising of at least one expert in environmental science. engineering, occupational health and social scientist, shall be created at the project site	Complied. We have well-established Environment Management Dept. headed by a competent experienced Manager with relevant academic

Sl. No.	Conditions of EC	Compliance Status
	itself and shall be headed by an officer of appropriate superiority and qualification it shall be ensured that the Head the Cell shall directly report to the head of the organization and he shall be held responsible for implementation of environmental regulations and social impact improvement, mitigation measures.	qualification supported by Environmental Engineers, Chemist & Horticulturist.
(xii)	The proponent shall upload the status of compliance of the stipulated environmental clearance 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 display at a convenient location near the main gate of the company in the public domain.	Complied. Display board has been installed at main gate of TPP. Recent Environment compliance report will be uploaded in company website. www.adanipower.com/Downloads
(xiii)	The environment statement for each financial year ending 31 March in Form- 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 at the Ministry.	Complied. The Environmental Statement Report for the period FY: 2021-22 in prescribed format (Form V) has been submitted to CECB, Raipur vide Letter No, REL/ENV/CECB/22-23/202 dated 10th September 2022.
(xiv)	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 by e-mail to the Regional Office, Ministry of Environment and Forests.	Being Complied. Six monthly compliances on the Environmental Clearance granted by MoEF is being submitted to MoEF&CC, CPCB & CECB regularly. Compliance status updated on company's website. www.adanipower.com/Downloads Compliance report for the period of April 2022 to September 2022 has been already submitted to your good office vide letter no.: APL/REL/TPP/EMD/MoEFCC/EC/218/11/22, dated: 28.11.2022.

Sl. No.	Conditions of EC	Compliance Status
(xv)	Regional Office of the Ministry of Environment, forest and climate change will monitor the implementation of the stipulated conditions. 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 update the same from time to time at least six-monthly basis Criteria pollutants levels including NOX (from stack & ambient air) shall be displayed at the main gate of the power plant.	Complied. EIA & EMP report with all necessary document & information are already submitted to RO, MoEF&CC and CECB.
(xvi)	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.	Complied. Separate fund has been already allocated for environmental protection
(xvii)	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 date of start of land development work a commissioning of plant.	Complied. Financial Closure granted on 10th Dec'10. The Project development started after receiving Consent to establish dated 13th Jun'11.
(xviii)	Full cooperation shall be extended to the Scientists/Officers from the Ministry Regional Office of the Ministry at Bangalore/CPCB/SPCB who would be monitoring the compliance of environmental status.	Noted. Full co-operation will be extended.
Conditions of Amended EC dated 13.06.2013		
(v)	High Efficiency Electrostatic Precipitators (ESPs) shall be installed and it shall be ensured that particulate emission does not exceed 50 mg/Nm3"	Complied. High efficiency Electrostatic Precipitators (ESP) has been installed to meet revised emission standard of <50 mg/ Nm^3 for PM. The monitoring report for stack emission is enclosed as **Annexure II.**
(xxxi)	The GCV of the imported coal from South Africa shall not be less than 4911 Kcal/kg	Being Complied.

Sl. No.	Conditions of EC	Compliance Status
	and the ash and sulphur contents shall not exceed the limits stated under: Ash contents: 33.7% Sulphur contents: 0.7%	As per the Office Memorandum, MoEFCC dated; 11.11.2020, all the Thermal Power Plants (including Captive Power Plants) having Environmental Clearance can **change the Coal Source** (from imported to domestic, domestic to domestic, and domestic to imported) including Lignite, directly through e-auctions/short term linkage/long term linkage/other linkage options of Ministry of Coal or any organization recognized for allotting coal linkages, **without seeking the amendment in Environmental Clearance.**
(xxxii)	A long-term study of radio activity and heavy metals contents on coal to be used shall be carried out through a reputed institute. Thereafter mechanism for an in-built continuous monitoring for radio activity and heavy metals in coal and fly ash (including bottom ash) shall be put in place.	Complied Radioactivity (U^{238} & Th^{232}) analysis in coal and ash is being carried out by Board of Radiation and Isotope Technology (BRIT) Government of India, copy of Radioactivity Test Certificate is enclosed as **Annexure IX.**
(xxxiii)	Continuous monitoring for heavy metals in and around the ash pond area shall be carried out through reputed institutes like IIT, Kanpur and records/ data maintained.	Complied. Quarterly monitoring of heavy metal and other physicochemical parameters in ground water around ash pond area is being carried out regularly by 3rd party NABL approved Environmental Laboratory. The ground water analysis report is enclosed as **Annexure II.**
Conditions of Amended EC Extension dated 18.11.2014		
(i)	The coal transportation by road shall be through mechanically covered trucks to the extent feasible, else, shall be through tarpaulin covered trucks.	Complied. The transportation through rail is being done.
(ii)	Avenue plantation of 2/3 rows all along the road shall be carried out by the project proponent at its own expenses in consultation with the State Government Authorities.	Complied. Avenue plantation all along the road has already been done inside the plant premises.
(iii)	Periodic maintenance of the road shall be done by the project proponent at its own expenses and shall facilitate the traffic control on the road in consultation with the State Government Authorities.	Complied. The coal transportation through rail has been started. Avenue plantation all along the road has already been done inside the plant premises.
(iv)	The PP shall advertise in the newspaper and place on the website, the amendment issued by the Ministry for public information.	Complied. Advertisement has been published in local daily News Papers. & details submitted with previous compliance report. Original Env. Clearance along with its amendment from time to time has been kept in public domain at the website of holding company https://www.adanipower.com/Downloads
(xxxiv)	Harnessing solar power within the premises of the plant particularly at available	Complied.

Sl. No.	Conditions of EC	Compliance Status
	rooftops shall be undertaken and status of implementation shall be submitted periodically to the Regional Office of the Ministry.	The feasibility study has been done & the work is awarded to M/s Mundra Solar PV Limited (MSPVL).
(xxxv)	Green belt shall also be developed around the Ash Pond over and above the Green Belt around the plant boundary.	Complied. Greenbelt development report is enclosed as **Annexure VII.**
(xxxvi)	The project proponent shall formulate a well-laid Corporate Environment Policy, identify, and designate responsible officers at all levels of its hierarchy for ensuring adherence to the policy and compliance with the conditions stipulated in this clearance letter and other applicable environmental laws and regulations.	Complied. Raipur TPP has implemented ISO 14001:2015 under Integrated Management System consist of Environment, Health & Safety, Quality and Energy Management Systems. We have formulated a corporate policy as per the requirement of Integrated Management System (IMS), Biodiversity Conservation Policy has already been framed and incorporated in existing IMS policy.
Conditions of Amended EC Extension dated 04.02.2015		
(i)	Sulphur and ash contents in the coal to be used in the project shall not exceed 0.7 % and 34% respectively for at any given time. In case of variation of coal quality at any point of time, fresh reference shall be made to the Ministry for suitable amendments to environmental clearance condition wherever necessary.	Being Complied.
(ii)	The PP shall advertise in the local newspapers and place on the website, the proposed amendment for public information.	Complied. Advertisement has been published in local daily News Papers. & details submitted with previous compliance report.
Conditions of Amended EC Extension dated 09.12.2015		
(i)	The Sulphur and ash contents in the coal shall not exceed 0.7 % and 34% respectively. In case of variation of coal quality at any point of time, fresh reference shall be made to the Ministry for consideration.	Being Complied. As per the Office Memorandum, MoEFCC dated; 11.11.2020, all the Thermal Power Plants (including Captive Power Plants) having Environmental Clearance can **change the Coal Source** (from imported to domestic, domestic to domestic, and domestic to imported) including Lignite, directly through e-auctions/short term linkage/long term linkage/other linkage options of Ministry of Coal or any organization recognized for allotting coal linkages, **without seeking the amendment in Environmental Clearance.**
(ii)	The PP shall advertise in the local leading newspapers and place on the website, the proposed amendment of EC (after receipt from Ministry) for change in source of coal for public information.	Complied.
EC amendment – MoEF&CC notification vide letter number S.O. 1561 (E) dated 21st May, 2020		

Sl. No.	Conditions of EC	Compliance Status
Sl. No.	**Condition of Notification**	**Compliance Status**
1)	Setting up technology solution for emission norms i) Compliance of specified emission norms for Particulate Matter, as per extent notifications and instructions of Central Pollution Control Board, issued from time to time. ii) In case of washeries, middling and rejects to be utilized in FBC (Fluidised Bed Combustion) technology based thermal power plant. Washery to have linkage for middling and rejects in Fluidised Bed Combustion plants.	Noted & No FBC Technology Boiler i) Technology solutions are being implemented for mitigating fugitive emissions of Particulate Matter. • The Dust Extraction (DE) type dust control system is provided for controlling fugitive dust emissions from dust generation points of coal handling system. • Bag filter type dust extraction system with reversable pulse jet cleaning arrangement with fan, bag filter and stacks are provided at coal crusher house. • Different types of dust suppression system and water sprinkling arrangements are already installed at various probable fugitive dust generation points. • Plain water dust suppression for wagon tippler complex. • Plain water dust suppression for Coal stockpile. • Pre-wetting system for Wagon Tripler. • Dry Fog dust suppression for all Transfer points. **ii) Super Thermal Power Plant.**
2)	Management of Ash Ponds i) The thermal power plants shall comply with conditions, as notified in the Fly Ash notifications issued from time to time, without being entitled to additional capacity of fly ash pond (for existing power generation capacity) on ground of switching from washed coal to unwashed coal. ii) Appropriate Technology solutions shall be applied to optimise water consumption for Ash management. iii) The segregation of ash may be done at the Electro- Static Precipitator stage, if required, based on site specific conditions, to ensure maximum utilisation of fly ash iv) Subject to 2(i) above, the thermal power plants to dispose fly ash in abandoned or working mines (to be facilitated by mine owner) with environmental safeguards.	Noted & being complied. i. Fly ash is being supplied to cement industries and brick manufacture. Fly Ash generation and utilization is regularly submitted to MoEF&CC, CPCB, CEA & CECB. Please refer to **Annexure VI.** ii. Water requirement is being restricted to 25 MCM. Optimization of water has been incorporated as part of plant design and COC is being maintained more than 5.0 iii. Noted & being complied to meet 100% utilization of fly ash. iv. Noted & will be complied as & when fly ash is disposed in abandoned or working mines.

Sl. No.	Conditions of EC	Compliance Status
3)	Transportation i) Coal transportation may be undertaken by covered Railway wagon (railway wagons covered by tarpaulin or other means) and/or covered conveyor beyond the mine area. However, till such time enabling Rail transport/conveyer beyond infrastructure is not available, road transportation may be undertaken in trucks, covered by tarpaulin or other means. ii) It shall be ensured by the thermal power plant that a) Rail siding facility or conveyer facility is set up at or near the power plant, for transportation by rail or conveyor; and b) If transportation by rail or conveyor facility is not available, ensure that the coal is transported out from the Delivery Point of the respective mine in covered trucks (by tarpaulin or other means), or any mechanized closed trucks by roads.	i) Noted & being complied. Rail siding facility has been made operational & coal is being transported through covered rail wagons ii) a) Rail siding facility has been made operational & coal is being transported through covered rail wagons b) Not applicable as Rail siding facility has been made operational & coal is being transported through covered rail wagons

F. No. J.13012/62/2008-IA.II (T)
Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)

2nd Floor, Vayu Block
Indira Paryavaran Bhawan
Aliganj, Jor Bagh Road,
New Delhi – 110 003

Dated: 24th April, 2023

To,

M/s Adani Power Ltd.
Adani House, Nr Mithakhali Circle
Navrangpura, Ahmedabad- 380009 (Gujarat)

Sub: 2x685 MW Super Critical Imported Coal Based Thermal Power Plant at villages Raikheda, Gaitara and Chicholi, in Tilda Block, in Raipur Distt., in Chhattisgarh - Transfer of Environmental Clearance from M/s Raipur Energen Limited to M/s Adani Power Ltd - reg.

Sir,

This has reference to your online proposal no. IA/CG/THE/297957/2023 dated 25th February, 2023 regarding transfer of the environmental clearance for the above said project from M/s Raipur Energen Limited to M/s Adani Power Ltd.

2. The Ministry had earlier issued environmental clearance for the project 2x685 MW Super Critical Imported Coal Based Thermal Power Plant at villages Raikheda, Gaitara and Chicholi, in Tilda Block, in Raipur Distt., in Chhattisgarh in favour of M/s GMR Energy Ltd vide letter dated 9th May, 2011, followed by amendment in EC dated 13th June, 2013, 18th November, 2014, 04th February, 2015 and 9th December, 2015. The said EC was transferred by the Ministry vide Office Order dated 5th November, 2019 in the name of M/s Raipur Energen Limited from M/s GMR Energy Ltd.

3. M/s Adani Power Ltd has submitted application for transfer of environmental clearance and informed that the Hon'ble NCLT vide its order dated 08th February, 2023, sanctioning the scheme of amalgamation of M/s Raipur Energen Limited with M/s Adani Power Ltd, and thus necessitating transfer of all requisite approvals in the name of M/s Adani Power Ltd. Also, it has informed that M/s Raipur Energen Limited is wholly owned subsidiary company of Adani Power Ltd.

4. M/s Adani Power Ltd, has submitted an affidavit to abide by the terms and conditions stipulated in the environment clearance dated 9th May, 2011, followed by amendment in EC dated 13th June, 2013, 18th November, 2014, 4th February, 2015 and 9th December, 2015 issued in the name of M/s Raipur Energen Limited.

5. As per the relevant provisions of the EIA Notification, 2006, as amended, the environmental clearance granted to the project vide letter

dated 9th May, 2011 for 2x685 MW Super Critical Imported Coal Based Thermal Power Plant followed by amendment in EC dated 13th June, 2013, 18th November, 2014, 4th February, 2015 and 9th December, 2015 at villages Raikheda, Gaitara and Chicholi, in Tilda Block, in Raipur Distt., in Chhattisgarh are hereby transferred from M/s Raipur Energen Limited to M/s Adani Power Ltd on the same terms and conditions under which prior environmental clearance was initially granted.

6. This issues with approval of the competent authority.

24.4.2023

(Yogendra Pal Singh)
Scientist 'E'
Tele: 011-20819364
Email Id: yogendra78@nic.in

Copy to: -

1. The Secretary, Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi - 110 001.
2. The Chairman, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi – 110 066.
3. The Member Secretary, Central Pollution Control Board, Parivesh Bhawan, CBD cum-Office Complex, East Arjun Nagar, Delhi – 110 032.
4. The Deputy Director General of Forests (C), Integrated Regional Office, Raipur, Ground Floor, Aranya Bhawan, North Block, Sector- 19, Naya Raipur, Atal Nagar, Chhattisgarh – 492 002.
5. The Principal Secretary Forest and Climate Change, Mahanadi Bhawan, Nawa Raipur, Atal Nagar, Raipur (CG)
6. The Member Secretary, Chhattisgarh Environment Conservation Board, Paryavas Bhawan, North Block Sector-19, Atal Nagar Dist – Raipur (C.G.) – 492 002.
7. Guard file/Monitoring file.
8. Website of MoEF&CC.

24.4.2023

(Yogendra Pal Singh)
Scientist 'E'

Annexure - II

ENVIRONMENTAL MONITORING REPORT

Submitted To:

M/s Raipur Energen Limited
(Formerly GMR Chhattisgarh Energy Ltd.)
Village- Raikheda, Block- Tilda,
District- Raipur, Chhattisgarh, India.
Pin Code - 493225

Study Conducted By:

M/s Vardan EnviroLab
Plot No. 82 A, Sector-5, IMT Manesar, Gurugram,
Haryana, India - 122051
E-mail: projects.env@vardan.co.in

(Recognized By NABL & MOEF&CC, Government of India)

PREFACE

The growing concern for Environmental protection and the passing of various Environmental Legislations have increased the responsibilities of Ministry of Environment, Forests & Climate Change, Pollution Control Boards in many folds. Besides enforcing the various Environmental Legislations MoEF&CC, CPCB & SPCB strive to propagate the necessity awareness regarding the various Legal Provisions and Environmental Protection measures in the country.

Electric Power scenario has occupied a significant place in the development program of the country. Development and Environment can neither be separated nor ignored. In fact, they are complimentary to each other. These issues have become a concern of the community, particularly the Environment Impact due to Industries in the developing countries.

However, the prerequisite for sustainable development is judicious planning of Environmental Status, likely impacts of the approach adopted on the Environment including inhabitants of the locality, availability of the Eco-friendly Technology, Emerging Waste Disposal and Waste Utilization Processes, Techniques of Land Reclamation for the Restoration of aesthetic beauty and soon.

M/s Raipur Energen Limited, (Formerly GMR Chhattisgarh Energy Ltd.), Village- Raikheda, Block-Tilda, District-Raipur, Chhattisgarh, India, has engaged **M/s Vardan EnviroLab, Gurugram, Haryana** to provide Environmental Services in respect of Ambient Air Quality Monitoring, Ambient Noise Level Monitoring, Sampling and Analysis of Ground Water Quality, Surface Water Quality, Treated Effluent Sewage, Effluent Water from STP & ETP, Soil & Stack Emission Monitoring for M/s **Raipur Energen Limited, Raipur, Chhattisgarh**, as per guidelines of MoEF&CC and CPCB Gazette Notification.

M/s Vardan EnviroLab, Gurugram, Haryana has deployed entirely its own personnel, facilities and expertise for doing this service. Sampling / Monitoring Stations were identified by the Environmental Officer of M/s Raipur Energen Limited, Raipur. The samples were analyzed partly at site and partly at our MoEF&CC Recognized Laboratory situated at Gurugram, Haryana.

This report presents the data generated for the period from 20th March 2023 to 28th March 2023, i.e. **for Fourth Quarter** which includes Sampling Locations, Methodology, Testing Procedure and Compilation for the Environmental Parameters i.e. Air, Noise, Water, Soil & Stack with a view to evaluate the impact due to the Thermal Power Plant activities.

During the course of our operations for the above task, the Staff and Management of M/s Raipur Energen Limited, were extremely co-operative. We are grateful to them for their invaluable support and assistance rendered to us during the course of the Sampling and Monitoring.

Date: 5/5/2023

Authorised Signatory

INDEX

Chapter – 1.0

INTRODUCTION

M/s Raipur Energen Limited, a subsidiary of Adani Power, is a power generation company based at Raipur in the State of Chhattisgarh. M/s Raipur Energen Limited has commissioned its Thermal Power Plant 1370 MW (2x685 MW) Unit at Village- Raikheda, Block -Tilda, District- Raipur, Chhattisgarh, India.

M/s Raipur Energen Limited is also committed towards the Environment and the Community it operates in. It has successfully implemented several Community Welfare Schemes in the field of Livelihood, Infrastructure, Community Health and Education which has so far benefited over 60,000 people from close to 75 Villages.

Figure No.1 M/s Raipur Energen Limited

Chapter – 2.0

PROJECT PROFILE

2.1 Topography & Drainage:-

Topography of this area is generally undulating. The area is drained by Raikheda Talab approximately 2.5 km. away from plant in SW direction and Bengoli Dam approximately 2.0 km. away from Plant in SW direction. Mura Talab approximately 5.0 km. away from plant in South direction, Chicholi Talab approximately 2.0 km. away from Plant in East direction.

2.2 Location:-

Plant is bounded by Northern Latitudes of 21^0 26' 23" to 21^0 27' 48" and Eastern Longitude of 81^0 50'34.6" to $81^0$52'08.5". This area falls in the survey of India top sheet no. 64 G/14, 64 G/15in parts(1:50000 Scale) The location of the Plant area is shown in **Fig. No.2**

2.3 Climate:-

The climate of the area is Sub-tropical type. It is in the zone of humid tropic climate where Temperature and Humidity of air are very high. The temperature varies from the Minimum - Maximum Temperature range between 31°C - 42°C in Summer, and 8°C - 25°C in Winter. The Humidity varies from 35 % to 82 %. The Annual Average Rainfall in the area is about 1300 mm.

2.4 Communication:-

The nearest Railway Station is Tilda, which is at a distance of 14 km. towards West direction. The area is well connected with S.H. No. 9. Nearest Airport is Raipur 32 km. in SW direction. Nearest Village is Raikheda 1.5 km. in South direction and nearest Town is Raipur 31 km. in SW direction.

2.5 Location Map:-

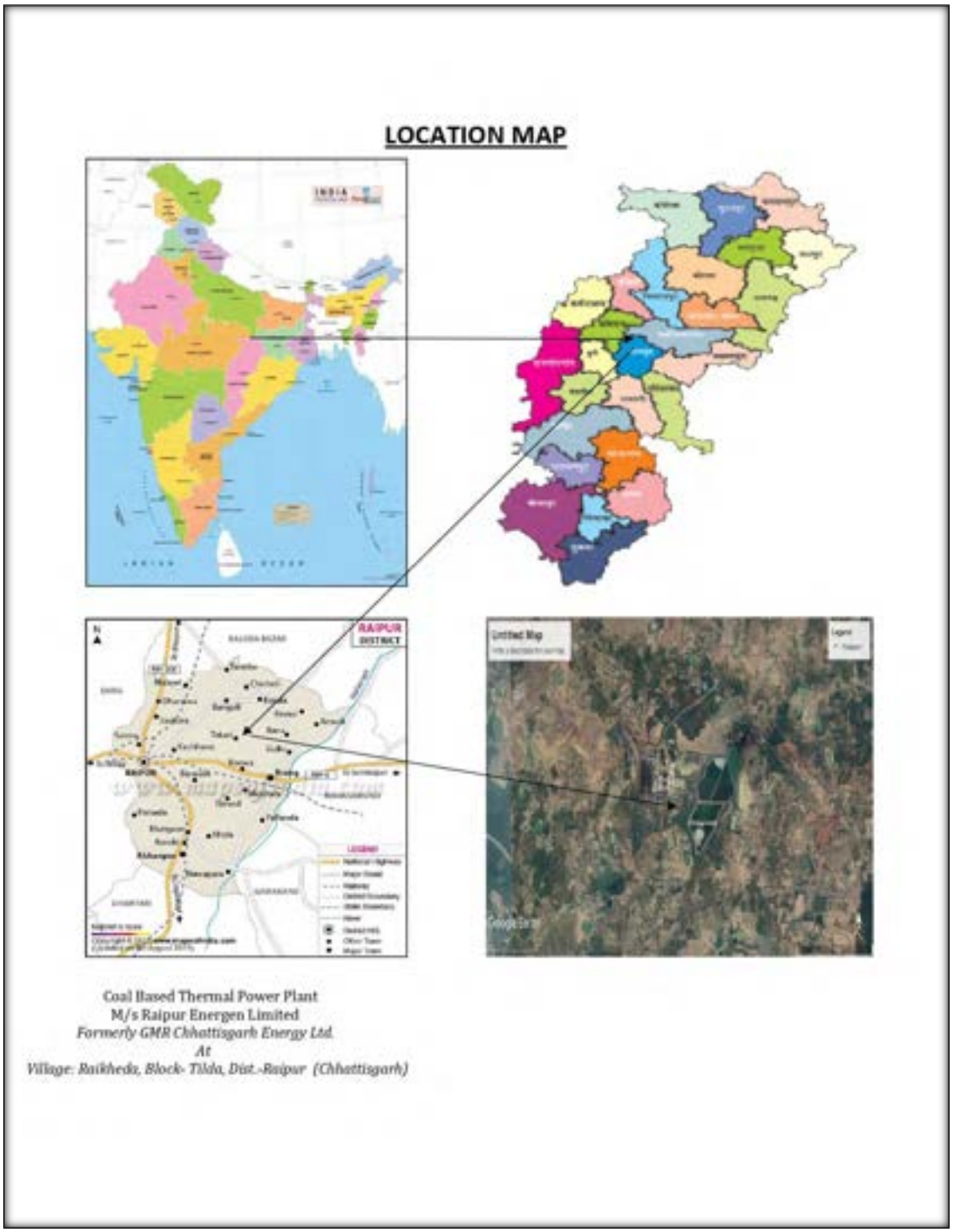


Figure No. 2. Location Map

Chapter – 3.0

SCOPE OF STUDY AND METHODOLOGY

3.1 Scope of Study:-

The scope of study includes Environmental Services in respect of Ambient Air Quality Monitoring, Ambient Noise Level Monitoring & Sampling and Analysis of Ground Water Quality, Surface Water Quality, Treated Effluent Sewage, Effluent Water from ETP & STP Plant, Soil and Stack Emission Monitoring.

3.2 Methodology:-

As mentioned in the scope of work covering the various Environmental Components Monitoring and Sampling and its Analysis was carried out on the basis of guidelines of Ministry of Environment, Forest & Climate Control of Government of India & Chhattisgarh State Pollution Control Board. Sampling procedure method reference and Analysis procedure method reference are mentioned in monitoring reports.

3.2.1 Ambient Air Quality Monitoring:-

The Ambient Air Quality has been carried out at various sources of Air Pollution surrounding and in the Plant. The prime objective of the Ambient Air Quality Monitoring is to access the existing air quality of the area.

The Ambient Air Quality Monitoring was carried out for 24 Hours at each Station. At all Stations PM_{10}, $PM_{2.5,}$ NO_2, SO_2, CO, C_6H_6, $NH_{3,}$ $O_{3,}$ Pb, As, Ni, BaP, TSPM and Mercury were monitored. All the samples collected and analyzed for Quantitative Analysis of various Pollutants. The Ambient Air Quality sampling locations were identified by the Environmental Officer of M/s Raipur Energen Limited.

3.2.2 Ambient Noise Environment:-

Sound Level Meter was used to know the sound levels generated due to plant activities at different locations. The measurements were taken for Equivalent sound level over a time period for Day and Night Time which is expressed in dB (A).

3.2.3 Ground, Surface & Waste Water Environment:-

The Ground Water Samples, Surface Water Samples were collected from selected locations in two liter sterilized plastic cans. These samples were analyzed as per IS: 10500-2012. The Domestic Effluent and Industrial Effluent Samples were collected and analyzed for Parameters: pH, Total Suspended Solids, Biochemical Oxygen Demand, Chemical Oxygen Demand and Oil & Grease.

3.2.4 Soil Environment:-

The Soil Samples were collected from selected locations. These samples were analyzed for Physico-Chemical Parameters including Heavy Metals.

3.2.5 Stack Emission Monitoring:-

The Stack Samples were collected from TPP (Unit-1 & Unit-2).

Chapter – 4.0

SAMPLING LOCATION MAP AND ANALYSIS REPORTS

4.1 Ambient Air Quality Monitoring:-

Figure No.3 Plan Showing Ambient Air Quality Location Map

Ambient Air Quality Monitoring Locations

Location Code:-

A1- Village- Chicholi (Near Sunil Joshi House)
A2- Jitendra Banjaris House (Raikheda)
A3- Village- Gaitara
A4- Near Petrol Pump (Mura Village)
A5- Near Old Project Doosan
A6- Near STP Area
A7- Near Raw Water Area

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/A/01
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.
Sample Description : Ambient Air

Report No. : VEL/A/2303311001
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001285F

General Information

Sampling Location	: Village- Chicholi (Near Sunil Joshi's House)
Sample Collected By	: VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	: RDS/FPS
Instrument Code	: VEL/RDS/FPS/04
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 20/03/2023 To 21/03/2023
Time of Monitoring	: 11:40 AM to 11:40 AM
Ambient Temperature (°C)	: Min.19°C, Max.34°C
Surrounding Activity	: Human & Vehicular Activities
Scope of Monitoring	: Regulatory Requirement
Sampling & Analysis Protocol	: IS: 5182 & CPCB Guidlines
Sampling Duration	: 24.0 Hours
Parameter Required	: As per work order

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter as (PM2.5)	IS 5182 (P-24)	31.72	µg/m3	60
2	Particulate Matter as (PM10)	IS 5182 (P-23)	65.08	µg/m3	100
3	Total Suspended Particulate Matter	IS 5182 (P-4)	182.72	µg/m3	Not Specified
4	Nitrogen Dioxide as (NO2)	IS 5182 (P-6)	20.42	µg/m3	80
5	Sulphur Dioxide as (SO2)	IS 5182 (P-2)	10.94	µg/m3	80
6	#Ozone as (O3)	IS 5182 (P-9)	23.46	µg/m3	180
7	Benzene as (C6H6)	IS 5182 (P-11)	BLQ(LOQ-0.5)	µg/m3	5
8	Benzo(a)pyrene as (BaP)	IS 5182 (P-12)	BLQ(LOQ-0.5)	ng/m3	1
9	Arsenic as (As)	VEL/ENV/STP/110, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-0.1)	ng/m3	6
10	Lead as (Pb)	IS 5182 (P-22)	BLQ(LOQ-0.1)	µg/m3	1
11	Mercury as (Hg)	VEL/ENV/STP/129, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-1.0)	ng/m3	Not Specified

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/A/01 Report No. : VEL/A/2303311001

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
12	Nickel as (Ni)	IS 5182 (P-26)	BLQ(LOQ-5.0)	ng/m3	20
13	#Carbon Monoxide (by NDIR)	IS 5182 (P-10)	0.64	mg/m3	4

#-indicates 1 hour monitoring of CO & Ozone

BLQ- Below Limit of Quantification, LOQ- Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/A/02
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : Ambient Air

Report No. : VEL/A/2303311002
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001286F

General Information

Sampling Location	:	Jitendra Banjari's House (Raikheda)
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	RDS/FPS
Instrument Code	:	VEL/RDS/FPS/04
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	21/03/2023 To 22/03/2023
Time of Monitoring	:	12:00 AM to 12:00 AM
Ambient Temperature (°C)	:	Min.16°C, Max.34°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS: 5182 & CPCB Guidlines
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter as (PM2.5)	IS 5182 (P-24)	30.11	µg/m3	60
2	Particulate Matter as (PM10)	IS 5182 (P-23)	61.98	µg/m3	100
3	Total Suspended Particulate Matter	IS 5182 (P-4)	174.42	µg/m3	Not Specified
4	Nitrogen Dioxide as (NO2)	IS 5182 (P-6)	16.16	µg/m3	80
5	Sulphur Dioxide as (SO2)	IS 5182 (P-2)	7.49	µg/m3	80
6	#Ozone as (O3)	IS 5182 (P-9)	18.46	µg/m3	180
7	Benzene as (C6H6)	IS 5182 (P-11)	BLQ(LOQ-0.5)	µg/m3	5
8	Benzo(a)pyrene as (BaP)	IS 5182 (P-12)	BLQ(LOQ-0.5)	ng/m3	1
9	Arsenic as (As)	VEL/ENV/STP/110, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-0.1)	ng/m3	6
10	Lead as (Pb)	IS 5182 (P-22)	BLQ(LOQ-0.1)	µg/m3	1
11	Mercury as (Hg)	VEL/ENV/STP/129, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-1.0)	ng/m3	Not Specified

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/A/02 **Report No.** : VEL/A/2303311002

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
12	Nickel as (Ni)	IS 5182 (P-26)	BLQ(LOQ-5.0)	ng/m3	20
13	#Carbon Monoxide (by NDIR)	IS 5182 (P-10)	0.65	mg/m3	4

#-indicates 1 hour monitoring of CO & Ozone

BLQ- Below Limit of Quantification, LOQ- Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/A/03
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : Ambient Air

Report No. : VEL/A/2303311003
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001287F

General Information

Sampling Location	:	Village- Gaitara
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	RDS/FPS
Instrument Code	:	VEL/RDS/FPS/04
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	22/03/2023 To 23/03/2023
Time of Monitoring	:	12:10 PM to 12:10 PM
Ambient Temperature (°C)	:	Min.19°C, Max.35.7°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS: 5182 & CPCB Guidlines
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter as (PM2.5)	IS 5182 (P-24)	33.42	µg/m3	60
2	Particulate Matter as (PM10)	IS 5182 (P-23)	64.92	µg/m3	100
3	Total Suspended Particulate Matter	IS 5182 (P-4)	181.41	µg/m3	Not Specified
4	Nitrogen Dioxide as (NO2)	IS 5182 (P-6)	17.66	µg/m3	80
5	Sulphur Dioxide as (SO2)	IS 5182 (P-2)	9.11	µg/m3	80
6	#Ozone as (O3)	IS 5182 (P-9)	15.06	µg/m3	180
7	Benzene as (C6H6)	IS 5182 (P-11)	BLQ(LOQ-0.5)	µg/m3	5
8	Benzo(a)pyrene as (BaP)	IS 5182 (P-12)	BLQ(LOQ-0.5)	ng/m3	1
9	Arsenic as (As)	VEL/ENV/STP/110, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-0.1)	ng/m3	6
10	Lead as (Pb)	IS 5182 (P-22)	BLQ(LOQ-0.1)	µg/m3	1
11	Mercury as (Hg)	VEL/ENV/STP/129, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-1.0)	ng/m3	Not Specified

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/A/03 Report No. : VEL/A/2303311003

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
12	Nickel as (Ni)	IS 5182 (P-26)	BLQ(LOQ-5.0)	ng/m3	20
13	#Carbon Monoxide (by NDIR)	IS 5182 (P-10)	0.66	mg/m3	4

#-indicates 1 hour monitoring of CO & Ozone

BLQ- Below Limit of Quantification,LOQ- Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/A/04
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : Ambient Air

Report No. : VEL/A/2303311004
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001288F

General Information

Sampling Location	:	Near Petrol Pump (Mura Village)
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	RDS/FPS
Instrument Code	:	VEL/RDS/FPS/05
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	22/03/2023 To 23/03/2023
Time of Monitoring	:	12:30 PM to 12:30 PM
Ambient Temperature (°C)	:	Min.19°C, Max.35.7°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS: 5182 & CPCB Guidlines
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter as (PM2.5)	IS 5182 (P-24)	27.42	µg/m3	60
2	Particulate Matter as (PM10)	IS 5182 (P-23)	51.88	µg/m3	100
3	Total Suspended Particulate Matter	IS 5182 (P-4)	152.11	µg/m3	Not Specified
4	Nitrogen Dioxide as (NO2)	IS 5182 (P-6)	21.17	µg/m3	80
5	Sulphur Dioxide as (SO2)	IS 5182 (P-2)	10.88	µg/m3	80
6	#Ozone as (O3)	IS 5182 (P-9)	17.42	µg/m3	180
7	Benzene as (C6H6)	IS 5182 (P-11)	BLQ(LOQ-0.5)	µg/m3	5
8	Benzo(a)pyrene as (BaP)	IS 5182 (P-12)	BLQ(LOQ-0.5)	ng/m3	1
9	Arsenic as (As)	VEL/ENV/STP/110, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-0.1)	ng/m3	6
10	Lead as (Pb)	IS 5182 (P-22)	BLQ(LOQ-0.1)	µg/m3	1
11	Mercury as (Hg)	VEL/ENV/STP/129, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-1.0)	ng/m3	Not Specified

VARDAN ENVIROLAB Dy. Technical Manager
(Checked By)

VARDAN ENVIROLAB Authorised Signatory
(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001
TC-6299

Test Report

Sample Number : VEL/A/04 Report No. : VEL/A/2303311004

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
12	Nickel as (Ni)	IS 5182 (P-26)	BLQ(LOQ-5.0)	ng/m3	20
13	#Carbon Monoxide (by NDIR)	IS 5182 (P-10)	0.62	mg/m3	4

#-indicates 1 hour monitoring of CO & Ozone

BLQ- Below Limit of Quantification, LOQ- Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/A/05
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : Ambient Air

Report No. : VEL/A/2303311005
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001289F

General Information

Sampling Location	:	Near Old Project Doosan
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	RDS/FPS
Instrument Code	:	VEL/RDS/FPS/02
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	23/03/2023 To 24/03/2023
Time of Monitoring	:	12:00 PM to 12:00 PM
Ambient Temperature (°C)	:	Min.20°C, Max.33.1°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS: 5182 & CPCB Guidlines
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter as (PM2.5)	IS 5182 (P-24)	29.76	µg/m3	60
2	Particulate Matter as (PM10)	IS 5182 (P-23)	59.07	µg/m3	100
3	Total Suspended Particulate Matter	IS 5182 (P-4)	164.82	µg/m3	Not Specified
4	Nitrogen Dioxide as (NO2)	IS 5182 (P-6)	17.42	µg/m3	80
5	Sulphur Dioxide as (SO2)	IS 5182 (P-2)	8.11	µg/m3	80
6	#Ozone as (O3)	IS 5182 (P-9)	18.07	µg/m3	180
7	Benzene as (C6H6)	IS 5182 (P-11)	BLQ(LOQ-0.5)	µg/m3	5
8	Benzo(a)pyrene as (BaP)	IS 5182 (P-12)	BLQ(LOQ-0.5)	ng/m3	1
9	Arsenic as (As)	VEL/ENV/STP/110, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-0.1)	ng/m3	6
10	Lead as (Pb)	IS 5182 (P-22)	BLQ(LOQ-0.1)	µg/m3	1
11	Mercury as (Hg)	VEL/ENV/STP/129, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-1.0)	ng/m3	Not Specified

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/A/05 Report No. : VEL/A/2303311005

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
12	Nickel as (Ni)	IS 5182 (P-26)	BLQ(LOQ-5.0)	ng/m3	20
13	#Carbon Monoxide (by NDIR)	IS 5182 (P-10)	0.53	mg/m3	4

#-indicates 1 hour monitoring of CO & Ozone

BLQ- Below Limit of Quantification,LOQ- Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/A/06
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : Ambient Air

Report No. : VEL/A/2303311006
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001290F

General Information

Sampling Location	:	Near STP Area
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	RDS/FPS
Instrument Code	:	VEL/RDS/FPS/03
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	23/03/2023 To 24/03/2023
Time of Monitoring	:	12:15 PM to 12:15 PM
Ambient Temperature (°C)	:	Min.16°C, Max.33.9°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS: 5182 & CPCB Guidlines
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter as (PM2.5)	IS 5182 (P-24)	32.42	µg/m3	60
2	Particulate Matter as (PM10)	IS 5182 (P-23)	64.11	µg/m3	100
3	Total Suspended Particulate Matter	IS 5182 (P-4)	173.11	µg/m3	Not Specified
4	Nitrogen Dioxide as (NO2)	IS 5182 (P-6)	18.07	µg/m3	80
5	Sulphur Dioxide as (SO2)	IS 5182 (P-2)	8.26	µg/m3	80
6	#Ozone as (O3)	IS 5182 (P-9)	21.72	µg/m3	180
7	Benzene as (C6H6)	IS 5182 (P-11)	BLQ(LOQ-0.5)	µg/m3	5
8	Benzo(a)pyrene as (BaP)	IS 5182 (P-12)	BLQ(LOQ-0.5)	ng/m3	1
9	Arsenic as (As)	VEL/ENV/STP/110, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-0.1)	ng/m3	6
10	Lead as (Pb)	IS 5182 (P-22)	BLQ(LOQ-0.1)	µg/m3	1
11	Mercury as (Hg)	VEL/ENV/STP/129, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-1.0)	ng/m3	Not Specified

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/A/06 Report No. : VEL/A/2303311006

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
12	Nickel as (Ni)	IS 5182 (P-26)	BLQ(LOQ-5.0)	ng/m3	20
13	#Carbon Monoxide (by NDIR)	IS 5182 (P-10)	0.55	mg/m3	4

#-indicates 1 hour monitoring of CO & Ozone

BLQ- Below Limit of Quantification,LOQ- Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/A/07
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : Ambient Air

Report No. : VEL/A/2303311007
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001291F

General Information

Sampling Location	:	Near Raw Water Area
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	RDS/FPS
Instrument Code	:	VEL/RDS/FPS/01
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	23/03/2023 To 24/03/2023
Time of Monitoring	:	12:30 PM to 12:30 PM
Ambient Temperature (°C)	:	Min.19°C, Max.34.6°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	IS: 5182 & CPCB Guidlines
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter as (PM2.5)	IS 5182 (P-24)	33.86	µg/m3	60
2	Particulate Matter as (PM10)	IS 5182 (P-23)	62.11	µg/m3	100
3	Total Suspended Particulate Matter	IS 5182 (P-4)	178.11	µg/m3	Not Specified
4	Nitrogen Dioxide as (NO2)	IS 5182 (P-6)	16.42	µg/m3	80
5	Sulphur Dioxide as (SO2)	IS 5182 (P-2)	6.98	µg/m3	80
6	#Ozone as (O3)	IS 5182 (P-9)	19.22	µg/m3	180
7	Benzene as (C6H6)	IS 5182 (P-11)	BLQ(LOQ-0.5)	µg/m3	5
8	Benzo(a)pyrene as (BaP)	IS 5182 (P-12)	BLQ(LOQ-0.5)	ng/m3	1
9	Arsenic as (As)	VEL/ENV/STP/110, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-0.1)	ng/m3	6
10	Lead as (Pb)	IS 5182 (P-22)	BLQ(LOQ-0.1)	µg/m3	1
11	Mercury as (Hg)	VEL/ENV/STP/129, Issue No.- 01, Issue date 01/11/2021	BLQ(LOQ-5.0)	ng/m3	Not Specified

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/A/07 Report No. : VEL/A/2303311007

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
12	Nickel as (Ni)	IS 5182 (P-26)	BLQ(LOQ-5.0)	ng/m3	20
13	#Carbon Monoxide (by NDIR)	IS 5182 (P-10)	0.58	mg/m3	4

#-indicates 1 hour monitoring of CO & Ozone

BLQ- Below Limit of Quantification,LOQ- Limit of Quantification.

End of Report

(Checked By)

(Approved By)

4.2 Ambient Noise Level Monitoring:-

Figure No. 4 Plan Showing Noise Level Monitoring Location Map

Ambient Noise Level Monitoring Locations

Location Code: -
N1- Near Occupational Health Centre
N2- Near Weigh Bridge
N3- Near Admin Building
N4- Field Hostel
N5- Gate No. 3 (Bhatapura)
N6- Near Mura Village Gate
N7- Gaitara Gate No. 2
N8- Near Main Gate No. 1

Test Report

Sample Number : VEL/N/01

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : AMBIENT NOISE

Report No. : VEL/N/2303311001
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 17/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001404F

General Information

Sampling Location	:	Near Occupational Health Centre
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	Sound Level Meter
Instrument Code	:	VEL/SLM/01
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	21/03/2023 To 22/03/2023
Time of Monitoring	:	06:00 AM to 06:00 AM
Ambient Temperature (°C)	:	Min.18°C, Max.35.2°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB Guidlines & IS:9989
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	
1	Leq	I S-9989	63.84	56.11	dB (A)
2	CPCB Limits in dB(A*) Leq (Industrial Area)	--	75	70	dB (A)
3	CPCB Limits in dB(A*) Leq (Residential Area)	--	55	45	dB (A)
4	CPCB Limits in dB(A*) Leq (Commercial Area)	--	65	55	dB (A)
5	CPCB Limits in dB(A*) Leq (Silent Zone)	--	50	40	dB (A)

Note-*A "decibel" is a unit in which noise is measured.

End of Report

VARDAN ENVIROLAB Amitabh Dr. Technical Manager
(Checked By)

VARDAN ENVIROLAB
(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/N/02

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : AMBIENT NOISE

Report No. : VEL/N/2303311002
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001292F

General Information

Sampling Location	:	Near Weigh Bridge
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	Sound Level Meter
Instrument Code	:	VEL/SLM/02
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	21/03/2023 To 22/03/2023
Time of Monitoring	:	06:00 AM to 06:00 AM
Ambient Temperature (°C)	:	Min.18°C, Max.35.2°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB Guidlines & IS:9989
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	
1	Leq	I S-9989	61.94	50.88	dB (A)
2	CPCB Limits in dB(A*) Leq (Industrial Area)	--	75	70	dB (A)
3	CPCB Limits in dB(A*) Leq (Residential Area)	--	55	45	dB (A)
4	CPCB Limits in dB(A*) Leq (Commercial Area)	--	65	55	dB (A)
5	CPCB Limits in dB(A*) Leq (Silent Zone)	--	50	40	dB (A)

Note-*A "decibel" is a unit in which noise is measured.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/N/03

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : AMBIENT NOISE

Report No. : VEL/N/2303311003
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 17/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001405F

General Information

Sampling Location	:	Near Admin Building
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	Sound Level Meter
Instrument Code	:	VEL/SLM/01
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	22/03/2023 To 23/03/2023
Time of Monitoring	:	06:00 AM to 06:00 AM
Ambient Temperature (°C)	:	Min.19°C, Max.35.7°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB Guidlines & IS:9989
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	
1	Leq	I S-9989	60.88	51.92	dB (A)
2	CPCB Limits in dB(A*) Leq (Industrial Area)	--	75	70	dB (A)
3	CPCB Limits in dB(A*) Leq (Residential Area)	--	55	45	dB (A)
4	CPCB Limits in dB(A*) Leq (Commercial Area)	--	65	55	dB (A)
5	CPCB Limits in dB(A*) Leq (Silent Zone)	--	50	40	dB (A)

Note-*A "decibel" is a unit in which noise is measured.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/N/04

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : AMBIENT NOISE

Report No. : VEL/N/2303311004
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 17/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001406F

General Information

Sampling Location	:	Field Hostel
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	Sound Level Meter
Instrument Code	:	VEL/SLM/02
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	22/03/2023 To 23/03/2023
Time of Monitoring	:	06:00 AM to 06:00 AM
Ambient Temperature (°C)	:	Min.19°C, Max.35.7°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB Guidlines & IS:9989
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	
1	Leq	I S-9989	51.96	40.88	dB (A)
2	CPCB Limits in dB(A*) Leq (Industrial Area)	--	75	70	dB (A)
3	CPCB Limits in dB(A*) Leq (Residential Area)	--	55	45	dB (A)
4	CPCB Limits in dB(A*) Leq (Commercial Area)	--	65	55	dB (A)
5	CPCB Limits in dB(A*) Leq (Silent Zone)	--	50	40	dB (A)

Note-*A "decibel" is a unit in which noise is measured.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/N/05

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : AMBIENT NOISE

Report No. : VEL/N/2303311005
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001293F

General Information

Sampling Location	:	Gate No-3 (Bhatapara)
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	Sound Level Meter
Instrument Code	:	VEL/SLM/01
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	23/03/2023 To 24/03/2023
Time of Monitoring	:	06:00 AM to 06:00 AM
Ambient Temperature (°C)	:	Min.19°C, Max.33.9°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB Guidlines & IS:9989
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	
1	Leq	I S-9989	54.86	44.82	dB (A)
2	CPCB Limits in dB(A*) Leq (Industrial Area)	--	75	70	dB (A)
3	CPCB Limits in dB(A*) Leq (Residential Area)	--	55	45	dB (A)
4	CPCB Limits in dB(A*) Leq (Commercial Area)	--	65	55	dB (A)
5	CPCB Limits in dB(A*) Leq (Silent Zone)	--	50	40	dB (A)

Note-*A "decibel" is a unit in which noise is measured.

End of Report

VARDAN ENVIROLAB * Dy. Technical Manager * (Checked By)

VARDAN ENVIROLAB * Authorised Signatory * (Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/N/06

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : AMBIENT NOISE

Report No. : VEL/N/2303311006
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001294F

General Information

Sampling Location	:	Near Mura Village Gate
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	Sound Level Meter
Instrument Code	:	VEL/SLM/02
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	23/03/2023 To 24/03/2023
Time of Monitoring	:	06:00 AM to 06:00 AM
Ambient Temperature (°C)	:	Min.19°C, Max.33.7°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB Guidlines & IS:9989
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	
1	Leq	I S-9989	51.06	42.11	dB (A)
2	CPCB Limits in dB(A*) Leq (Industrial Area)	--	75	70	dB (A)
3	CPCB Limits in dB(A*) Leq (Residential Area)	--	55	45	dB (A)
4	CPCB Limits in dB(A*) Leq (Commercial Area)	--	65	55	dB (A)
5	CPCB Limits in dB(A*) Leq (Silent Zone)	--	50	40	dB (A)

Note-*A "decibel" is a unit in which noise is measured.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/N/07

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : AMBIENT NOISE

Report No. : VEL/N/2303311007
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001295F

General Information

Sampling Location	:	Gaitara Gate No-2
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	Sound Level Meter
Instrument Code	:	VEL/SLM/01
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	24/03/2023 To 25/03/2023
Time of Monitoring	:	06:00 AM to 06:00 AM
Ambient Temperature (°C)	:	Min.20°C, Max.37.5°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB Guidlines & IS:9989
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	
1	Leq	I S-9989	61.42	50.82	dB (A)
2	CPCB Limits in dB(A*) Leq (Industrial Area)	--	75	70	dB (A)
3	CPCB Limits in dB(A*) Leq (Residential Area)	--	55	45	dB (A)
4	CPCB Limits in dB(A*) Leq (Commercial Area)	--	65	55	dB (A)
5	CPCB Limits in dB(A*) Leq (Silent Zone)	--	50	40	dB (A)

Note-*A "decibel" is a unit in which noise is measured.

End of Report

(Checked By)

(Approved By)

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/N/08

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : AMBIENT NOISE

Report No. : VEL/N/2303311008
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 03/04/2023-08/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001296F

General Information

Sampling Location	:	Near Main Gate No-1
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Sampling Equipment used	:	Sound Level Meter
Instrument Code	:	VEL/SLM/03
Instrument Calibration Status	:	Calibrated
Meteorological condition during monitoring	:	Clear Sky
Date of Monitoring	:	24/03/2023 To 25/03/2023
Time of Monitoring	:	06:00 AM to 06:00 AM
Ambient Temperature (°C)	:	Min.20°C, Max.35.9°C
Surrounding Activity	:	Human & Vehicular Activities
Scope of Monitoring	:	Regulatory Requirement
Sampling & Analysis Protocol	:	CPCB Guidlines & IS:9989
Sampling Duration	:	24.0 Hours
Parameter Required	:	As per work order

S.No.	Parameters	Test Method	Test Results		Units
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 6:00 am)	
1	Leq	I S-9989	64.89	54.06	dB (A)
2	CPCB Limits in dB(A*) Leq (Industrial Area)	--	75	70	dB (A)
3	CPCB Limits in dB(A*) Leq (Residential Area)	--	55	45	dB (A)
4	CPCB Limits in dB(A*) Leq (Commercial Area)	--	65	55	dB (A)
5	CPCB Limits in dB(A*) Leq (Silent Zone)	--	50	40	dB (A)

Note-*A "decibel" is a unit in which noise is measured.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

4.3 Ground Water Sample Quality Analysis:-

Figure No. 5 Plan Showing Ground Water Quality Monitoring Location Map

Ground Water Quality Monitoring Locations

Location Code:-

GW1- Near Phillips Office
GW2- Village- Chicholi Hand Pump Water
GW3- Village- Gaitara Hand Pump Water
GW4- Village- Raikheda Tap Water
GW5- Village- Mura Hand Pump Water
GW6- Field Hostal Tap Water
GW7- Near AAQMS- 1 (Raw Water Area) (Piezometer – 01)
GW8- Near Mura Gate (Piezometer – 02)
GW9- Near Ash Recovery Water Area (Piezometer – 03)
GW10- Near Wagon Tippler (CHP) Area (Piezometer – 04)
GW11- Near AAQMS-2 Doosan (Piezometer - 05)
GW12- Near Bricks Plant (OWC Area) (Piezometer - 06)

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/01
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Ground Water)
Location : Near Phillips Office /Borewell/ Nursery
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP,..

Report No. : VEL/W/2303311005
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab
ULR No. : TC629923200001298F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.57	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	207.90	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	73.40	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	192.85	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	58.93	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	5.92	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	324.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	20.11	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.28	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	8.08	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/01 Report No. : VEL/W/2303311005

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.02)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.011	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.028	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.02)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.001)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.075	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/01 Report No. : VEL/W/2303311005

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml		

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By)
SATYA DEV
Dy. Technical Manager-Micro

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/01
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Ground Water)
Location : Near Phillips Office /Borewell/ Nursery
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP,,.

Report No. : VEL/W/2303311005/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/02
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Ground Water)
Location : Chicholi hand Pump Water
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311006
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab
ULR No. : TC629923200001299F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.64	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	198.00	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	65.47	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	203.00	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	61.29	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	8.34	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	344.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	23.20	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.26	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	5.28	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/02 Report No. : VEL/W/2303311006

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.017	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.030	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.045	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.001)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

VARDAN ENVIROLAB GURGAON 2023

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/02 Report No. : VEL/W/2303311006

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By)
SATYA DEV
Dy. Technical Manager-Micro

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/02
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Ground Water)
Location : Chicholi hand Pump Water
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311006/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/03
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Ground Water)
Location : Gaitara Hand Pump Water
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311007
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab
ULR No. : TC629923200001300F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.53	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	247.50	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	61.50	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	248.67	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	70.72	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)		0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	22.78	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	274.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	24.85	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.48	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	5.35	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/03 Report No. : VEL/W/2303311007

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.017	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.001)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

VARDAN ENVIRO LAB GURGAON

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001
TC-6299

Test Report

Sample Number : VEL/W/03 Report No. : VEL/W/2303311007

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml		

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By) 18/04/2023
SATYA DEV
Dy. Technical Manager-Micro

(Approved By) 18/04/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/03
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Ground Water)
Location : Gaitara Hand Pump Water
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP,,,

Report No. : VEL/W/2303311007/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/04
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Ground Water)
Location : Raikheda Tap Water
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311008
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab
ULR No. : TC629923200001301F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.53	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	237.60	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	65.47	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	243.60	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	68.36	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	17.96	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	385.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	25.88	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.33	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	7.63	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/04 Report No. : VEL/W/2303311008

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By)
08/04/2023
SATYA DEV
Dy. Technical Manager-Micro

(Approved By)
08/04/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/04 Report No. : VEL/W/2303311008

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.062	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.001)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

(Checked By) (Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/04
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/W/2303311008/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

Sample Description : WATER (Ground Water)
Location : Raikheda Tap Water
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	*	*

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/05
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/W/2303311009
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

Sample Description : WATER (Ground Water)
Location : Mura Hand Pump Water
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP,,

ULR No. : TC629923200001302F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.63	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	198.00	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	67.45	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	203.00	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	87.22	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	7.13	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	407.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	28.98	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.38	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	6.52	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/05 Report No. : VEL/W/2303311009

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.02)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.022	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.02)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.001)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.046	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/05 Report No. : VEL/W/2303311009

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml		

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By) 08/04/2023
SATYA DEV
Dy. Technical Manager-Micro

(Approved By) 08/04/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/05
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Ground Water)
Location : Mura Hand Pump Water
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311009/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/06
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Ground Water)
Location : Field Hostel Tap Water
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311010
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab
ULR No. : TC629923200001303F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.56	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	183.15	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	61.50	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	187.77	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	80.15	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	7.14	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	341.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	19.69	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.29	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	7.61	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/06 Report No. : VEL/W/2303311010

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.02)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.029	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.02)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.049	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/06 Report No. : VEL/W/2303311010

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml		

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By)
SATYA DEV
Dy. Technical Manager-Micro

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/06
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Ground Water)
Location : Field Hostel Tap Water
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP,,,

Report No. : VEL/W/2303311010/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/07
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Piezometer Water Well-01)
Location : Near AAQMS-1 (Raw Water Area
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP,..

Report No. : VEL/W/2303311011
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

ULR No. : TC629923200001304F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.59	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	193.05	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	63.48	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	203.00	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	73.08	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	8.34	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	360.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	25.99	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.36	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	6.71	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/07 Report No. : VEL/W/2303311011

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.016	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.025	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.001)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.021	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W//07 **Report No.** : VEL/W/2303311011

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml		

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

Depth.Of Water Level :4.06 Mtr.

End of Report

(Checked By)
08/04/2023
SATYA DEV
Dy. Technical Manager-Micro

(Approved By)
08/04/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/07
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Piezometer Water Well-01)
Location : Near AAQMS-1 (Raw Water Area
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311011/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

Depth.Of Water Level :4.06 Mtr.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/08
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Piezometer -02)
Location : Near Mura Gate
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311012
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

ULR No. : TC629923200001305F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.58	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	188.10	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	59.51	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	192.85	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	87.22	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	9.55	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	409.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	34.34	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.31	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3, B Screening Method / IS: 3025 (P-34) Chromotropic method	6.60	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/08 Report No. : VEL/W/2303311012

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.02)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.050	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.02)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.05)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

Checked By

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/08 Report No. : VEL/W/2303311012

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml		

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

Depth. Of Water Level :5.35 Mtr.

End of Report

(Checked By)
SATYA DEV
Dy. Technical Manager-Microc

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/08
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Piezometer -02)
Location : Near Mura Gate
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311012/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

Depth. Of Water Level :5.35 Mtr.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/09
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Piezometer -03)
Location : Near Ash Recovery Water Area
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311013
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab
ULR No. : TC629923200001306F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.57	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	188.10	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	71.42	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	197.92	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	73.08	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	2.32	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	333.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	27.95	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.42	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	6.88	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/09 Report No. : VEL/W/2303311013

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ0.01)	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.065	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.001)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permisson on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/09 Report No. : VEL/W/2303311013

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml		

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

Depth. Of Water Level: 1.2 Mtr.

End of Report

(Checked By) SATYA DEV Dy. Technical Manager-Micro

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/09
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/W/2303311013/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

Sample Description : WATER (Piezometer -03)
Location : Near Ash Recovery Water Area
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

Depth. Of Water Level: 1.2 Mtr.

End of Report

VARDAN ENVIROLAB GURGAON

(Checked By) 08/04/2023

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/10
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Piezometer -04)
Location : Near Wagon Tippler (CHP) Area
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311014
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab
ULR No. : TC629923200001307F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.61	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	178.20	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	59.51	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	182.70	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	54.22	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	7.15	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	352.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	27.02	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.30	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	5.16	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/10 Report No. : VEL/W/2303311014

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.012	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.048	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.001)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

VARDAN ENVIRO LAB GURGAON

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/10 Report No. : VEL/W/2303311014

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml		
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml		

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

Depth. Of Water Level :22.16 Mtr.

End of Report

SATYA DEV
Dy. Technical Manager-Micro

(Checked By) (Approved By)

Mohammad Sharif
Technical Manager

Terms & Conditions

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/10
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Piezometer -04)
Location : Near Wagon Tippler (CHP) Area
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311014/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

Depth. Of Water Level :22.16 Mtr.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/11
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Piezometer -05)
Location : AAQMS-2 (Doosan)
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311015
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab
ULR No. : TC629923200001308F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.68	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	193.05	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	71.42	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	203.00	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	68.36	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	3.52	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	320.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	20.73	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.35	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	5.59	mg/L	45	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/11 Report No. : VEL/W/2303311015

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.02)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.027	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.02)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.001)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.046	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/11 Report No. : VEL/W/2303311015

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml		

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

Depth.Of Water Level :13.55 Mtr.

End of Report

08/04/2023

(Checked By)

SATYA DEV

Dy. Technical Manager-Micro

08/04/2023

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/11
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : WATER (Piezometer -05)
Location : AAQMS-2 (Doosan)
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

Report No. : VEL/W/2303311015/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

Depth.Of Water Level :13.55 Mtr.

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/W/12
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/W/2303311016
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

Sample Description : WATER (Piezometer -06)
Location : Near Bricks Plant (OWC Area)
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP,,,

ULR No. : TC629923200001309F

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	pH (at 25 °C)	IS:3025 (Part-11)	7.41	-	6.5-8.5	No relaxation
2	Colour,Max	IS:3025 (Part-4)	BLQ(LOQ-1.0)	Hazen Unit	5	15
3	Turbidity,Max	IS:3025 (Part-10)	BLQ(LOQ-1.0)	NTU	1	5
4	Odour	IS:3025 (Part-5)	Agreeable	-	Agreeable	Agreeable
5	Taste	IS:3025 (Part-8)	Agreeable	-	Agreeable	Agreeable
6	Total Hardness (as CaCO3),Max	IS:3025 (Part-21)	212.85	mg/L	200	600
7	Calcium (as Ca),Max	IS:3025 (Part-40)	71.42	mg/L	75	200
8	Total Alkalinity (as CaCO3),Max	IS:3025 (Part-23)	213.15	mg/L	200	600
9	Chloride (as Cl),Max	IS:3025 (Part-32)	73.08	mg/L	250	1000
10	Residual Free Chlorine (RFC),Min	IS 3025 (Part-26)	BLQ(LOQ-0.15)	mg/L	0.2	1
11	Cyanide (as CN),Max	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation
12	Magnesium (as Mg),Max	APHA 23rd Edition:, 3500 Mg B,	8.33	mg/L	30	100
13	Total Dissolved Solids,Max	IS 3025 (Part-16)	368.00	mg/L	500	2000
14	Sulphate (as SO4),Max	IS 3025 (Part-24)	27.33	mg/L	200	400
15	Fluoride (as F),Max	APHA 4500 F D	0.29	mg/L	1.0	1.5
16	Nitrate (as NO3),Max	APHA 23rd Edition:2017,4500 NO3. B Screening Method / IS: 3025 (P-34) Chromotropic method	6.06	mg/L	45	No relaxation

(Checked By)

(Approved By)
Dr. Shiv Prakash Singh

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/12 Report No. : VEL/W/2303311016

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
17	Anionic Detergents (as MBAS),Max	IS 3025 (Part - 68)	BLQ(LOQ-0.05)	mg/L	0.2	1.0
18	Iron,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.014	mg/L	1.0	No relaxation
19	Aluminium as Al,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.03	0.2
20	Boron as B,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	0.042	mg/L	0.5	2.4
21	Zinc,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	5	15
22	Copper,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.002)	mg/L	0.05	1.5
23	Manganese,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.1	0.3
24	Selenium as Se,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.001)	mg/L	0.01	No relaxation
25	Arsenic as As,Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.005)	mg/L	0.01	No relaxation
26	Barium (as Ba),Max	VEL/STP/ICP/W-01,Issue No-01,Issue Date-01/11/2021	BLQ(LOQ-0.01)	mg/L	0.7	No relaxation
27	Mineral Oil,Max	IS:3025 (P-39)	BLQ(LOQ-0.1)	mg/L	1.0	No relaxation
28	Sulphide as H2S	IS:3025 (P-29)	BLQ(LOQ-0.02)	mg/L	0.05	No relaxation

VARDAN ENVIROLAB GURGAON

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/W/12 Report No. : VEL/W/2303311016

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
Microbiological Analysis						
29	Coliform	APHA, 23rd Edition, 9221B	<1.8	MPN/100ml	-	--
30	Escherichia coli	APHA, 23rd Edition, 9221F	<1.8	MPN/100ml	--	--
31	Faecal Coliform	APHA, 23rd Edition, 9221E	<1.8	MPN/100ml		

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

Depth Of Water Level Meter:9.77 Mtr

End of Report

(Checked By)
28/04/2023
SATYA DEV
Dy. Technical Manager-Micro

(Approved By)
28/04/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/W/12
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/W/2303311016/N
Format No : 7.8 F 03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-06/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.+250 ml
Sampling Type : Grab

Sample Description : WATER (Piezometer -06)
Location : Near Bricks Plant (OWC Area)
Sample Collected by : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS, APHA & STP...

S.No.	Parameter	Test Method	Result	Unit	Specification as per IS:10500:2012	
					Acceptable Limit	Permissible Limits
1	Phenolic Compounds (as C6H5OH),Max	IS: 3025 (P-43)	BLQ(LOQ-0.0005)	mg/L	0.001	0.002
2	Ammonia (as total ammonia-NH3)	IS 3025 (P-34)	BLQ(LOQ-0.3)	mg/L	-	-

BLQ-Below Limit of Qauntification,LOQ-Limit of Quantification.

Depth Of Water Level Meter:9.77 Mtr

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

4.4 Surface Water Sample Quality Analysis:-

Figure. No. 6 Plan Showing Surface Water Quality Monitoring Location Map

Surface Water Quality Monitoring Locations

Location Code:-

SW1- Chicholi Pond Water

SW2- Gaitara Pond Water

SW3- Raikheda Pond Water

SW4- Bangoli Dam

SW5- Mura Pond Water

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/SW/01

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : Surface Water
Location : Chicholi Pond Water
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS : 3025 & APHA

Report No. : VEL/SW/2303311001
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-04/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.
Sampling Type : Grab
ULR No. : TC629923200001281F

S.No.	Test Parameters	Test Method	Results	Units
1	pH (at 25°C)	IS:3025 (P-11)	7.61	--
2	Turbidity	IS:3025 (P-10)	5.30	NTU
3	Colour	IS: 3025 (P-4)	BLQ(LOQ-1.0)	Hazen
4	Odour	IS: 3025 (P-5)	Agreeable	--
5	Total Hardness as CaCO3	IS:3025 (P-21)	163.35	mg/L
6	Chloride as Cl	IS:3025 (P-32)	87.22	mg/L
7	Dissolved Oxygen	IS:3025 (P-38)	6.20	mg/L
8	Cyanide as CN	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L
9	Total Dissolved Solids	IS:3025 (P-16)	324.00	mg/L
10	Sulphate (as SO4)	IS:3025 (P-24)	22.17	mg/L
11	Fluoride (as F)	APHA, 4500 F B & D	0.37	mg/L
12	Chemical Oxygen Demand	IS:3025 (P-58)	49.00	mg/L
13	Biological Oxygen Demand	IS 3025 (Part-44)	11.00	mg/L
14	Lead	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
15	Selenium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.001)	mg/L
16	Iron	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
17	Arsenic as As	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.005)	mg/L
18	Oil & Grease	IS:3025 (P-39)	0.60	mg/L

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/SW/01

Report No. : VEL/SW/2303311001

S.No.	Test Parameters	Test Method	Results	Units
19	Total Chromium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
20	Phenolic Compounds	IS:3025 Part-43	BLQ(LOQ-0.0005)	mg/L
21	Anionic Detergent as MBAS	IS:3025 Part- 68	BLQ(LOQ-0.05)	mg/L
22	Zinc	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
23	Copper	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
24	Cadmium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
25	Calcium as Ca	IS: 3025 (P-40)	47.61	mg/L
26	Total Alkalinity as CaCO3	IS:3025 (P-23)	131.95	mg/L
27	Magnesium as Mg	APHA, 3500 Mg B, Calculation Method	10.77	mg/L
28	Aluminium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
29	Boron	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	0.085	mg/L
30	Manganese as Mn	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
31	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.0005)	mg/L

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/SW/01

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : Surface Water
Location : Chicholi Pond Water
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS : 3025 & APHA

Report No. : VEL/SW/2303311001/N
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-04/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.
Sampling Type : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	Residual Free Chlorine	IS :3025 (P-26)	BLQ(LOQ-0.15)	mg/L
2	Nitrate as NO3	IS:3025 (P - 34)	8.72	mg/L

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/SW/02

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/SW/2303311002
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-04/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.
Sampling Type : Grab

Sample Description : Surface Water
Location : Gaitara Pond Water
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS : 3025 & APHA
ULR No. : TC629923200001282F

S.No.	Test Parameters	Test Method	Results	Units
1	pH (at 25°C)	IS:3025 (P-11)	7.74	--
2	Turbidity	IS:3025 (P-10)	7.20	NTU
3	Colour	IS: 3025 (P-4)	BLQ(LOQ-1.0)	Hazen
4	Odour	IS: 3025 (P-5)	Agreeable	--
5	Total Hardness as CaCO3	IS:3025 (P-21)	128.70	mg/L
6	Chloride as Cl	IS:3025 (P-32)	77.79	mg/L
7	Dissolved Oxygen	IS:3025 (P-38)	5.80	mg/L
8	Cyanide as CN	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L
9	Total Dissolved Solids	IS:3025 (P-16)	256.00	mg/L
10	Sulphate (as SO4)	IS:3025 (P-24)	24.13	mg/L
11	Fluoride (as F)	APHA, 4500 F B & D	0.38	mg/L
12	Chemical Oxygen Demand	IS:3025 (P-58)	57.17	mg/L
13	Biological Oxygen Demand	IS 3025 (Part-44)	2.30	mg/L
14	Lead	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
15	Selenium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.001)	mg/L
16	Iron	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
17	Arsenic as As	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.005)	mg/L
18	Oil & Grease	IS:3025 (P-39)	0.60	mg/L

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/SW/02 Report No. : VEL/SW/2303311002

S.No.	Test Parameters	Test Method	Results	Units
19	Total Chromium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
20	Phenolic Compounds	IS:3025 Part-43	BLQ(LOQ-0.0005)	mg/L
21	Anionic Detergent as MBAS	IS:3025 Part- 68	BLQ(LOQ-0.05)	mg/L
22	Zinc	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
23	Copper	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
24	Cadmium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
25	Calcium as Ca	IS: 3025 (P-40)	47.61	mg/L
26	Total Alkalinity as CaCO3	IS:3025 (P-23)	131.95	mg/L
27	Magnesium as Mg	APHA, 3500 Mg B, Calculation Method	2.35	mg/L
28	Aluminium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
29	Boron	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
30	Manganese as Mn	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
31	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.0005)	mg/L

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/SW/02

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/SW/2303311002/N
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-04/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.
Sampling Type : Grab

Sample Description : Surface Water
Location : Gaitara Pond Water
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS : 3025 & APHA

S.No.	Test Parameters	Test Method	Results	Units
1	Residual Free Chlorine	IS :3025 (P-26)	BLQ(LOQ-0.15)	mg/L
2	Nitrate as NO3	IS:3025 (P - 34)	7.18	mg/L

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/SW/03

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/SW/2303311003
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-04/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.
Sampling Type : Grab

Sample Description : Surface Water
Location : Raikheda Pond Water
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS : 3025 & APHA
ULR No. : TC629923200001283F

S.No.	Test Parameters	Test Method	Results	Units
1	pH (at 25°C)	IS:3025 (P-11)	7.69	--
2	Turbidity	IS:3025 (P-10)	5.10	NTU
3	Colour	IS: 3025 (P-4)	BLQ(LOQ-1.0)	Hazen
4	Odour	IS: 3025 (P-5)	Agreeable	--
5	Total Hardness as CaCO3	IS:3025 (P-21)	163.35	mg/L
6	Chloride as Cl	IS:3025 (P-32)	87.22	mg/L
7	Dissolved Oxygen	IS:3025 (P-38)	6.00	mg/L
8	Cyanide as CN	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L
9	Total Dissolved Solids	IS:3025 (P-16)	320.00	mg/L
10	Sulphate (as SO4)	IS:3025 (P-24)	18.04	mg/L
11	Fluoride (as F)	APHA, 4500 F B & D	0.39	mg/L
12	Chemical Oxygen Demand	IS:3025 (P-58)	49.00	mg/L
13	Biological Oxygen Demand	IS 3025 (Part-44)	10.28	mg/L
14	Lead	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
15	Selenium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.001)	mg/L
16	Iron	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	0.013	mg/L
17	Arsenic as As	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.005)	mg/L
18	Oil & Grease	IS:3025 (P-39)	BLQ(LOQ-0.4)	mg/L

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/SW/03 Report No. : VEL/SW/2303311003

S.No.	Test Parameters	Test Method	Results	Units
19	Total Chromium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
20	Phenolic Compounds	IS:3025 Part-43	BLQ(LOQ-0.0005)	mg/L
21	Anionic Detergent as MBAS	IS:3025 Part- 68	BLQ(LOQ-0.05)	mg/L
22	Zinc	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	0.036	mg/L
23	Copper	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
24	Cadmium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
25	Calcium as Ca	IS: 3025 (P-40)	49.59	mg/L
26	Total Alkalinity as CaCO3	IS:3025 (P-23)	157.32	mg/L
27	Magnesium as Mg	APHA, 3500 Mg B, Calculation Method	9.56	mg/L
28	Aluminium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
29	Boron	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
30	Manganese as Mn	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
31	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.0005)	mg/L

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

VARDAN ENVIROLAB GURGAON

(Checked By)

(Approved By)

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/SW/03

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : Surface Water
Location : Raikheda Pond Water
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS : 3025 & APHA

Report No. : VEL/SW/2303311003/N
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-04/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.
Sampling Type : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	Residual Free Chlorine	IS :3025 (P-26)	BLQ(LOQ-0.15)	mg/L
2	Nitrate as NO3	IS:3025 (P - 34)	11.15	mg/L

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

VARDAN ENVIROLAB PVT. LTD. GURGAON 05/04/2023

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/SW/04

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/SW/2303311004
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-04/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.
Sampling Type : Grab
ULR No. : TC629923200001284F

Sample Description : Surface Water
Location : Bangoli Dam
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS : 3025 & APHA

S.No.	Test Parameters	Test Method	Results	Units
1	pH (at 25°C)	IS:3025 (P-11)	7.56	--
2	Turbidity	IS:3025 (P-10)	4.80	NTU
3	Colour	IS: 3025 (P-4)	BLQ(LOQ-1.0)	Hazen
4	Odour	IS: 3025 (P-5)	Agreeable	--
5	Total Hardness as CaCO3	IS:3025 (P-21)	158.40	mg/L
6	Chloride as Cl	IS:3025 (P-32)	70.72	mg/L
7	Dissolved Oxygen	IS:3025 (P-38)	6.3	mg/L
8	Cyanide as CN	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L
9	Total Dissolved Solids	IS:3025 (P-16)	200.00	mg/L
10	Sulphate (as SO4)	IS:3025 (P-24)	18.87	mg/L
11	Fluoride (as F)	APHA, 4500 F B & D	0.35	mg/L
12	Chemical Oxygen Demand	IS:3025 (P-58)	40.84	mg/L
13	Biological Oxygen Demand	IS 3025 (Part-44)	10.02	mg/L
14	Lead	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
15	Selenium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.001)	mg/L
16	Iron	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
17	Arsenic as As	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.005)	mg/L
18	Oil & Grease	IS:3025 (P-39)	0.40	mg/L

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/SW/04 Report No. : VEL/SW/2303311004

S.No.	Test Parameters	Test Method	Results	Units
19	Total Chromium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
20	Phenolic Compounds	IS:3025 Part-43	BLQ(LOQ-0.0005)	mg/L
21	Anionic Detergent as MBAS	IS:3025 Part- 68	BLQ(LOQ-0.05)	mg/L
22	Zinc	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	0.026	mg/L
23	Copper	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
24	Cadmium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
25	Calcium as Ca	IS: 3025 (P-40)	53.56	mg/L
26	Total Alkalinity as CaCO3	IS:3025 (P-23)	142.10	mg/L
27	Magnesium as Mg	APHA, 3500 Mg B, Calculation Method	5.95	mg/L
28	Aluminium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
29	Boron	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
30	Manganese as Mn	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
31	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.0005)	mg/L

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/SW/04

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : Surface Water
Location : Bangoli Dam
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS : 3025 & APHA

Report No. : VEL/SW/2303311004/N
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-04/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.
Sampling Type : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	Residual Free Chlorine	IS :3025 (P-26)	BLQ(LOQ-0.15)	mg/L
2	Nitrate as NO3	IS:3025 (P - 34)	7.48	mg/L

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/SW/05

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/SW/2303311005
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-04/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.
Sampling Type : Grab

Sample Description : Surface Water
Location : Mura Pond Water
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS : 3025 & APHA
ULR No. : TC629923200001297F

S.No.	Test Parameters	Test Method	Results	Units
1	pH (at 25°C)	IS:3025 (P-11)	7.73	--
2	Turbidity	IS:3025 (P-10)	5.80	NTU
3	Colour	IS: 3025 (P-4)	BLQ(LOQ-1.0)	Hazen
4	Odour	IS: 3025 (P-5)	Agreeable	--
5	Total Hardness as CaCO3	IS:3025 (P-21)	123.75	mg/L
6	Chloride as Cl	IS:3025 (P-32)	61.29	mg/L
7	Dissolved Oxygen	IS:3025 (P-38)	5.40	mg/L
8	Cyanide as CN	IS:3025 (P-27)	BLQ(LOQ-0.02)	mg/L
9	Total Dissolved Solids	IS:3025 (P-16)	244.00	mg/L
10	Sulphate (as SO4)	IS:3025 (P-24)	21.35	mg/L
11	Fluoride (as F)	APHA, 4500 F B & D	0.36	mg/L
12	Chemical Oxygen Demand	IS:3025 (P-58)	49.00	mg/L
13	Biological Oxygen Demand	IS 3025 (Part-44)	8.95	mg/L
14	Lead	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
15	Selenium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.001)	mg/L
16	Iron	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
17	Arsenic as As	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.005)	mg/L
18	Oil & Grease	IS:3025 (P-39)	0.60	mg/L

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/SW/05 Report No. : VEL/SW/2303311005

S.No.	Test Parameters	Test Method	Results	Units
19	Total Chromium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
20	Phenolic Compounds	IS:3025 Part-43	BLQ(LOQ-0.0005)	mg/L
21	Anionic Detergent as MBAS	IS:3025 Part- 68	BLQ(LOQ-0.05)	mg/L
22	Zinc	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	0.023	mg/L
23	Copper	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
24	Cadmium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
25	Calcium as Ca	IS: 3025 (P-40)	43.64	mg/L
26	Total Alkalinity as CaCO3	IS:3025 (P-23)	127.50	mg/L
27	Magnesium as Mg	APHA, 3500 Mg B, Calculation Method	3.56	mg/L
28	Aluminium	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.002)	mg/L
29	Boron	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
30	Manganese as Mn	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.01)	mg/L
31	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No. 01, Issue date 01/11/2021	BLQ(LOQ-0.0005)	mg/L

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number : VEL/SW/05

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/SW/2303311005/N
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-04/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 5.0 Ltrs.
Sampling Type : Grab

Sample Description : Surface Water
Location : Mura Pond Water
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Sampling and Analysis Protocol : IS : 3025 & APHA

S.No.	Test Parameters	Test Method	Results	Units
1	Residual Free Chlorine	IS :3025 (P-26)	BLQ(LOQ-0.15)	mg/L
2	Nitrate as NO3	IS:3025 (P - 34)	7.33	mg/L

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

4.5 Soil Quality Analysis:-

Figure No. 8 Plan Showing Soil Sample Monitoring Location Map

Soil Quality Monitoring Locations

Location Code:-

S1- Chicholi Village

S2- Gaitara Village

S3- Raikheda Village

S4- Mura Village

S5- Near Field Hostel

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/S0/01
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : SOIL
Location : ACW Area
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : Ok
Parameter Required : As per work order
Sampling and Analysis Protocol : IS 2720, APHA & USDA

Report No. : VEL/S0/2303311001-A
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-05/04/2023
Receipt Date : 31/03/2023
Sampling Date : 22/03/2023
Sampling Quantity : 3.0 Kg
Sampling Type : Composite
Packing Status : Sealed Pack
ULR No. : TC629923200001265F

S.No.	Parameters	Test Method	Results	Units
1	pH	IS:2720 Part-26	7.69	-
2	Conductivity at 25°C	IS:14767	0.279	mS/cm
3	Colour	VEL/STP/EN/67,Issue No.- 01,ssue date 01/11/2021	Brownish	-
4	Water holding capacity	VEL/STP/EN/86, Ilssue No.- 01,Issue date 01/11/2021	39.07	%
5	Bulk density	VEL/STP/EN/59, Issue No.- 01,Issue date 01/11/2021	1.35	gm/cc
6	Chloride	VEL/STP/EN/69, Issue No.- 01,ssue date 01/11/2021	93.98	mg/100gm
7	Exchangeable Calcium as Ca	VEL/STP/EN/72, Issue No.- 01,ssue date 01/11/2021	357.31	mg/100gm
8	Sodium Exchangeable as Na	VEL/STP/EN/62, Issue No.- 01,ssue date 01/11/2021	169.68	mg/kg
9	Exchangeable Potassium as K	VEL/STP/EN/62, Issue No.- 01,ssue date 01/11/2021	298.47	kg. /hec.
10	Organic Matter	IS:2720 Part-22	0.53	%
11	Exchangeable Magnesium as Mg	VEL/STP/EN/72, Issuc No.- 01,ssue date 01/11/2021	152.87	mg/100gm
12	Available Nitrogen	IS:14684	245.25	kg. /hec.
13	Available Phosphorous as P	VEL/STP/EN/73, Issue No.- 01,ssue date 01/11/2021	49.35	kg. /hec.

VARDAN ENVIROLAB Dy. Technical Manager
(Checked By)

VARDAN ENVIROLAB Authorised Signatory
(Approved By)
05/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/S0/01 Report No. : VEL/S0/2303311001-A

S.No.	Parameters	Test Method	Results	Units
14	Total Zinc (as Zn)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	47.39	mg/kg
15	Total Manganese (as Mn)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	0.29	mg/kg
16	Total Chromium (as Cr)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	0.40	mg/kg
17	Total Lead (as Pb)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	0.22	mg/kg
18	Total Cadmium (as Cd)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	BLQ(LOQ-0.1)	mg/kg
19	Total Copper (as Cu)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	0.29	mg/kg
20	Soil Texture	VEL/STP/EN/64,Issue No.- 01,Issue date 01/11/2021	Silty loam	--

Note:-This report replaces our earlier report no.VEL/S0/2303311001,dated on 08/04/2023,due to typing error in the sampling location.

Amended report re-issued on dated 05/05/2023.BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

VARDAN ENVIROLAB Dy. Technical Manager (Checked By)

VARDAN ENVIROLAB Authorised Signatory (Approved By) 05/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/S0/02

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : SOIL
Location : Weigh Bridge -01
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : Ok
Parameter Required : As per work order
Sampling and Analysis Protocol : IS 2720, APHA & USDA

Report No. : VEL/S0/2303311002-A
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-05/04/2023
Receipt Date : 31/03/2023
Sampling Date : 22/03/2023
Sampling Quantity : 3.0 Kg
Sampling Type : Composite
Packing Status : Sealed Pack
ULR No. : TC629923200001266F

S.No.	Parameters	Test Method	Results	Units
1	pH	IS:2720 Part-26	7.48	-
2	Conductivity at 25°C	IS:14767	0.261	mS/cm
3	Colour	VEL/STP/EN/67,Issue No.- 01,ssue date 01/11/2021	Brownish	-
4	Water holding capacity	VEL/STP/EN/86, IIssue No.- 01,Issue date 01/11/2021	36.81	%
5	Bulk density	VEL/STP/EN/59, Issue No.- 01,Issue date 01/11/2021	1.37	gm/cc
6	Chloride	VEL/STP/EN/69, Issue No.- 01,ssue date 01/11/2021	78.00	mg/100gm
7	Exchangeable Calcium as Ca	VEL/STP/EN/72, Issue No.- 01,ssue date 01/11/2021	420.08	mg/100gm
8	Sodium Exchangeable as Na	VEL/STP/EN/62, Issue No.- 01,ssue date 01/11/2021	156.93	mg/kg
9	Exchangeable Potassium as K	VEL/STP/EN/62, Issue No.- 01,ssue date 01/11/2021	167.22	kg. /hec.
10	Organic Matter	IS:2720 Part-22	0.57	%
11	Exchangeable Magnesium as Mg	VEL/STP/EN/72, Issue No.- 01,ssue date 01/11/2021	178.25	mg/100gm
12	Available Nitrogen	IS:14684	206.55	kg. /hec.
13	Available Phosphorous as P	VEL/STP/EN/73, Issue No.- 01,ssue date 01/11/2021	48.11	kg. /hec.

VARDAN ENVIROLAB * Dy. Technical Manager *
(Checked By)

VARDAN ENVIROLAB * Authorised Signatory *
(Approved By)
15/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/S0/02 Report No. : VEL/S0/2303311002-A

S.No.	Parameters	Test Method	Results	Units
14	Total Zinc (as Zn)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	47.60	mg/kg
15	Total Manganese (as Mn)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	51.70	mg/kg
16	Total Chromium (as Cr)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	8.53	mg/kg
17	Total Lead (as Pb)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	1.58	mg/kg
18	Total Cadmium (as Cd)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	BLQ(LOQ-0.1)	mg/kg
19	Total Copper (as Cu)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	1.82	mg/kg
20	Soil Texture	VEL/STP/EN/64,Issue No.- 01,Issue date 01/11/2021	Silty loam	--

Note:-This report replaces our earlier report no.VEL/S0/2303311002,dated on 08/04/2023,due to typing error in the sampling location.
Amended report re-issued on dated 05/05/2023.BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

VARDAN ENVIROLAB Dy. Technical Manager
(Checked By)

VARDAN ENVIROLAB Authorised Signatory
(Approved By)
05/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/S0/03
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : SOIL
Location : Guest House Area
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : Ok
Parameter Required : As per work order
Sampling and Analysis Protocol : IS 2720, APHA & USDA

Report No. : VEL/S0/2303311003-A
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-05/04/2023
Receipt Date : 31/03/2023
Sampling Date : 22/03/2023
Sampling Quantity : 3.0 Kg
Sampling Type : Composite
Packing Status : Sealed Pack
ULR No. : TC629923200001267F

S.No.	Parameters	Test Method	Results	Units
1	pH	IS:2720 Part-26	7.73	-
2	Conductivity at 25°C	IS:14767	0.239	mS/cm
3	Colour	VEL/STP/EN/67,Issue No.- 01,ssue date 01/11/2021	Brownish	-
4	Water holding capacity	VEL/STP/EN/86, IIssue No.- 01,Issue date 01/11/2021	35.27	%
5	Bulk density	VEL/STP/EN/59, Issue No.- 01,Issue date 01/11/2021	1.26	gm/cc
6	Chloride	VEL/STP/EN/69, Issue No.- 01,ssue date 01/11/2021	89.74	mg/100gm
7	Exchangeable Calcium as Ca	VEL/STP/EN/72, Issue No.- 01,ssue date 01/11/2021	378.62	mg/100gm
8	Sodium Exchangeable as Na	VEL/STP/EN/62, Issue No.- 01,ssue date 01/11/2021	160.67	mg/kg
9	Exchangeable Potassium as K	VEL/STP/EN/62, Issue No.- 01,ssue date 01/11/2021	256.26	kg. /hec.
10	Organic Matter	IS:2720 Part-22	0.54	%
11	Exchangeable Magnesium as Mg	VEL/STP/EN/72, Issue No.- 01,ssue date 01/11/2021	127.50	mg/100gm
12	Available Nitrogen	IS:14684	222.78	kg. /hec.
13	Available Phosphorous as P	VEL/STP/EN/73, Issue No.- 01,ssue date 01/11/2021	43.36	kg. /hec.

VARDAN ENVIROLAB Technical Manager
Amitabh
(Checked By)

VARDAN ENVIROLAB Authorised Signatory
(Approved By)
05/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/S0/03 **Report No.** : VEL/S0/2303311003-A

S.No.	Parameters	Test Method	Results	Units
14	Total Zinc (as Zn)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	41.48	mg/kg
15	Total Manganese (as Mn)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	55.45	mg/kg
16	Total Chromium (as Cr)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	9.28	mg/kg
17	Total Lead (as Pb)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	1.67	mg/kg
18	Total Cadmium (as Cd)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	BLQ(LOQ-0.1)	mg/kg
19	Total Copper (as Cu)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	2.00	mg/kg
20	Soil Texture	VEL/STP/EN/64,Issue No.- 01,Issue date 01/11/2021	Silty loam	--

Note:-This report replaces our earlier report no.VEL/S0/2303311003,dated on 08/04/2023,due to typing error in the sampling location.

Amended report re-issued on dated 05/05/2023.BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

VARDAN ENVIROLAB * Dy. Technical Manager * (Checked By)

VARDAN ENVIROLAB * Authorised Signatory * (Approved By) 05/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/S0/04
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : SOIL
Location : Gammon India Area L2 Gate
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : Ok
Parameter Required : As per work order
Sampling and Analysis Protocol : IS 2720, APHA & USDA

Report No. : VEL/S0/2303311004-A
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-05/04/2023
Receipt Date : 31/03/2023
Sampling Date : 22/03/2023
Sampling Quantity : 3.0 Kg
Sampling Type : Composite
Packing Status : Sealed Pack
ULR No. : TC629923200001268F

S.No.	Parameters	Test Method	Results	Units
1	pH	IS:2720 Part-26	7.63	-
2	Conductivity at 25°C	IS:14767	0.285	mS/cm
3	Colour	VEL/STP/EN/67,Issue No.- 01,ssue date 01/11/2021	Brownish	-
4	Water holding capacity	VEL/STP/EN/86, Ilssue No.- 01,Issue date 01/11/2021	41.31	%
5	Bulk density	VEL/STP/EN/59, Issue No.- 01,Issue date 01/11/2021	1.28	gm/cc
6	Chloride	VEL/STP/EN/69, Issue No.- 01,ssue date 01/11/2021	70.33	mg/100gm
7	Exchangeable Calcium as Ca	VEL/STP/EN/72, Issue No.- 01,ssue date 01/11/2021	357.51	mg/100gm
8	Sodium Exchangeable as Na	VEL/STP/EN/62, Issue No.- 01,ssue date 01/11/2021	141.20	mg/kg
9	Exchangeable Potassium as K	VEL/STP/EN/62, Issue No.- 01,ssue date 01/11/2021	253.53	kg. /hec.
10	Organic Matter	IS:2720 Part-22	0.64	%
11	Exchangeable Magnesium as Mg	VEL/STP/EN/72, Issue No.- 01,ssue date 01/11/2021	140.23	mg/100gm
12	Available Nitrogen	IS:14684	222.78	kg. /hec.
13	Available Phosphorous as P	VEL/STP/EN/73, Issue No.- 01,ssue date 01/11/2021	51.37	kg. /hec.

VARDAN ENVIROLAB Dy. Technical Manager (Checked By)

VARDAN ENVIROLAB Authorised Signatory (Approved By) 05/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/S0/04 **Report No.** : VEL/S0/2303311004-A

S.No.	Parameters	Test Method	Results	Units
14	Total Zinc (as Zn)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	68.90	mg/kg
15	Total Manganese (as Mn)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	95.42	mg/kg
16	Total Chromium (as Cr)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	16.03	mg/kg
17	Total Lead (as Pb)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	2.45	mg/kg
18	Total Cadmium (as Cd)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	BLQ(LOQ-0.1)	mg/kg
19	Total Copper (as Cu)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	3.33	mg/kg
20	Soil Texture	VEL/STP/EN/64,Issue No.- 01,Issue date 01/11/2021	Silty loam	--

Note:-This report replaces our earlier report no.VEL/S0/2303311004,dated on 08/04/2023,due to typing error in the sampling location.

Amended report re-issued on dated 05/05/2023.BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

VARDAN ENVIROLAB Amritabh Dy. Technical Manager (Checked By)

VARDAN ENVIROLAB Authorised Signatory (Approved By) 05/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/S0/05
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : SOIL
Location : STP Area
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : Ok
Parameter Required : As per work order
Sampling and Analysis Protocol : IS 2720, APHA & USDA

Report No. : VEL/S0/2303311005-A
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-05/04/2023
Receipt Date : 31/03/2023
Sampling Date : 22/03/2023
Sampling Quantity : 3.0 Kg
Sampling Type : Composite
Packing Status : Sealed Pack
ULR No. : TC629923200001269F

S.No.	Parameters	Test Method	Results	Units
1	pH	IS:2720 Part-26	7.46	-
2	Conductivity at 25°C	IS:14767	0.284	mS/cm
3	Colour	VEL/STP/EN/67,Issue No.- 01,ssue date 01/11/2021	Brownish	-
4	Water holding capacity	VEL/STP/EN/86, IIssue No.- 01,Issue date 01/11/2021	41.19	%
5	Bulk density	VEL/STP/EN/59, Issue No.- 01,Issue date 01/11/2021	1.31	gm/cc
6	Chloride	VEL/STP/EN/69, Issue No.- 01,ssue date 01/11/2021	264.02	mg/100gm
7	Exchangeable Calcium as Ca	VEL/STP/EN/72, Issue No.- 01,ssue date 01/11/2021	251.99	mg/100gm
8	Sodium Exchangeable as Na	VEL/STP/EN/62, Issue No.- 01,ssue date 01/11/2021	152.37	mg/kg
9	Exchangeable Potassium as K	VEL/STP/EN/62, Issue No.- 01,ssue date 01/11/2021	96.32	kg. /hec.
10	Organic Matter	IS:2720 Part-22	0.64	%
11	Exchangeable Magnesium as Mg	VEL/STP/EN/72, Issue No.- 01,ssue date 01/11/2021	140.03	mg/100gm
12	Available Nitrogen	IS:14684	226.01	kg. /hec.
13	Available Phosphorous as P	VEL/STP/EN/73, Issue No.- 01,ssue date 01/11/2021	45.66	kg. /hec.

VARDAN ENVIROLAB (Checked By)

VARDAN ENVIROLAB (Approved By) 05/05/2023 Authorised Signatory

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Test Report

Sample Number : VEL/S0/05 Report No. : VEL/S0/2303311005-A

S.No.	Parameters	Test Method	Results	Units
14	Total Zinc (as Zn)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	49.38	mg/kg
15	Total Manganese (as Mn)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	66.26	mg/kg
16	Total Chromium (as Cr)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	11.38	mg/kg
17	Total Lead (as Pb)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	1.91	mg/kg
18	Total Cadmium (as Cd)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	BLQ(LOQ-0.1)	mg/kg
19	Total Copper (as Cu)	VEL/STP/HW/03,Issue No.- 01,Issue date 01/10/2021	2.39	mg/kg
20	Soil Texture	VEL/STP/EN/64,Issue No.- 01,Issue date 01/11/2021	Silty loam	--

Note:-This report replaces our earlier report no.VEL/S0/2303311005,dated on 08/04/2023,due to typing error in the sampling location.
Amended report re-issued on dated 05/05/2023.BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

VARDAN ENVIROLAB Dy. Technical Manager (Checked By)

VARDAN ENVIROLAB Authorised Signatory (Approved By) 05/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

4.6 Waste Water Sample Quality Analysis Report:-

Figure No. 9 Plan Showing Waste Water Sample Monitoring Location Map

Waste Water Quality Monitoring Locations

Location Code:-

WW1- STP Outlet (STP Plant)

WW2- ETP Outlet (ETP Plant)

Vardan EnviroLab
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001
TC-6299

Test Report

Sample Number : VEL/WW/01
Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village- Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Report No. : VEL/WW/2303311001
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 10/04/2023
Period of Analysis : 31/03/2023-07/04/2023
Receipt Date : 31/03/2023
Sampling Date : 27/03/2023
Sampling Quantity : 2.0 Ltrs.
Sampling Type : Grab
ULR No. : TC629923200001310F

Sample Description : Waste Water (STP Outlet)
Location : STP Plant
Sample Collected By : VEL Representative (Mr. Chimman Lal)
Environmental Condition : OK
Parameter Required : As per work order
Analysis Protocol : APHA & IS

S.No.	Test Parameters	Test Method	Result	Unit	Limits as Per EPA (Sche.-VI)		
					Inland Surface Water	Public Sewers	Land for Irrigation
1	pH at 25°C	IS:3025 (p-11)	8.14	--	5.5 - 9.0	5.5 - 9.0	5.5 - 9.0
2	Total Suspended Solids(TSS), max.	IS: 3025 (P-17)	6.20	mg/L	100.0	600.0	200.0
3	Oil & Grease, Max.	Clause No-5 of IS:3025 (P-39)	0.60	mg/L	10.0	20.0	10.0
4	Biological Oxygen Demand, Max.	IS 3025 (Part-44)	14.00	mg/L	30.0	350.0	100.0
5	COD, Max.	APHA, 5220 B Open Reflux	57.17	mg/L	250.0	--	--

End of Report

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number :	VEL/WW/02	**Report No.**	: VEL/WW/2303311002
Name & Address of the Party	: M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.	**Format No**	: 7.8 F-03
		Party Reference No	: 5703004128 (21/04/2022)
		Reporting Date	: 10/04/2023
		Period of Analysis	: 31/03/2023-07/04/2023
		Receipt Date	: 31/03/2023
Sample Description	: Waste Water (ETP Outlet)	**Sampling Date**	: 27/03/2023
Location	: ETP Plant	**Sampling Quantity**	: 2.0 Ltrs.
Sample Collected By	: VEL Representative (Mr. Chimman Lal)	**Sampling Type**	: Grab
Environmental Condition	: OK		
Parameter Required	: As per work order	**ULR No.**	: TC629923200001311F
Analysis Protocol	: APHA & IS		

S.No.	Test Parameters	Test Method	Result	Unit	Limits as Per EPA (Sche.-VI)		
					Inland Surface Water	Public Sewers	Land for Irrigation
1	pH at 25°C	IS:3025 (p-11)	8.26	--	5.5 - 9.0	5.5 - 9.0	5.5 - 9.0
2	Total Suspended Solids(TSS), max.	IS: 3025 (P-17)	8.20	mg/L	100.0	600.0	200.0
3	Oil & Grease, Max.	Clause No-5 of IS:3025 (P-39)	0.80	mg/L	10.0	20.0	10.0
4	Biological Oxygen Demand, Max.	IS 3025 (Part-44)	17.00	mg/L	30.0	350.0	100.0
5	COD, Max.	APHA, 5220 B Open Reflux	73.51	mg/L	250.0	--	--

End of Report

VARDAN ENVIROLAB GURGAON 10/04/2023

(Checked By)

(Approved By)

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

4.7 Stack Emission Monitoring Analysis Report:-

Figure No. 10 Plan Showing Stack Emission Monitoring Location Map

Stack Emission Monitoring Locations

Location Code:-

TPP (Unit-1)

TPP (Unit-2)

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)

ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/S/01

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : **Stack Emission Monitoring**

Report No. : VEL/S/2303311001-A
Format No : 7.8 F-03
Party Reference No : 5703004128 (21/04/2022)
Reporting Date : 08/04/2023
Period of Analysis : 31/03/2023-05/04/2023
Receipt Date : 31/03/2023
ULR No. : TC629923200001270F

General Information

Sampling Location	:	Unit-1
Sample Collected By	:	VEL Representative (Mr. Chimman Lal)
Date of Sampling	:	28/03/2023
Sampling duration (Minutes)	:	40.1 Min
Stack attached to	:	ESP Outlet
Make of stack	:	MS
Diameter of stack(m)	:	7.5 Mtr
Height of stack(m)	:	275.0 Mtr
Instrument calibration status	:	Calibrated
Meteorological Condition	:	Clear Sky
Ambient Temperature - Ta (°C)	:	32.0
Temperature of Stack Gases - Ts (°C)	:	122.0
Velocity of Stack Gases (m/sec.)	:	17.47
Flow rate of PM (LPM)	:	24.9
Flow rate of Gas (LPM)	:	2.0
Sampling condition	:	Isokentic
Protocol used	:	IS 11255 & EPA

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM)	IS:11255 (P-1)	35.81	mg/Nm3	50
2	Sulphur Dioxide (as SO2)	IS:11255 (P-2)	1206.00	mg/Nm3	--
3	Oxide of Nitrogen (as NOX)	IS:11255 (P-7)	250.43	mg/Nm3	--
4	Mercury (as Hg)	VEL/ENV/STP/144, Issue No.01, Issue Date - 01/11/2021	BLQ(LOQ-0.005)	mg/Nm3	--

Note:-This report replaces our earlier report no.VEL/S/2303311001,dated on 08/04/2023,due to typographical error in height of stack.

Amended report re-issued on dated 05/05/2023

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

VARDAN ENVIROLAB Amitabh Kumar Dy. Technical Manager (Checked By)

VARDAN ENVIROLAB Authorised Signatory (Approved By) 05/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

TC-6299

Test Report

Sample Number : VEL/S/02

Name & Address of the Party : M/s Raipur Energen Limited (Formerly GMR Chhattisgarh Energy Ltd.) Village-Raikheda, Block- Tilda, Dist-Raipur, Chhattisgarh.

Sample Description : **Stack Emission Monitoring**

Report No.	: VEL/S/2303311002-A
Format No	: 7.8 F-03
Party Reference No	: 5703004128 (21/04/2022)
Reporting Date	: 08/04/2023
Period of Analysis	: 31/03/2023-05/04/2023
Receipt Date	: 31/03/2023
ULR No.	: TC629923200001273F

General Information

Sampling Location	: Unit-2
Sample Collected By	: VEL Representative (Mr. Chimman Lal)
Date of Sampling	: 28/03/2023
Sampling duration (Minutes)	: 45.16 Min
Stack attached to	: ESP Outlet
Make of stack	: MS
Diameter of stack(m)	: 7.5 Mtr
Height of stack(m)	: 275.0 Mtr
Instrument calibration status	: Calibrated
Meteorological Condition	: Clear Sky
Ambient Temperature - Ta (°C)	: 33.0
Temperature of Stack Gases - Ts (°C)	: 126.0
Velocity of Stack Gases (m/sec.)	: 15.75
Flow rate of PM (LPM)	: 22.44
Flow rate of Gas (LPM)	: 2.0
Sampling condition	: Isokentic
Protocol used	: IS 11255 & EPA

S.No.	Test Parameters	Test Method	Results	Units	Limits as per CPCB
1	Particulate Matter (as PM)	IS:11255 (P-1)	39.42	mg/Nm3	50
2	Sulphur Dioxide (as SO2)	IS:11255 (P-2)	1134.00	mg/Nm3	--
3	Oxide of Nitrogen (as NOX)	IS:11255 (P-7)	260.47	mg/Nm3	--
4	Mercury (as Hg)	VEL/ENV/STP/144, Issue No.01, Issue Date - 01/11/2021	BLQ(LOQ-0.005)	mg/Nm3	--

Note:-This report replaces our earlier report no.VEL/S/2303311002,dated on 08/04/2023,due to typographical error in height of stack.

Amended report re-issued on dated 05/05/2023.

BLQ-Below Limit of Quantification,LOQ-Limit of Quantification

End of Report

VARDAN ENVIRO LAB * Dr. Technical Manager * (Checked By)

VARDAN ENVIROLAB * Authorised Signatory * (Approved By) 05/05/2023

Terms & Conditions

- The results reported relate only to the samples tested. In case sample is not drawn the results apply to the sample as received.
- This test report in full or in part, shall not be reproduced in any court of law without prior written approval of the laboratory.
- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period
- The report no. with Suffix A-Amended Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission on the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Chapter – 5.0
CONCLUSIONS

M/s RAIPUR ENERGEN LIMITED., authorities have been taken successful steps in controlling environmental pollution in and around the project. This fact is clear from analytical results of different environmental parameters. A brief conclusion is as follows.

S. No.	Environmental Parameters	Conclusions
5.1	Ambient Air Quality Environment	After analysis of the samples from five different locations it is observed that both the individuals and average concentration of air pollutants in respect of PM_{10}, $PM_{2.5}$, NO_2, SO_2, CO, C_6H_6, NH_3, O_3, Pb, As, Ni, BaP, TSPM and Mercury are well within the prescribed limits of NAAQ Standards. People of township and of surrounding villages do not have any problems regarding the airqualityand have no grievances because of Thermal Power Plant activities.
5.2	Ambient Noise Environment	The observations taken at eight villages location during Day and Night Time shows that the noise level are well within prescribed limits of CPCB. Hence there is no possibility of any adverse effect of noise generated due to Thermal Power Plant activities on peoples of Surrounding areas.
5.3	Ground, Surface & Waste Water Environment	The analytical result of the samples from the Ground Water of Villages, Surface Water from Pond & Dam, and Domestic & Industrial Effluent after treatment shows that the concentrations of different water parameters are well within prescribed limits and will not cause any adverse impact on human health and on surrounding area. People of Surrounding areas express satisfaction about the water quality of that area.
5.4	Soil Environment	The analytical result of the samples from the Soil shows that the concentrations of different soil parameters are well within prescribed limits and will not cause any adverse impact on surrounding area. People of Surrounding areas express satisfaction about the soil quality of that area.

5.5	Stack Emission Environment	The analytical result of the samples from the TPP (Unit-1 & Unit-2) shows that the concentrations of different stack parameters are well within prescribed limits and will not cause any adverse impact on surrounding area.

All the above details show that Thermal Power Plant of M/s RAIPUR ENERGEN LIMITED is not causing any adverse impact on the human health and ecological balance.

END OF THE REPORT

Rainwater Harvesting Ponds at APL, Raipur Site

Annexure - III

HYDROGEOLOGICAL INVESTIGATION REPORT

IN AND AROUND RAIKHEDA VILLAGE,

BLOCK- TILDA

DISTRICT - RAIPUR (C.G.)

M/S RAIPUR ENERGEN LIMITED

PREPARED BY

ENVIBA ENVIRONMENTAL SERVICES

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

Ph-09617160900 (M), 09711718234 (M)

Email:enviba.enviro@gmail.com

CONTENTS

1. INTRODUCTION

Adani Power Limited (APL), India's largest private sector thermal power producer, announced the completion of acquisition of Raipur Energen Limited, which owns and operates a 1,370 MW (2 X 685 MW) Supercritical power plant at Raikheda village, in Raipur District of Chhattisgarh.

The Raikheda power plant, which utilizes Boiler and Turbine Generator equipment supplied by Doosan Heavy Industries, S. Korea, is situated close to the coal bearing areas of Chhattisgarh. The addition of 1,370 MW capacity, along with the recently concluded acquisition of the 600 MW Korba West Power Co. Ltd., solidifies APL's position as India's largest private sector thermal power producer, with aggregate operating capacities of 12,450 MW and gives it a strong presence in India's leading power generating as well as power consuming regions.

With these developments, APL is now uniquely poised to contribute to the forthcoming growth phase of India's electricity sector, driven by a robust economic growth, as well as an increase in the market size led by reforms under the Government's ambitious "Power For All" vision. APL now has a healthy mix of open capacities as well as capacities tied up in long term PPAs, which provide it long term visibility while allowing it to tap into real growth opportunities. The Adani Group, with its established Pit-to-Plug presence, is confident of leveraging its strengths to achieve its long term goals, and contributing significantly to nation building.

This pre-eminent position of APL will be further consolidated upon completion of the 1,600 MW (2 X 800 MW) Ultra-supercritical power project, which is being constructed in Godda District of Jharkhand for supply of power to Bangladesh, and take the aggregate generation capacity to 14,050 MW.

About The Adani Group

Adani Power (APL), a part of the diversified Adani Group, is the largest private thermal power producer in India. The company has an installed thermal power capacity of 12,450 MW spread across four power plants in Gujarat, Maharashtra, Karnataka and Rajasthan. With the help of a world-class team of experts in every field of power, Adani Power is on course to achieve its growth potential. The company is harnessing technology and innovation to transform India into a power-surplus nation, and provide quality and affordable electricity for all.

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, pumping test, chemical analysis of ground and surface water samples from the buffer zone of 10 km radius and particularly downstream side of ash dyke and its impact on the water regime for REL, TPP 2 X 685 NW,Raikheda, Block- Tilda, District-Raipur, Raipur Energen Limited.
2. Survey and hydrological data collection of 30 key wells of 10km 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. Conducting a pump test any existing plant/private bore well along with recuperation test. The pump test is required to find out the aquifer parameters like K,T and S. Interpretation of pump test data by software is included conducting pump test on any open well and its recovery test to find out aquifer parameters.
5. Collection of samples of ground water and few surface samples from the buffer zone and more from the downstream side of ash dyke for determination of 23 constituents and 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 (which are generally present in bottom ash).
6. Preparation of ground water quality report of 10 km radius area of buffer zone based the results of chemical analysis and its different maps showing the different contour maps on important constituents.
7. Hydrological and drainage studies of buffer zone, delineation of micro watersheds, its

catchment area, catchment yields, particularly of watershed covering the ash dyke.

8. Preparation of ground water contour map of 10 km radius area showing the Ground water flow direction and hydraulic gradient.
9. Submission of draft report covering the findings of the investigations, original data and recommendations for future monitoring.
10. Submission of final report after incorporation of user observations.
11. The monitoring is to be carried out four times in a year i.e. January, May, August and November", ground water regime monitoring has been carried out under the present study. The study envisages regular monitoring of water level at select locations to observe the changes in ground water regime in time and space. The detailed hydro-geological study, already submitted forms base for the present monitoring work. The present report describes the behavior of ground water regime between **January 2019 and November 2022**, elucidates the analysis of ground water monitoring data and further depict overall picture of ground water regime along with changes in storage in time domain due to continuous abstraction of groundwater.

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:

1. A detailed Hydrogeological investigation was carried out in & around Plant within 10 km of radius for both Core & Buffer Zone for evaluating the impact of project activity on ground water storage in the area.
2. Collection and collation of supplementary data viz. soils, geology, geomorphology, drainage etc. for interpretation.
3. Establishment of observation stations for water level measurements in different seasons as well as water sample collection for determining the quality aspects.
4. Pumping test data & its interpretation for knowing the hydrogeological parameters, etc.
5. Ground water resources have been estimated based on the norms recommended by GEC'97.
6. 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 Raipur Energen Limited is a1,370 MW (2 X 685 MW) Supercritical power plant at Village: Raikheda, Taluka: Tilda, Dist:.Raipur, Chhattisgarh.

The co-ordinates of the Plant are 21°26'23" N - 21°27'48" N latitudes and 81°50'34.6" E to 81°52'08.5" E longitudes. For the present study, an area of 10 km of radius has been demarcated which lies between 21°21'46.77" N - 21°32'34" N latitudes and 81°45'22.87" Eto81°56'58.41" E longitudes and falls under the Survey of India Top sheet No. 64 G/14 and G/15in parts (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. Tilda Railway station, on Mumbai- Howrah Broad Gauge main line of the South-Eastern-Central Railway is situated around 14 kms western direction from plant site. Raipur is nearest Airport and is about 65 km from the study area which is also approachable by road and rail. The block head quarter is Tilda.

2.3 DEMOGRAPHY

There are 59 villages within 10 km radius of plant area. The total population as per 2011 Census is **90074** (for 10 km radius buffer zone). Scheduled Caste population of the study area (10km) is 18462 and Scheduled Tribe is 5212, Percentage of literacy is 65%.The workers those actually engaged in occupation are 40921 Main workers are around 15201while marginal workers are 33952. Rest of the total population, are considered as non-workers. A population detail is presented in table 2.1.

Table 2.1 Population details as per census 2011

Name	NoHH	TOT_P	TOT_M	TOT_F	P_SC	M_SC	F_SC	P_ST	M_ST	F_ST
Nilja	463	2476	1250	1226	25	13	12	655	322	333
Mangasa	186	914	469	445	88	47	41	0	0	0
Mauhagaon	256	1255	628	627	893	442	451	8	3	5
Amlitalab	114	528	275	253	313	165	148	0	0	0
Bahesar	343	1694	847	847	593	301	292	25	14	11
Bangoli	438	1898	956	942	192	87	105	123	68	55

Name	NoHH	TOT_P	TOT_M	TOT_F	P_SC	M_SC	F_SC	P_ST	M_ST	F_ST
Baronda	419	2033	994	1039	556	278	278	13	7	6
Bartori	272	1202	606	596	465	227	238	76	41	35
Bartori 2	285	1573	769	804	2	0	2	125	66	59
Bharuwadih Kala	172	825	412	413	118	63	55	152	67	85
BharuwadihKhurd	151	738	373	365	361	185	176	0	0	0
Bhibhauri	290	1446	726	720	72	34	38	69	35	34
Changori	86	407	212	195	407	212	195	0	0	0
ChhachhanPahri	98	463	232	231	237	125	112	0	0	0
Chhadia	320	1518	746	772	548	289	259	0	0	0
Chhapora	240	1187	589	598	339	181	158	0	0	0
Chhataud	461	2219	1070	1149	231	103	128	40	18	22
Chicholi	236	1103	539	564	472	238	234	11	5	6
Deogaon	281	1245	613	632	388	201	187	84	34	50
Deori	294	1376	711	665	86	43	43	0	0	0
Dhansuli 1	254	1241	607	634	310	151	159	13	7	6
Gaitra	199	892	456	436	427	226	201	29	14	15
Ganiyari	393	2045	1022	1023	162	80	82	2	1	1
Gaurkheda	163	853	425	428	77	41	36	24	11	13
Jalso	200	932	478	454	20	11	9	87	44	43
Janjgira	219	1265	614	651	431	198	233	260	132	128
Kathiya 1	493	2410	1203	1207	541	283	258	326	158	168
Keotara	297	1469	758	711	674	352	322	151	77	74
Khamhariya	264	1252	612	640	80	38	42	287	139	148
Khapri	117	597	303	294	7	4	3	7	4	3
KhauliDabri	89	422	202	220	226	112	114	22	11	11
Khauna	786	3745	1894	1851	933	465	468	176	94	82
Khudmudi	200	969	506	463	235	120	115	0	0	0
Kodawa	290	1382	697	685	446	223	223	22	12	10
Konari	154	772	403	369	8	4	4	0	0	0
Kundru	916	4016	2071	1945	411	210	201	205	104	101
Kurra 1	251	1271	628	643	197	99	98	7	4	3
Madhi	506	2530	1231	1299	87	42	45	396	183	213
Math	453	2501	1434	1067	584	320	264	243	126	117
Mohrenga	525	2555	1275	1280	256	118	138	11	6	5
Mudpar 1	245	1189	573	616	192	98	94	0	0	0
Mura	531	2359	1188	1171	625	311	314	20	10	10

Name	NoHH	TOT_P	TOT_M	TOT_F	P_SC	M_SC	F_SC	P_ST	M_ST	F_ST
Nahardih	156	847	424	423	102	54	48	21	13	8
NaktiKhapri	152	735	365	370	368	180	188	0	0	0
NaktiKumhari	249	1215	599	616	175	83	92	47	23	24
Pachari	381	2112	1045	1067	987	501	486	268	133	135
Pachdeori	88	394	188	206	139	65	74	0	0	0
Paraswani	78	427	209	218	35	16	19	15	8	7
PatharaKundi	77	359	188	171	314	167	147	0	0	0
Pikaridih	256	1067	543	524	268	136	132	0	0	0
Raikheda	696	3541	1734	1807	52	25	27	305	139	166
Rajiya	199	906	435	471	277	139	138	20	10	10
Sirwe	232	1172	580	592	153	75	78	277	136	141
Sontara	227	1084	543	541	459	240	219	0	0	0
Tarasiw	322	1460	726	734	64	33	31	0	0	0
TekariParswani	430	1743	901	842	332	166	166	43	24	19
Tildadih	226	1009	532	477	365	188	177	0	0	0
Kharora (NP)	1961	9236	4632	4604	1057	521	536	547	270	277
Total	**18680**	**90074**	**45241**	**44833**	**18462**	**9329**	**9133**	**5212**	**2573**	**2639**

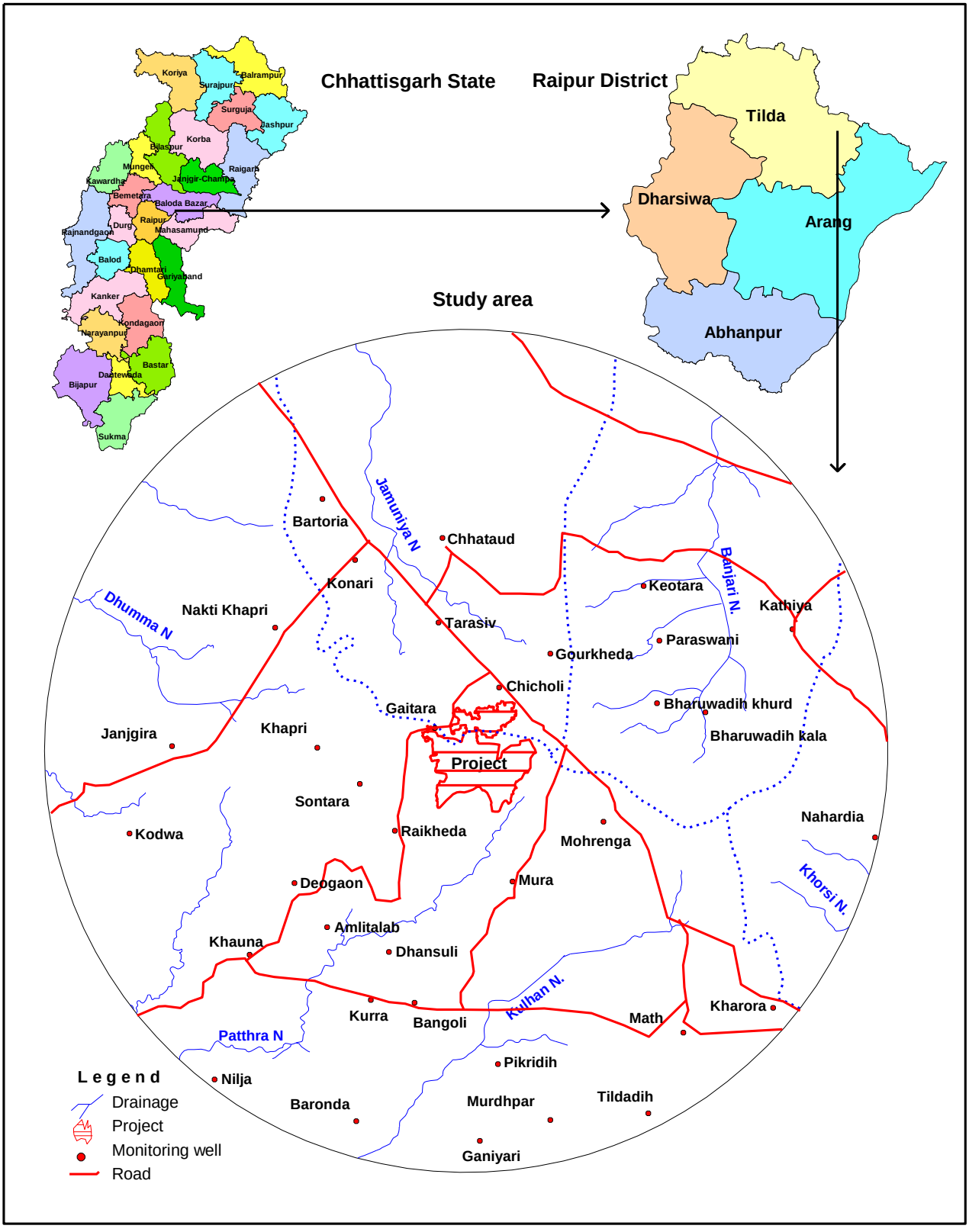


Fig 2.1: Location map the Study area

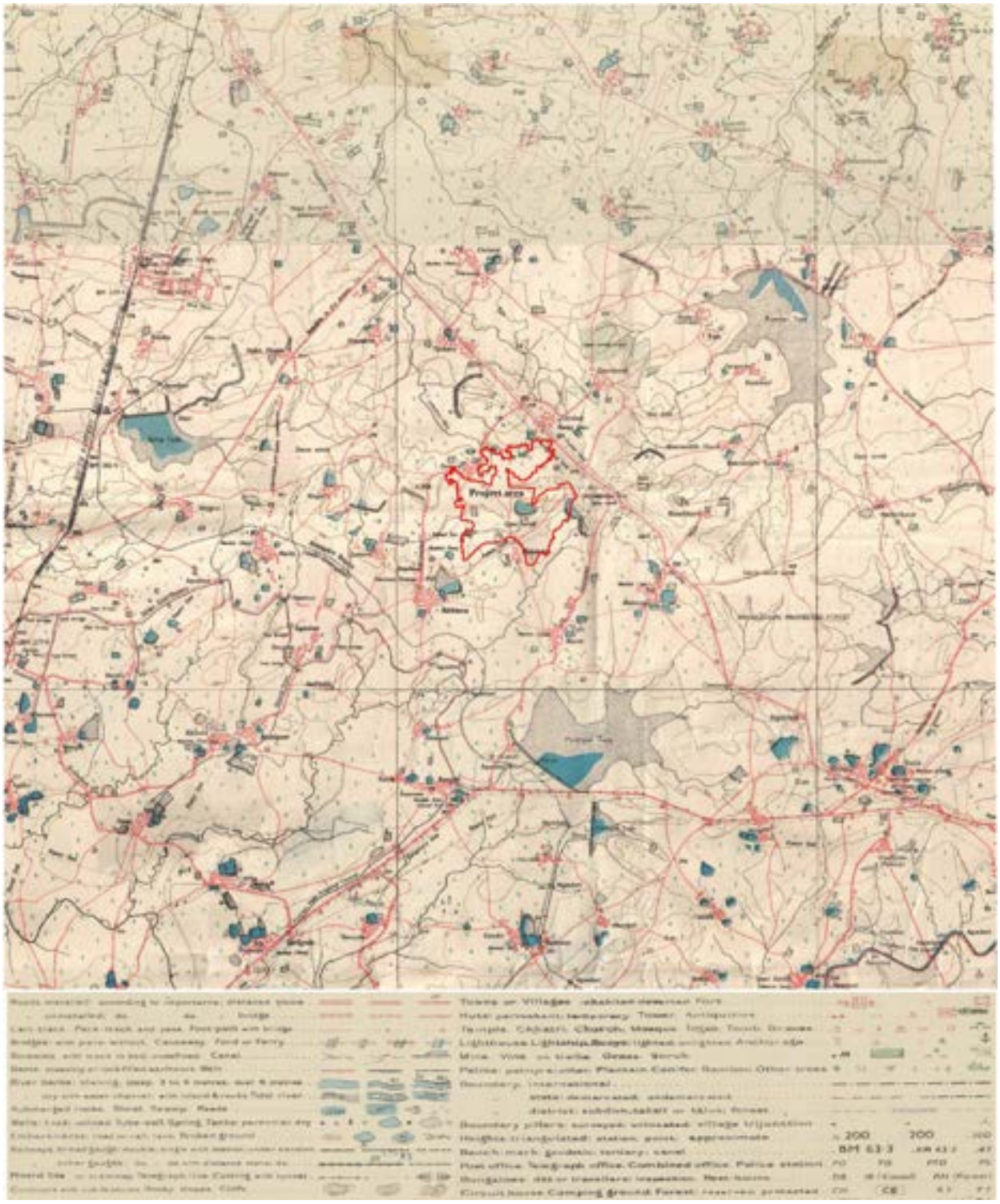


Fig 2.2: Top sheet (1:50000) of the Study area

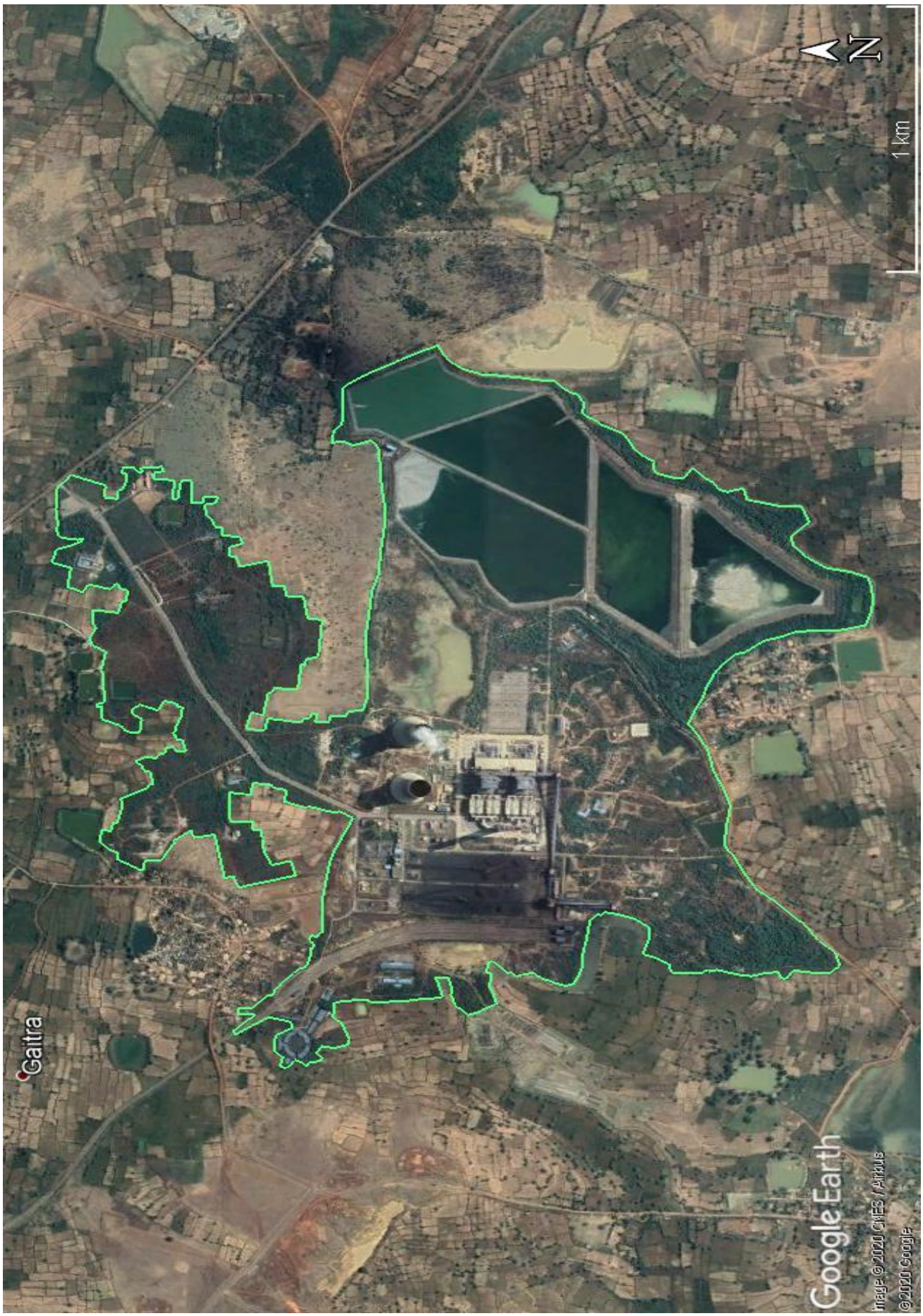


Fig 2.3: Satellite of the Study area

2.4 LAND USE

In the study area, nearly 3239 ha is covered by irrigated area, 18626 ha is covered by non-irrigated area. Cultivable waste land area comes around 303 ha while 276 ha area is covered by area not available for cultivation. Details of land use pattern of the study area are presented in **Table 2.2** below and **Fig 2.4**.

Table 2.2: Land use Pattern of the Study Area (10 km radius from theProject site)

Sno.	Crop type	Area in Sqkm	Percentage to total area
1	Rabi Crop	15.8699	5.05
2	Kharif Crop	186.264	59.31
3	Double Crop	16.5283	5.26
4	Land Without Scrub	54.3982	17.32
5	Land With Scrub	13.562	4.32
6	Scrub forest	0.793647	0.25
7	Fallows	2.76988	0.88
8	Settlement	3.03294	0.97
9	Water	16.1558	5.14
10	Plant area	4.67	1.49
		314.0447	**100.00**

Source: Satellite Imagery

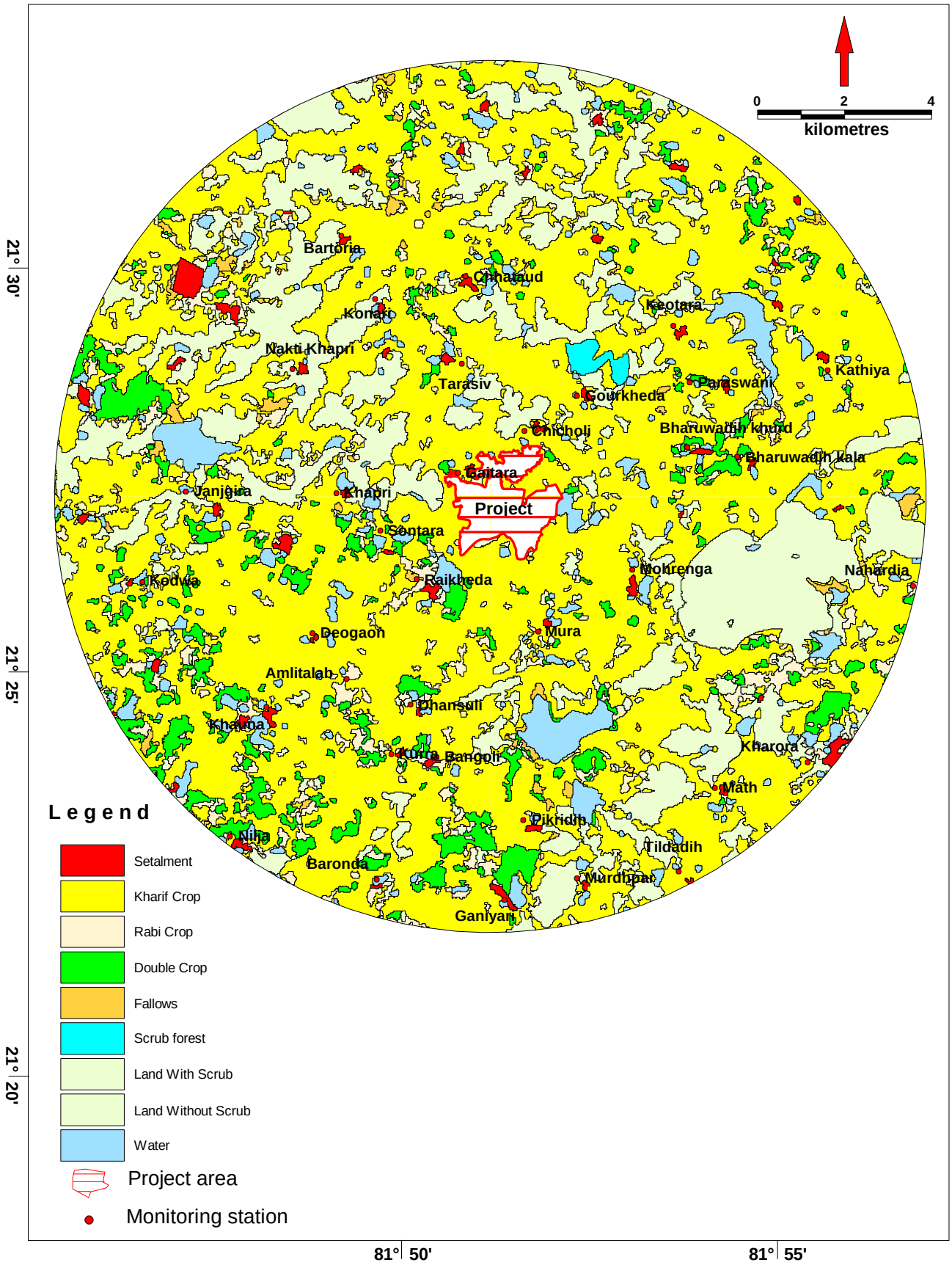


Fig 2.4: Land use map the Study area

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 10 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 t**able 2.**3.

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%. The rainfall increases generally from the north-west to the south-east. 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- 60rainy days in a year**.** There is only one observatory located in Raipur which is about 65 km away from the study area maintained by Indian Meteorology Department. The monthly average of different parameters of weather for the period 1980 to 2020 is presented in **Table-2.4** below.

Table-2.4. Climatological data of Observatory station at Raipur, IMD

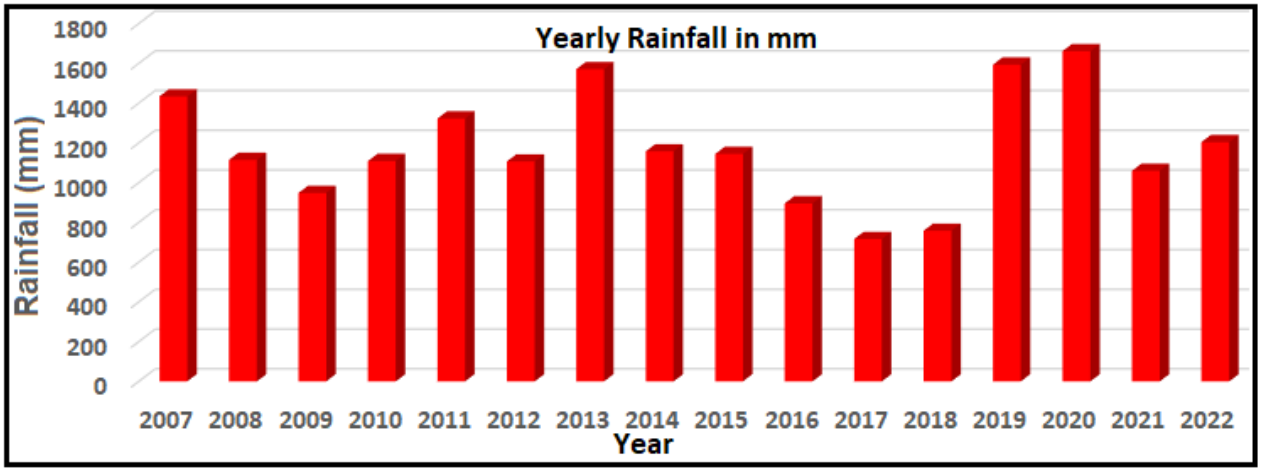
Month	Mean Temp.(°C)		Relative Humidity (%)	Wind Velocity (Km/Hr)	Rainfall (mm)	EPT(mm)
	Max	Min				
January	27	13	50	5	6.2	114
February	30.8	16	39	6	12	132
March	35	20	32	6.9	19	185
April	40	26	30	8.4	13	221
May	42	28.2	31.6	10.4	19	258
June	37	26	58	122.1	205	195
July	30	23	80.1	11.8	392	125
August	30	23	80.1	10	358	122
September	31	23.8	75	7	221	125
October	31	26.1	64	6	57	144
November	29	16.1	53	4	7	114
December	27	13.1	52	4.1	3	104
Avg./Total	32.5	21.2	53.7	16.8	1312.2	153

2.6.2 Rainfall

During the Year 2007 to 2022 the maximum rainfall recorded 1593.85 mm in the year 2019 and minimum rainfall 716.41 mm had been recorded in the year 2017. Details are as shown in **Table 2.5**. 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 average1174.85 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 2.5: Rainfall (mm) data (2007-2022) of Raipur District, IMD

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2007	0	19.5	0.2	0.2	4.1	525.2	320.1	284.6	238	28.3	14	0	1434.2
2008	6.5	10.1	2.6	1	5.8	262.8	233.1	279.5	289.7	23.4	0	0	1114.5
2009	0	0	0	2.1	4.9	25.8	571.8	246.4	66.4	20.1	10.5	0.3	948.3
2010	3.4	1	0	1.7	5	53.8	462.4	225	273.8	47.7	23.3	12	1109.1
2011	0	3.7	0.3	116.6	8.6	197.7	293.4	363.8	334.6	4.1	0.1	0	1322.9
2012	0	26.1	7.86	0	3.2	154.9	363.8	349.7	184.7	4.1	8.16	3.72	1106.5
2013	0	64.2	4.9	15.3	4.1	283.1	387.1	433.8	289	89.4	0	0	1570.8
2014	0	64.1	24.4	11.9	15.1	53.4	485.9	217.6	240.1	45.4	0	0	1157.9
2015	15.1	6.4	19.26	43.36	9	331.3	273.8	280.2	158.5	2.44	0	5.44	1144.7
2016	0	8.13	13	14.91	10.42	129.77	299.49	132.09	259.49	28.11	0	0	895.41
2017	0	0	0.5	0	17.3	177.7	170	148.4	111.5	91.45	0	0	716.41
2018	0	11.32	1.1	13.16	27.4	128.9	233.5	221.3	64.36	0	0	57.16	758.09
2019	0	64.2	4.9	15.3	4.1	283.1	387.1	433.8	289	89.4	23	0	1593.8
2020	28.6	77	38.4	22.9	40.4	298.3	216.6	580.6	285.8	72.6			1661.2
2021	12.8	4.8	10		39.6	220.4	315.8	71.4	295.6	25.2	25.2	39	1059.8
2022	10.2	2.4		5.4	6.8	225.4	296.2	460	132.2	65.2			1203.8
Ave.	4.78	22.68	8.49	17.58	12.86	209.5	331.8	295.5	219.5	39.80	7.4	8.40	1174.85



2.7 SOILS

Two main soil categories are present in the study area namely Ultisols and Vertisols, Soil map mop of the study area is presented in **Fig 2.5**.

2.7.1: Ultisols

The Indian equivalent of this soil found in study area is Lateritic and red yellow soil. It is exposed in south-east-north western part& central part 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.

2.7.2 :Vertisols

Indian equivalent of this soil is found in the area namely Medium black soil. They are exposed in north east to south western part of the study area. They are characterized by a high content of expanding and shrinking clay known as montmorillonite. They may also be characterized by salinity and well-defined layers of calcium carbonate or gypsum. Vertisols typically form from highly basic rocks such as basalts and are found typically on level or mildly sloping topography in climatic zones that have distinct wet and dry seasons. Depending on the parent material and the climate, they can range from grey or red to the more familiar deep black. Vertisols contain high level of plant nutrients, but, owing to their high clay content, they are not well suited to cultivation without painstaking management. Vertisols are especially suitable for rice because they are almost impermeable when saturated. Rain fed farming is very difficult because vetisols can be worked only under a very narrow range of moisture conditions as they become very hard when dry and become very sticky when wet. Deep black Soil of Vertisols is found in small patches of sounthern side of the study area.

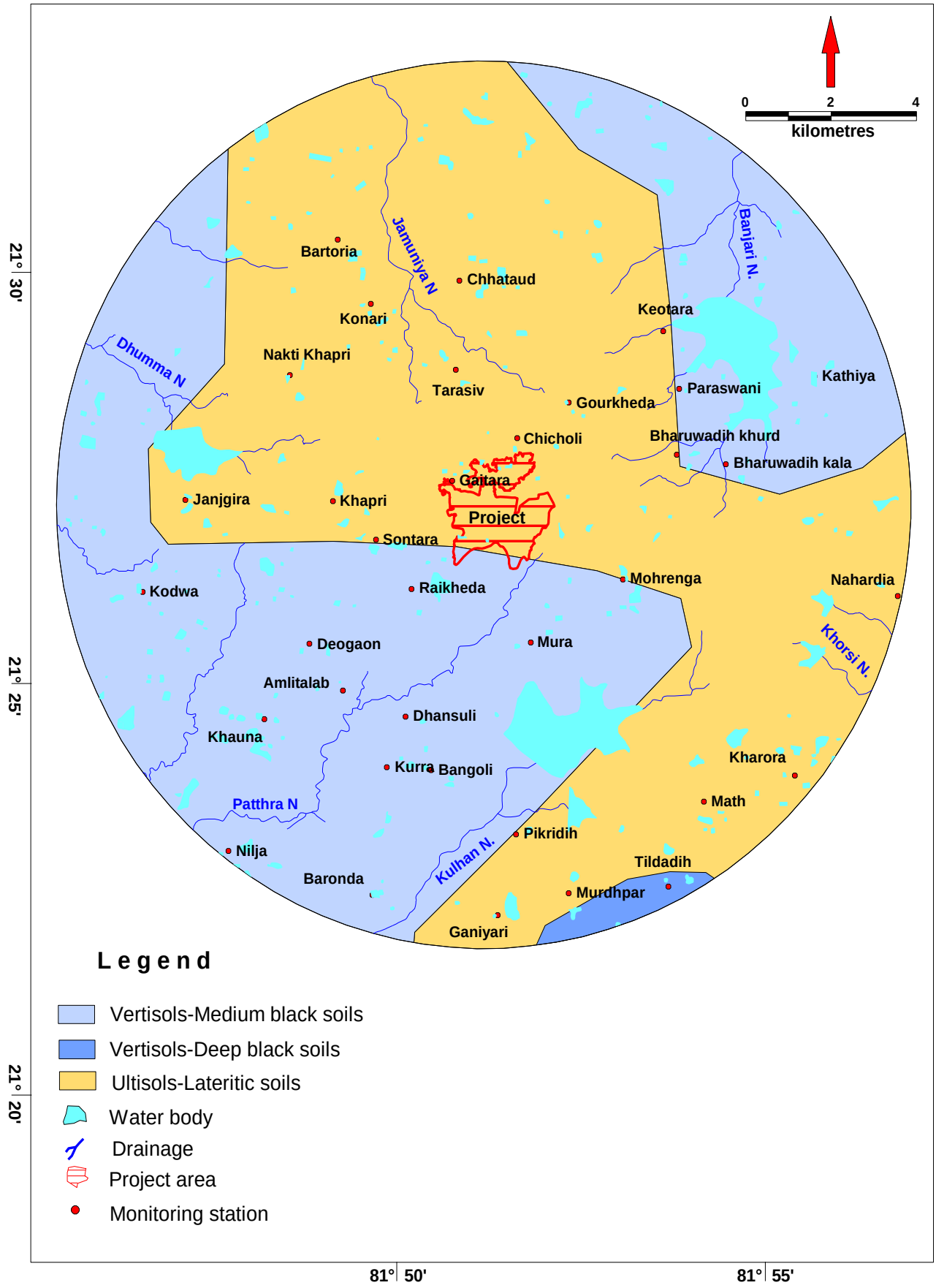


Fig 2.5: Soil map of the Study area

2.8. DRAINAGE AND GEOMORPHOLOGY

2.8.1 Drainage

The area is drained by tributaries of Seonath River especially by Banjari River and Khorsi nala. Banjari River is north flowing tributary to Seonath River and flows in the northern while Khorsi nala flows in the east of project area. Thus, the project area is in the interfluves zone of Banjari & Khorsi and Kulhan. Seonath River is a perennial river while these three tributaries are ephemeral in nature. 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 2.6**.

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/ pediment & Valleys. The Physiography of the basin is controlled by geological formations namely limestone, shale, and laterite.

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/pediment and valley fill. 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. This is primarily composed of

of Khorsi and Banjari nala. The geomorphic features in the study area are shown in **Fig 2.7.**

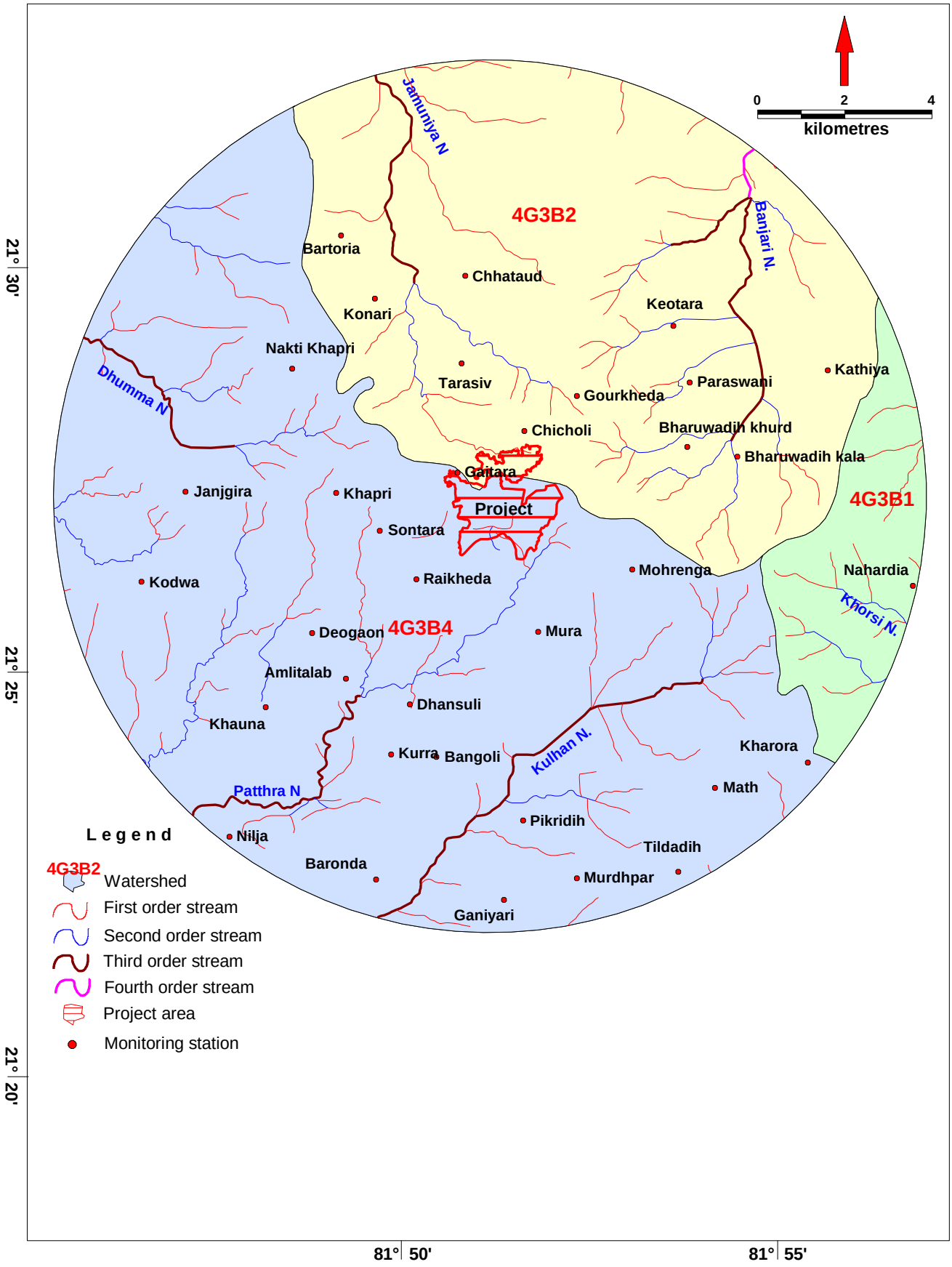


Fig 2.6: Drainage and watershed map of the Study area

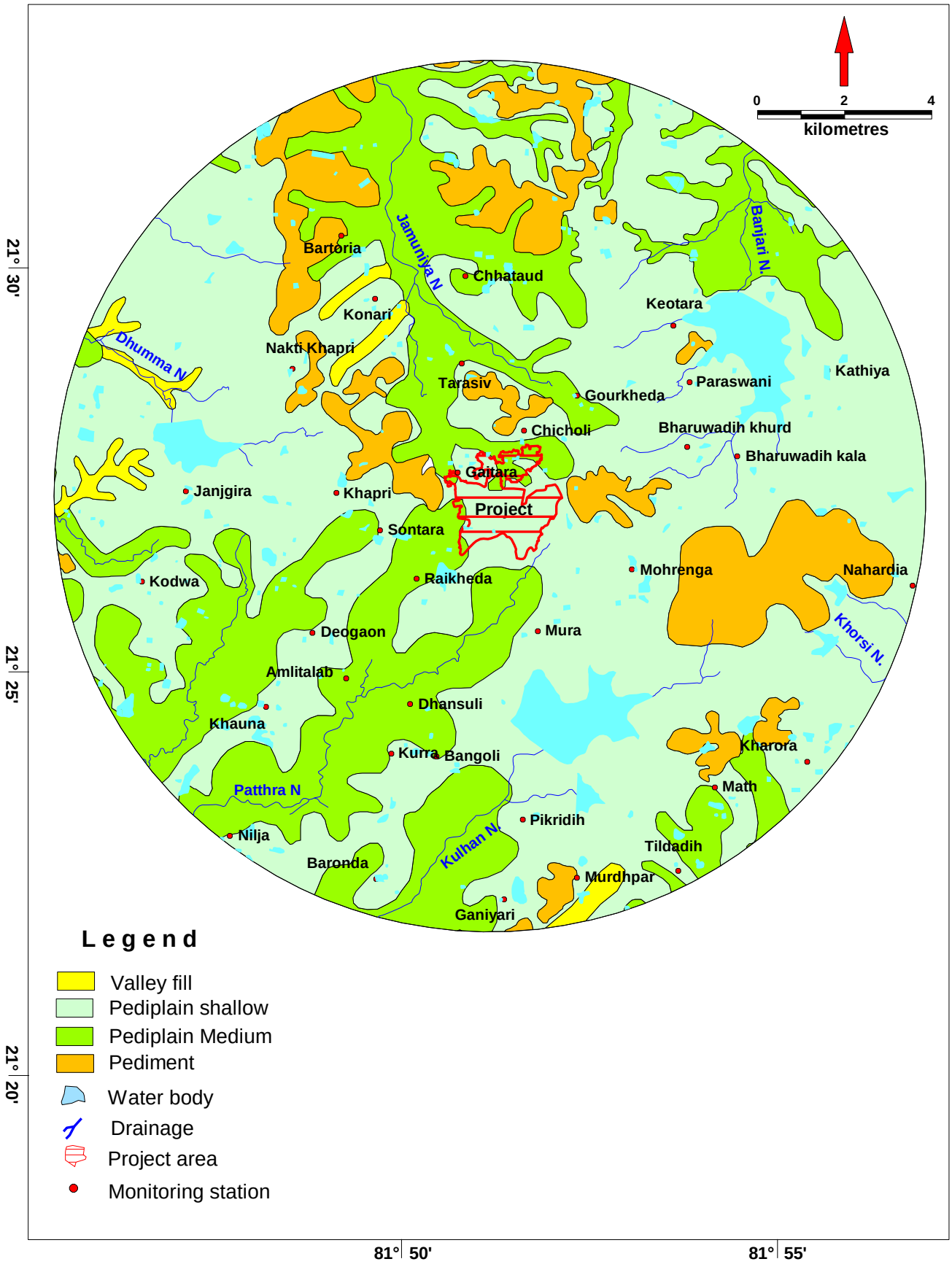


Fig 2.7: Geomorphological map the Study area

3. GEOLOGY

The rocks of the Chhattisgarh super group represented by limestone 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 Raipur 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**
			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			

3.1.1 Basement Crystalline:

The basement crystalline 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.

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.

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.

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 carbonates sequence and is conformably overlain by Gunderdehi formation.

Gunderdehi formation- dominantly a calcareous argillite purple colored 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 comprises cherty shale, calcareous shale and argillaceous dolomite, green and white clay.

Hirri formation- conformably overlies the Tarenga formation in south and Pandariaformation(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.

3.1.3 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 limestone and 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 f 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 limestone and 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 Soil/Laterite:

The major part of the area is underlain by alluvial residual soil covers which are loam and sandy loam. Laterites occur as capping associated with limestone and shale. The thickness of overburden varies from 2 to 6 m.

3.2.2 Grey shale:

Shale is softer in nature and do not outcrop in the area and lies below thin soil cover. It is buff grey in color and calcareous in nature. It splits easily along the bedding plains. They are generally horizontally laid. At places have low dips of 2 to 3 degrees towards North-west.

3.2.3 Dolomite:

Outcrops of dolomite exhibit typical ‘Elephant Skin’ weathering. It is dirty yellowish to brown in color. It is compact, hard, and massive. Outcrops of dolomite occur mainly in the western part of

the deposit and form a distinct zone. The dolomite occurs overlying the limestone and varies in thickness from 0.5m to as much as 24.0m.

3.2.4 Limestone:

Limestone forms the dominant rock type in the area. It is compact, fine grained, massive and chocolate brown to purple grey to grey in color. Analytical data shows that the limestone is thick and quite uniform in quality both laterally and vertically. Thickness of limestone in general is about 30m. Limestone forms a sharp boundary with dolomite occurring in the area. Shaly patches do occur within the limestone but its thickness is quite less.

3.2.5 Magnesium Limestone:

Limestone in the area is followed by fine grained, massive and compact magnesium limestone having a thickness of about 20m. Exploration data shows that the magnesium limestone occurs at a depth of about 235 amsl.

In order to understand the geological sequence fully well in the project site geological map of study area is **Fig 3.1.**

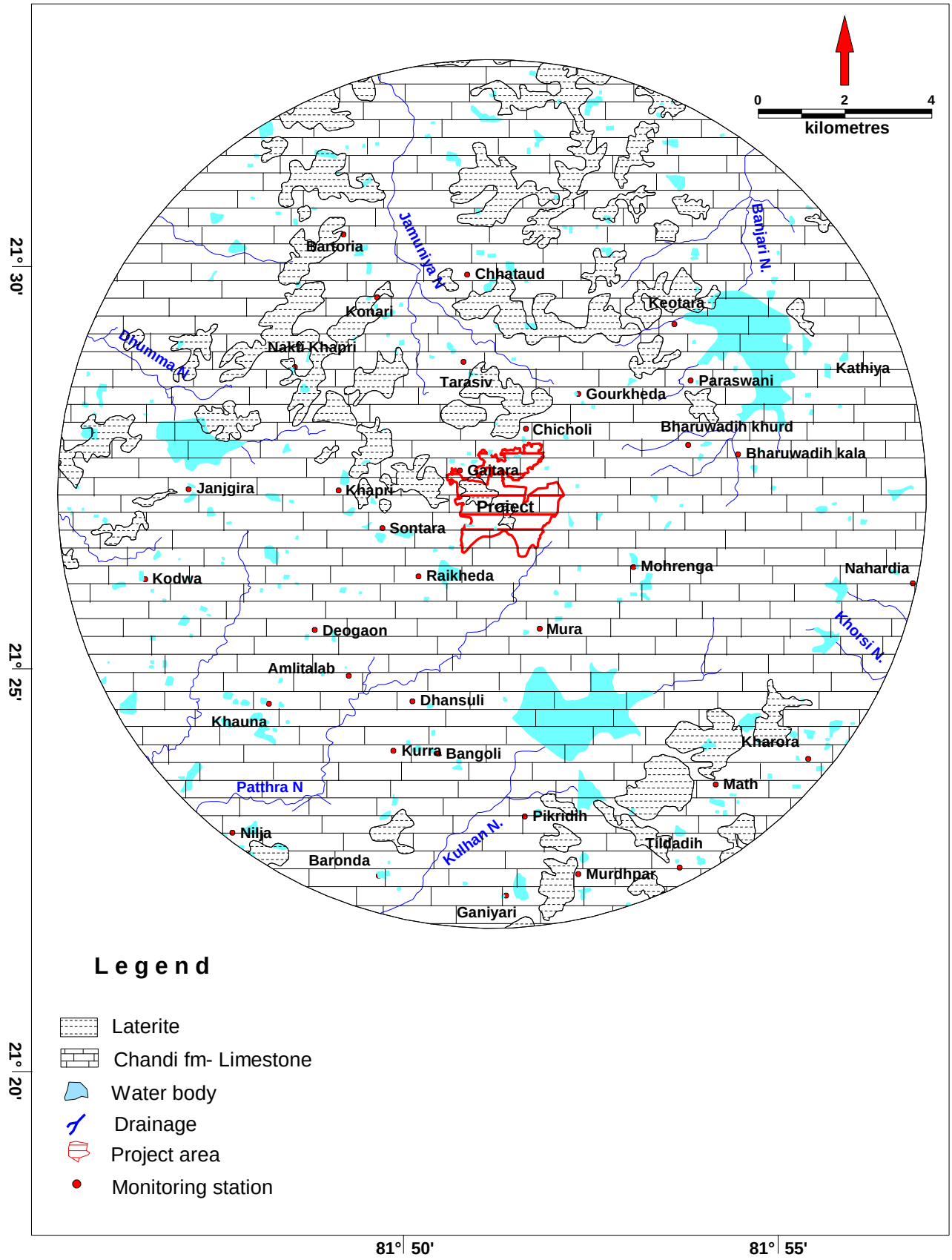


Fig 3.1: Geological map of the Study area

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. limestone and shale at depths. The shallow aquifers occur within an average depth of 20m. 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 Chandi formation comprising limestone 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 north-west and in southern part of the study area it is in south direction indicating the surface water divide in the central portion of the study area near to project area.

A local variation in flow direction is also observed which indicates the flow towards the mine pit in all directions. The Jamunia and Banjari nala flowing to north over the north-eastern part and Kulhan–

Pathra nala flowing westerly over western part of the study area are effluent in nature. The water table elevation in the study area ranges between 270 to 300 mamsl indicating more or less the plain terrain. North-western part of the area is having low altitude of water table elevation i.e. 270 mamsl while water table elevation increases to central& is maximum i.e. 300 mamsl. The gradient of water table is variable. In the area the yield ranges between 1 to 5 lps in central & eastern indicating the area is covered by stromatolitic limestone while in major part of the area it is 1 to 3 lps which is covered with shale & flaggy limestone. Hydrogeological map is given at **Fig.4.1 and 4.2.**

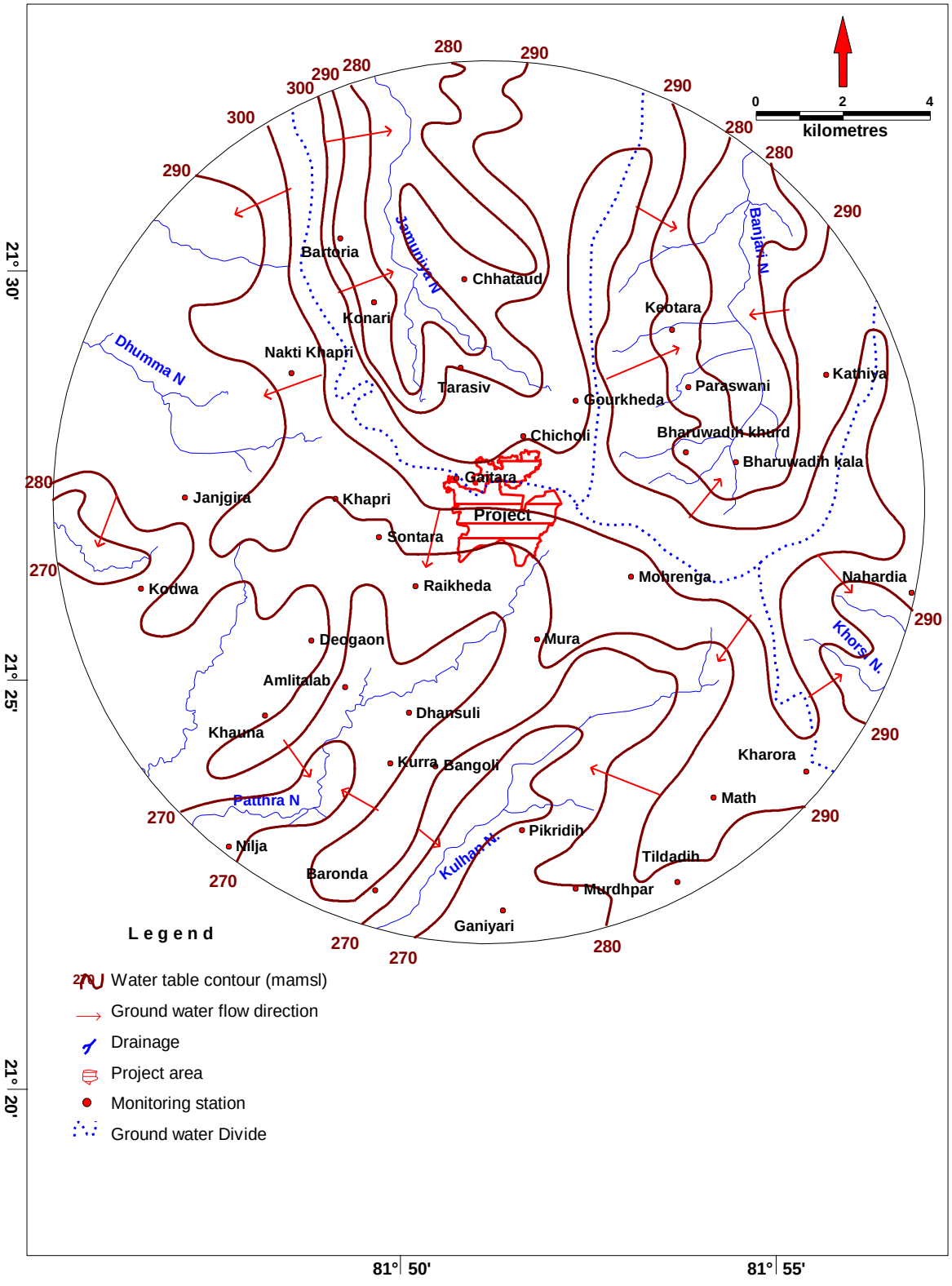


Fig 4.1 Water table contour and ground water flow direction

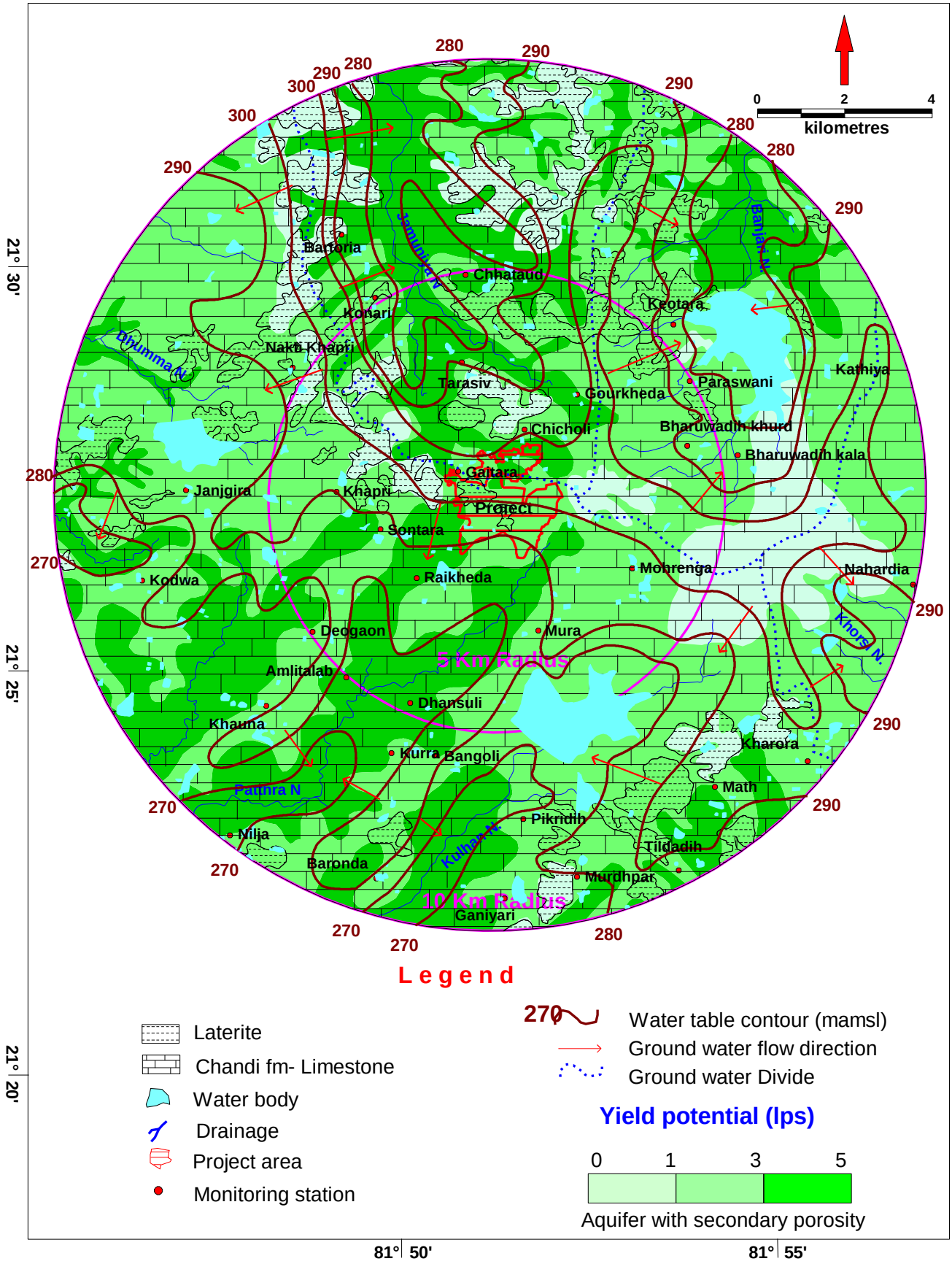


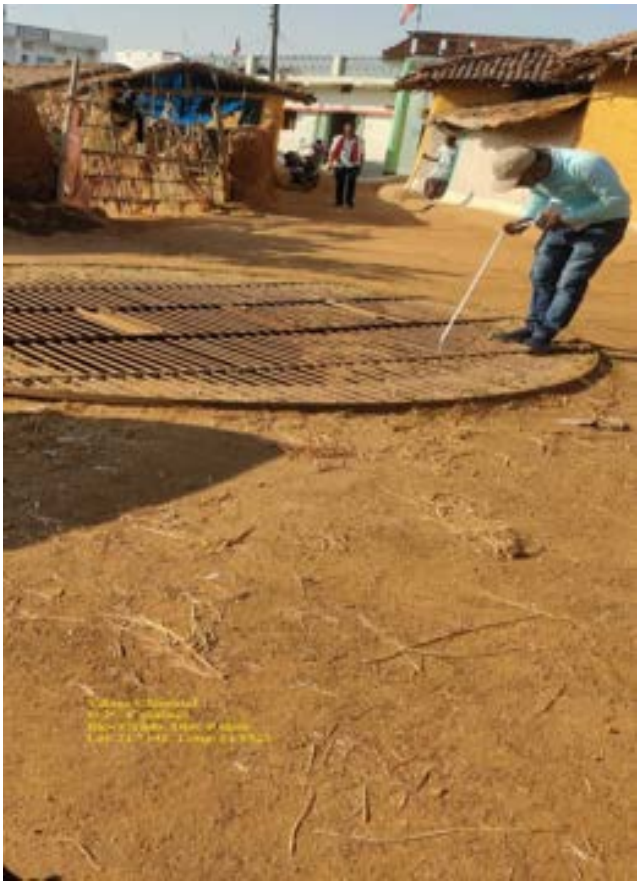
Fig 4.2 Hydrogeological map of the Study area

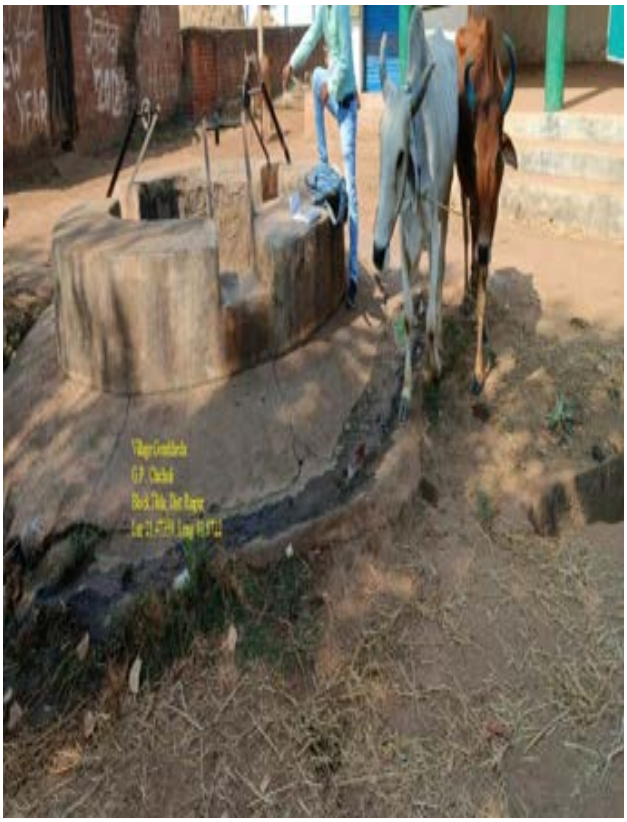
4.4 GROUND WATER REGIME MONITORING

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 2022. Ground water regime monitoring was carried out four times in a year i.e. January May, August 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 some monitoring stations are indicated in **plate: I**, which was taken during the collection of water level of ground water in all four seasons.


GPS Map Camera
Gaitra, Chhattisgarh, India
Unnamed Road, Gaitra, Chhattisgarh 493225, India
Lat 21.453185°
Long 81.844846°
28/11/22 03:52 PM GMT +05:30
Google






Village:Naharda
G.P. :Chhadya
Block:Tilda, Dist :Raipur
Lat:21.4292, Long: 81.9853


Village: Pikridih
G.P. Pikridih
Block: Tilda, Dist: Raipur
Lat:21.3843 Long: 81.8499

4.4.1 Distribution of monitoring stations

To study the change in ground water regime in and around study area, total of 35 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.**

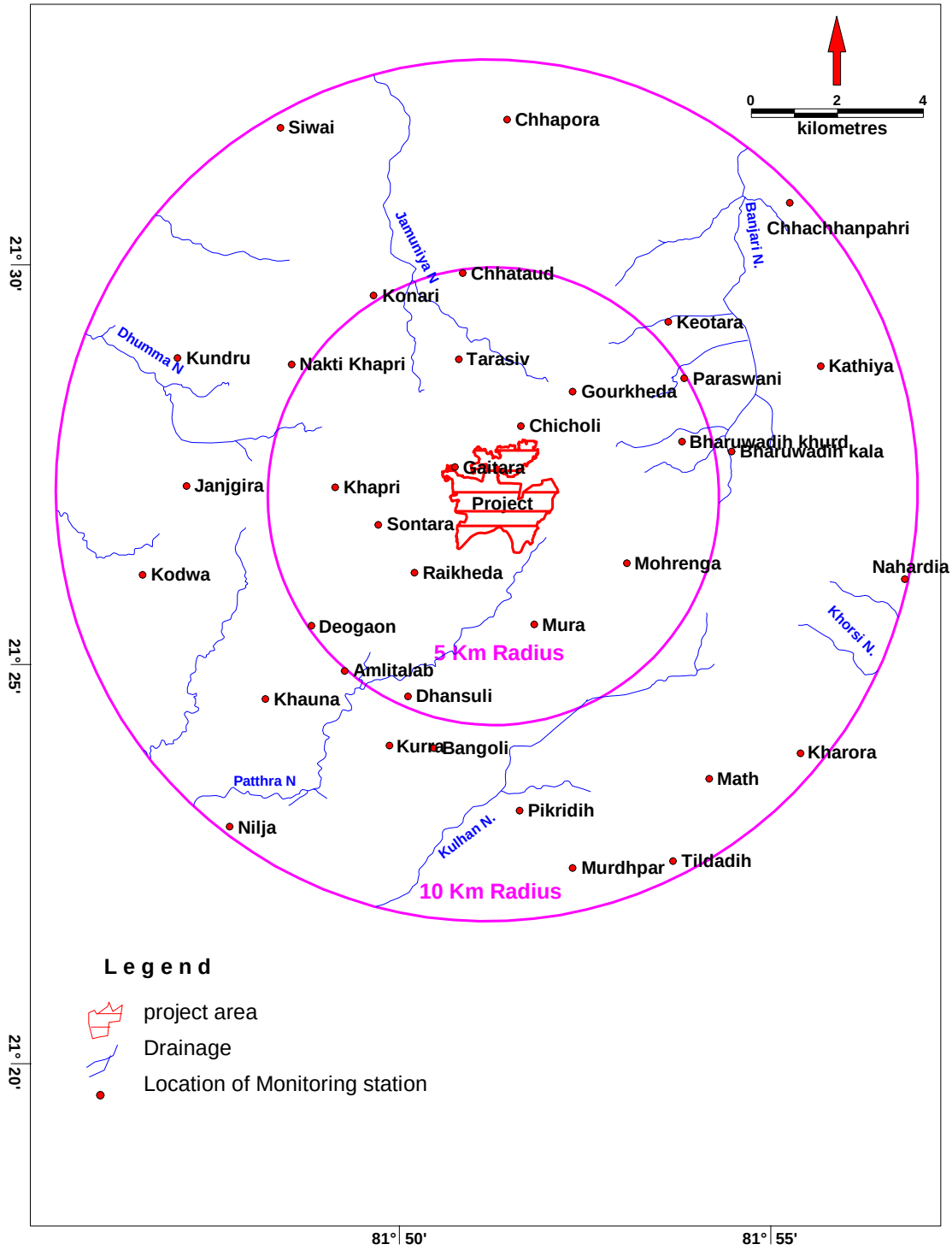


Fig 4.3: location of monitoring wells of the Study area

Table 4.1: Basic details of established monitoring wells

Sn	Village	GP	Block	RL Of ground level	Dia (m)	Lat (X)	Long (Y)
1	Amlitalab	Devgaon	Tilda	279	5.2	81.8211	21.4153
2	Bharuwadih khurd	Bharuwadih Kala	Tilda	295	2.7	81.8967	21.4631
3	Chhataud	Chhataud	Tilda	295	2.8	81.8475	21.4983
4	Chicholi	Chicholi	Tilda	310	1.85	81.8606	21.4664
5	Deogaon	Devgaon	Tilda	282	2.9	81.8136	21.4247
6	Dhansuli	Dhansuli	Tilda	276	2.7	81.8353	21.41
7	Gaitara	Gaitra	Tilda	300	4.4	81.8458	21.4578
8	Gourkheda	Chicholi	Tilda	305	2.45	81.8722	21.4736
9	Khapri	Khapri	Tilda	295	1.75	81.8189	21.4536
10	Mohrenga	Mohrenga	Tilda	300	1.85	81.8844	21.4378
11	Mura	Mura	Tilda	292	2.1	81.8636	21.425
12	Paraswani	Nakti Kumhari	Tilda	295	7.95	81.8972	21.4764
13	Raikheda	Raikheda	Tilda	290	4.5	81.8367	21.4358
14	Sontara	Sontara	Tilda	293	3.9	81.8286	21.4458
15	Tarasiv	Tarasiw	Tilda	295	2.3	81.8467	21.4803
16	Bangoli	Bangoli	Tilda	282	2.05	81.8411	21.3992
17	Bharuwadih kala	Bharuwadih Kala	Tilda	291	2.5	81.9078	21.4611
18	Chhachhanpahri		Tilda	285	0.6	81.9209	21.513
19	Chhapora		Tilda	295	0.3	81.8575	21.5303
20	Janjgira	Janjgira	Tilda	290	3.8	81.7856	21.4539
21	Kathiya	Katiya	Tilda	296	2.4	81.9278	21.4789
22	Keotara	Kevtara	Tilda	292	4.25	81.8936	21.4881
23	Kharora	Kharora	Tilda	304	3.9	81.9233	21.3981
24	Khauna	Khauna	Tilda	280	2.25	81.8033	21.4094
25	Kodwa	Kodwa	Tilda	283	4.5	81.7758	21.4353
26	Konari	Khamriya	Tilda	293	2.9	81.8275	21.4936
27	Kundru		Tilda	283	0.7	81.7836	21.4806
28	Kurra	Kurra	Tilda	278	1.4	81.8311	21.3997
29	Math	Math	Tilda	304	3.2	81.9028	21.3928
30	Murdhpar	Mudhpar	Tilda	292	1.55	81.8722	21.3742
31	Nahardia	Chhadiya	Tilda	305	2.7	81.9467	21.4344
32	Nakti Khapri	Jalso	Tilda	299	2.7	81.8092	21.4792
33	Nilja	Nilja	Dharsiwa	272	2.9	81.7953	21.3828
34	Pikridih	Pikridih	Tilda	285	1.7	81.8603	21.3861
35	Siwai		Tilda	295	0.6	81.8067	21.5286
36	Tildadih	Tildadih	Tilda	291	3.1	81.8947	21.3756

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 2022, analyzed for every set of measurements and discussed with maps in following sections.

5.2.1 Analysis of water levels (2022)

The water level data collected four times during the year 2022 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 2022)

Sn	Village	Depth to water level (mbgl) Jan-22	Depth to water level (mbgl) May-22	Depth to water level (mbgl) Aug-22	Depth to water level (mbgl) Nov-22	Fluctuation (m)	RL Pre monsoon water level (mamsl)
1	Amlitalab	2.98	5.20	1.00	2.10	3.10	273.80
2	Bharuwadih khurd	9.30	11.20	3.30	5.30	5.90	285.64
3	Chhataud	6.92	8.36	2.10	4.60	3.76	286.64
4	Chicholi	6.56	7.89	1.40	2.50	5.39	302.11
5	Deogaon	5.30	6.79	2.10	3.80	2.99	275.21
6	Dhansuli	2.21	3.78	1.10	2.00	1.78	272.22
7	Gaitara	4.50	6.84	1.39	2.90	3.94	293.16
8	Gourkheda	4.33	5.64	1.60	2.10	3.54	298.77
9	Khapri	3.12	4.90	1.30	2.50	2.40	290.10
10	Mohrenga	2.70	3.69	1.10	2.10	1.59	296.31
11	Mura	3.10	4.69	1.21	1.80	2.89	287.31
12	Paraswani	6.48	8.88	2.40	3.34	5.54	285.30
13	Raikheda	3.70	4.63	1.80	2.80	1.83	285.37
14	Sontara	5.33	6.70	2.60	3.80	2.90	286.77
15	Tarasiv	4.08	5.78	1.28	2.00	3.78	289.22
16	Bangoli	7.30	9.60	2.10	4.20	5.40	272.40
17	Bharuwadih kala	9.80	12.70	2.80	5.54	7.16	277.31
18	Chhachhanpahri	7.20	10.60	4.00	4.90	5.70	274.98
19	Chhapora	6.40	7.56	2.20	3.45	4.11	288.99
20	Janjgira	7.30	10.40	2.30	5.60	4.80	279.60
21	Kathiya	5.30	7.63	0.90	1.30	6.33	288.37
22	Keotara	6.20	8.03	1.30	4.50	3.53	283.04
23	Kharora	4.30	6.35	1.02	2.50	3.85	297.65
24	Khauna	6.55	8.77	2.11	5.27	3.50	270.30
25	Kodwa	4.35	6.00	1.08	2.00	4.00	277.00
26	Konari	6.14	7.50	1.01	1.30	6.20	285.50
27	Kundru	7.10	9.80	1.80	4.60	5.20	273.20
28	Kurra	9.56	11.47	2.10	5.61	5.86	266.53
29	Math	3.72	5.12	1.08	2.00	3.12	298.88
30	Murdhpar	5.70	7.23	0.98	2.30	4.93	284.77

31	Nahardia	6.21	8.47	2.40	5.20	3.27	296.53
32	Nakti Khapri	9.80	12.60	2.90	7.70	4.90	286.40
33	Nilja	3.12	5.70	1.06	2.01	3.69	266.30
34	Pikridih	5.21	7.56	1.10	2.70	4.86	277.44
35	Siwai	6.30	8.66	2.70	4.81	3.85	286.34
36	Tildadih	3.41	5.71	1.06	2.80	2.91	285.29

5.2.1.1 Pre-monsoon Depth to Water level (May' 2022)

The depth to water level map has been prepared based on ground water monitoring data of May 2022. From the perusal of Table 5.1, it is observed that the overall depth to water level remains between 3.69 to 12.7 meters below ground level. The pre-monsoon depth to water levels ranges between 5 and 10 mbgl in 5 km radius 60% of the villages, water levels more than 10 mbgl are observed in the villages namely Bharuwadih khurd villages and less than 5 observed in 33% villages. In 10 km radius depth to water levels ranges between 5 and 10 mbgl observed in 76% of the villages, water levels more than 10 mbgl are observed in remaining 24 % villages of buffer zone. Water level less than 5 mbgl. recorded at Mohrenga,Dhansuli,Raikheda,Murra and Khapri villages in 5 km radius, shown in **Fig 5.1**.

5.2.1.2 Post-monsoon Depth to Water level (November' 2022)

The depth to water level map has been prepared based on ground water monitoring data of Nov 2022. On perusal of the data and map given at **Fig.5.2**, it is observed that the overall depth to water level remains between 1.3 and 7.7 meters below ground level. The post-monsoon depths to water level range of 0 to 3 mbgl are observed in 66% villages of core zone (5 km Radius), about 26% villages shows water level in the range of 3 to 5 mbgl and more than 5 mbgl at Bharuwadih khurd village. In the area of 10 km radius ground water levels less than 3 mbgl are observed in the 42% villages, about 29% villages shows water level in the range of 3 to 5 mbgl and more than 5 in 29% villages.

5.2.1.3 Seasonal water level fluctuation (May 2022 Vs Nov. 2022)

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 1.59 to 7.16 meters. Lower range of water level fluctuation is also observed along the river course followed by > 6. 4 to 6, & 2 to 4.

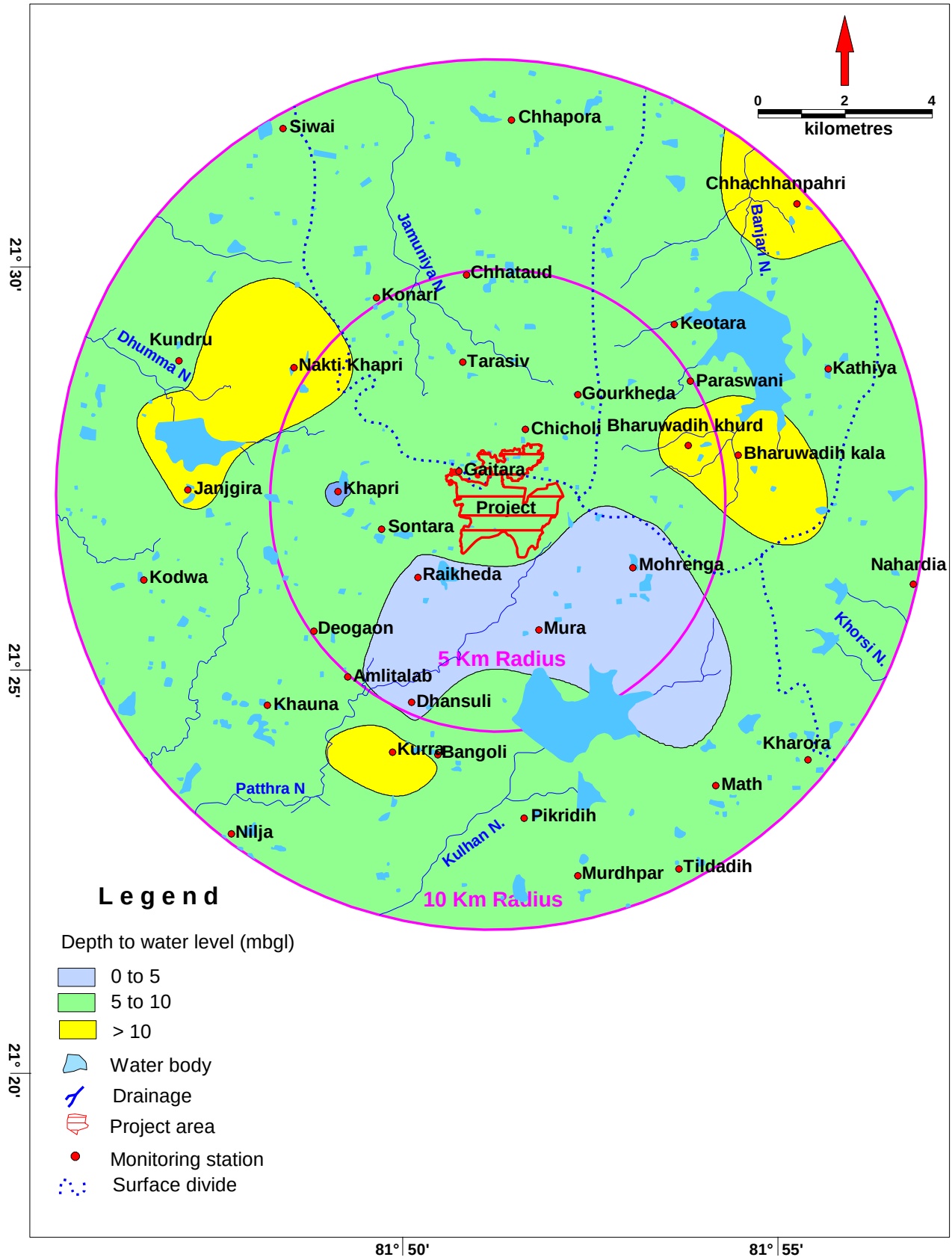


Fig.5.1: Pre-monsoon Depth to Water level map (May'2022)

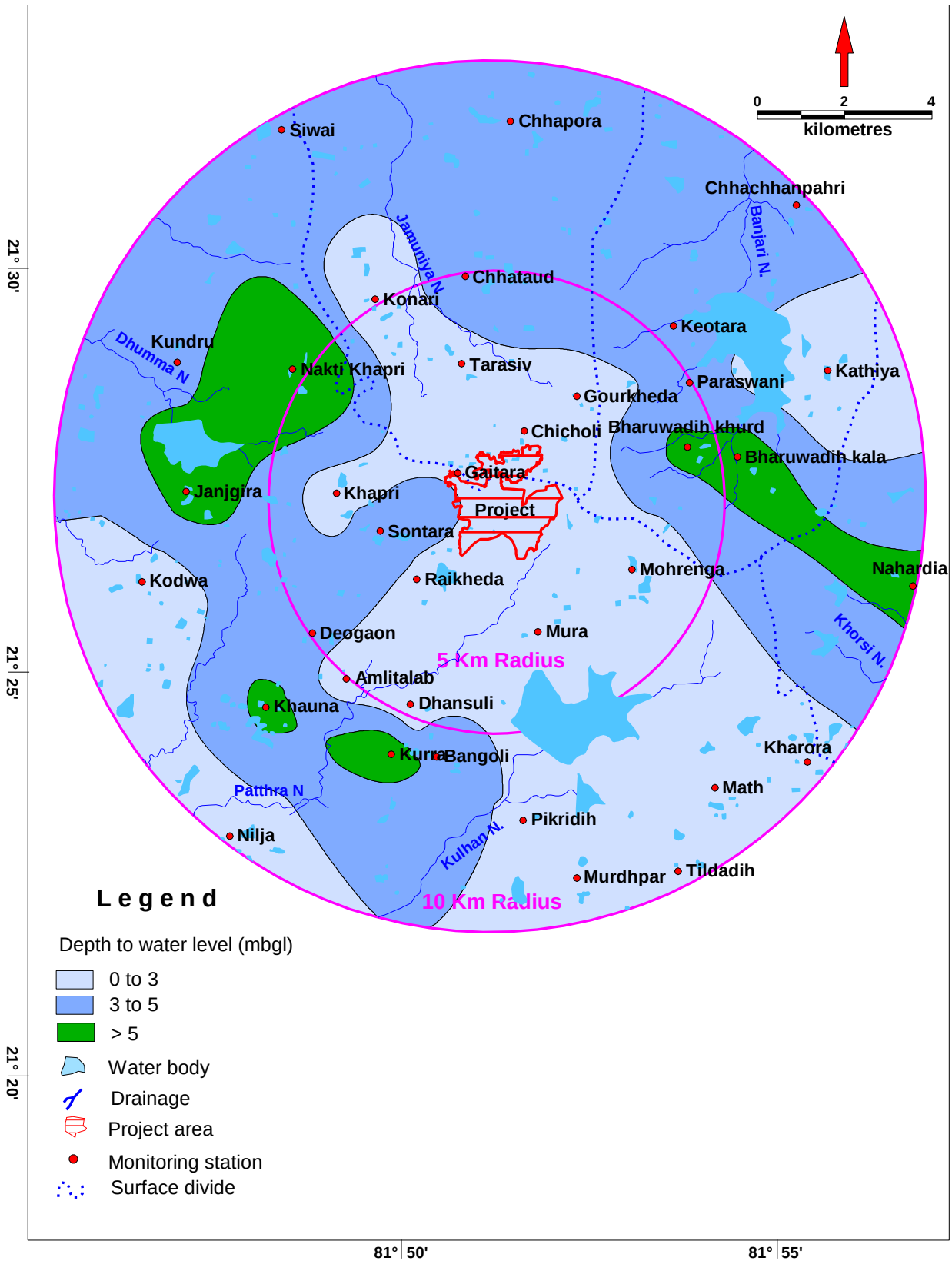
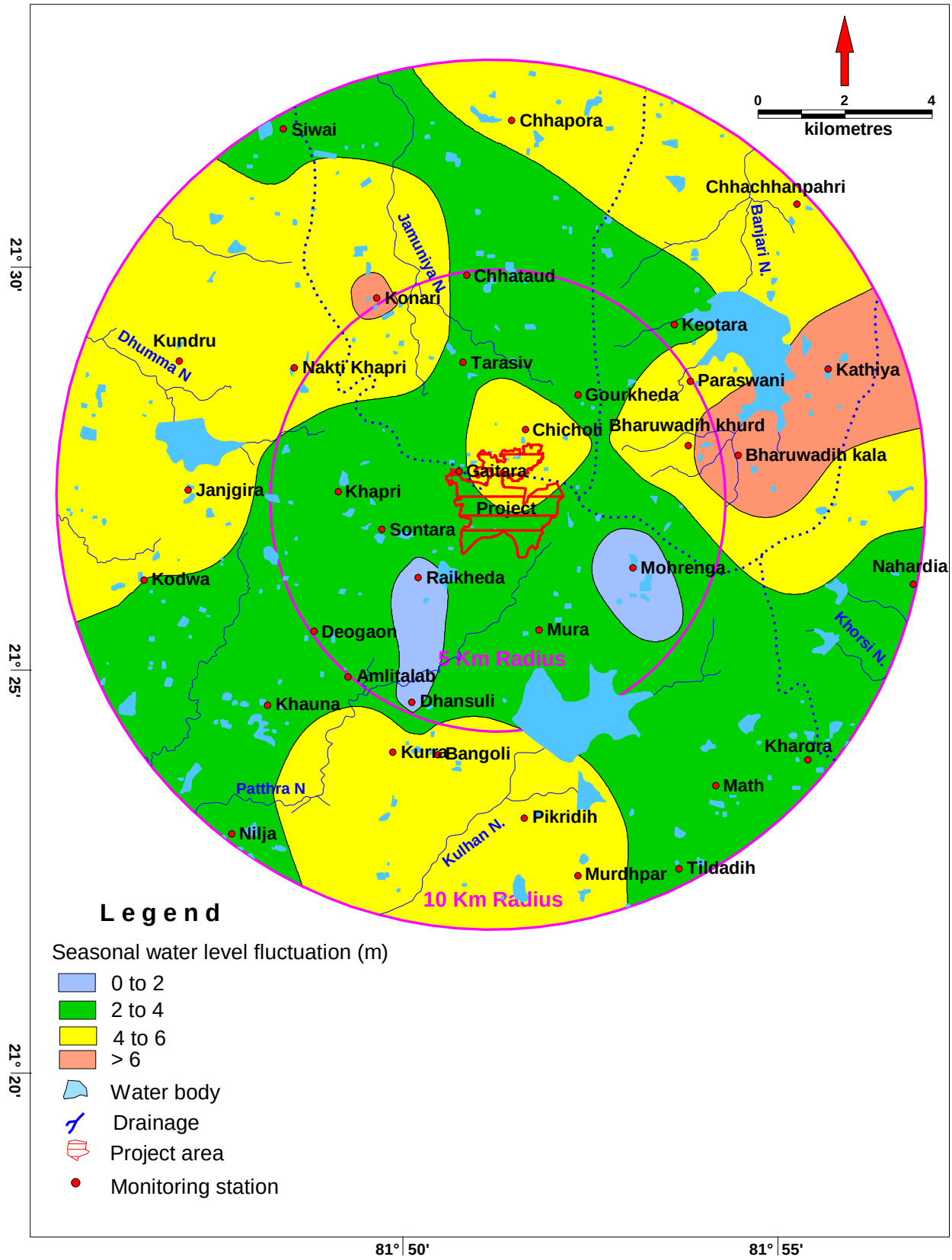


Fig.5.2: Post-monsoon Depth to Water level map (Nov.'2022)



Fig

5.3: Seasonal Water Level Fluctuation map (Nov.' 2022 Vs May' 2022)

5. 3 COMPARISONS OF WATER LEVELS OVER THE YEARS

The ground water levels in the area have been monitored 4 times in a year as mentioned earlier. Mean water level (2019-2021) has been compared with water levels of year 2022, for pre-monsoon and post-monsoon period separately in core and buffer zones, to assess the change in ground water levels over the years. Keeping this in view, the water level data of last twelve years has been analysed to assess the change in water level behaviour. The said water levels of year 2019-2021 (mean) compared with respect to year 2022 both for pre-monsoon and post-monsoon period separately for core and buffer zones are presented in **Table 5.2**.

5.3.1 WATER LEVEL CHANGES

The water level data for last four years have been analysed to assess decline or rise in the ground water level through fluctuation in water level within the study area. Ground water level data for year 2022 has been analysed for core and buffer zones and changes in water levels through fluctuation with respect to the mean water levels (2019-2021) for different seasons is observed and presented in **Table 5.2.**

5.3.1.1 PRE-MONSOON DEPTH TO WATER LEVEL TREND

While comparing mean pre-monsoon average water levels of (2019-2021) with that of 2022 (Table 5.2), it is found that all the villages in core zone (5 Km Radius) which are considered for analysis showing decline in the range of -0.2 to -0.8 m. except Gaukheda and Paraswani villages (Fig 5.5) which are showing rise of water level in the ranges of 0.16 to 0.18 m and 57 % of the villages in buffer zone(10 Km Radius) are showing decline in range of -0.1 to -0.8 m while 43 % villages are showing rising in water level in the range of 0.02 to 4.96 m as shown in **Fig 5.6.** The area showing falling trend more than 20 cm/yr are of considerable significance which is attributed to increase in draft in selective patches. In conclusion, if the decline per year is more than 0.20 m then for the period of four years it will be more than 0.8 m which is considered as significant but in the present scenario all the villages of core zone and buffer zone considered for analysis shows decline less than 0.8 m over the period of four years, so it is evident that in there is a marginal decline in water level trend in pre-monsoon period over the period of four years (**Fig 5.4).**

Table 5.2: Comparisons of water levels (2019-2021) with reference to water levels of the year 2022.

Sn	Village	**Mean pre-monsoon (May' 2011 - May 21) (mbgl)**	**Mean post-monsoon (Nov' 2011 -Nov 21) (mbgl)**	**DTW May' 2022 (mbgl)**	**DTW Nov' 2022 (mbgl**	**Change(m) Pre-monsoon**	**Change (m) post-monsoon**
5 Km Radius							
1	Amlitalab	4.40	1.60	5.20	2.10	-0.80	-0.50
2	Bharuwadih khurd	10.43	5.68	11.20	5.30	-0.77	0.38

3	Chhataud	7.80	3.86	8.36	4.60	-0.56	-0.74
4	Chicholi	7.20	1.72	7.89	2.50	-0.69	-0.78
5	Deogaon	6.03	3.07	6.79	3.80	-0.76	-0.73
6	Dhansuli	3.30	1.28	3.78	2.00	-0.48	-0.72
7	Gaitara	6.30	2.25	6.84	2.90	-0.54	-0.65
8	Gourkheda	5.80	2.33	5.64	2.10	0.16	0.23
9	Khapri	4.70	1.70	4.90	2.50	-0.20	-0.80
10	Mohrenga	2.99	1.51	3.69	2.10	-0.70	-0.59
11	Mura	4.20	1.20	4.69	1.80	-0.49	-0.60
12	Paraswani	9.06	4.34	8.88	3.34	0.18	1.00
13	Raikheda	4.01	2.01	4.63	2.80	-0.62	-0.79
14	Sontara	6.50	3.08	6.70	3.80	-0.20	-0.72
15	Tarasiv	5.01	1.92	5.78	2.00	-0.77	-0.08
10 KM Radius							
16	Bangoli	9.62	4.70	9.60	4.20	0.02	0.50
17	Bharuwadih kala	12.34	6.44	12.70	5.54	-0.36	0.90
18	Chhachhanpahri	9.80	4.30	10.60	4.90	-0.80	-0.60
19	Chhapora	6.80	3.68	7.56	3.45	-0.76	0.23
20	Janjgira	10.02	4.89	10.40	5.60	-0.38	-0.71
21	Kathiya	8.45	2.95	7.63	1.30	0.82	1.65
22	Keotara	8.22	3.74	8.03	4.50	0.19	-0.76
23	Kharora	5.90	1.80	6.35	2.50	-0.45	-0.70
24	Khauna	9.04	5.54	8.77	5.27	0.27	0.27
25	Kodwa	6.20	2.10	6.00	2.00	0.20	0.10
26	Konari	7.80	2.98	7.50	1.30	0.30	1.68
27	Kundru	9.70	4.80	9.80	4.60	-0.10	0.20
28	Kurra	11.05	5.91	11.47	5.61	-0.42	0.30
29	Math	4.55	1.65	5.12	2.00	-0.57	-0.35
30	Murdhpar	12.19	5.80	7.23	2.30	4.96	3.50
31	Nahardia	8.02	4.51	8.47	5.20	-0.45	-0.69
32	Nakti Khapri	12.01	6.90	12.60	7.70	-0.59	-0.80
33	Nilja	5.90	2.05	5.70	2.01	0.20	0.04

34	Pikridih	6.89	1.91	7.56	2.70	-0.67	-0.79
35	Siwai	8.50	4.90	8.66	4.81	-0.16	0.09
36	Tildadih	5.80	2.05	5.71	2.80	0.09	-0.75

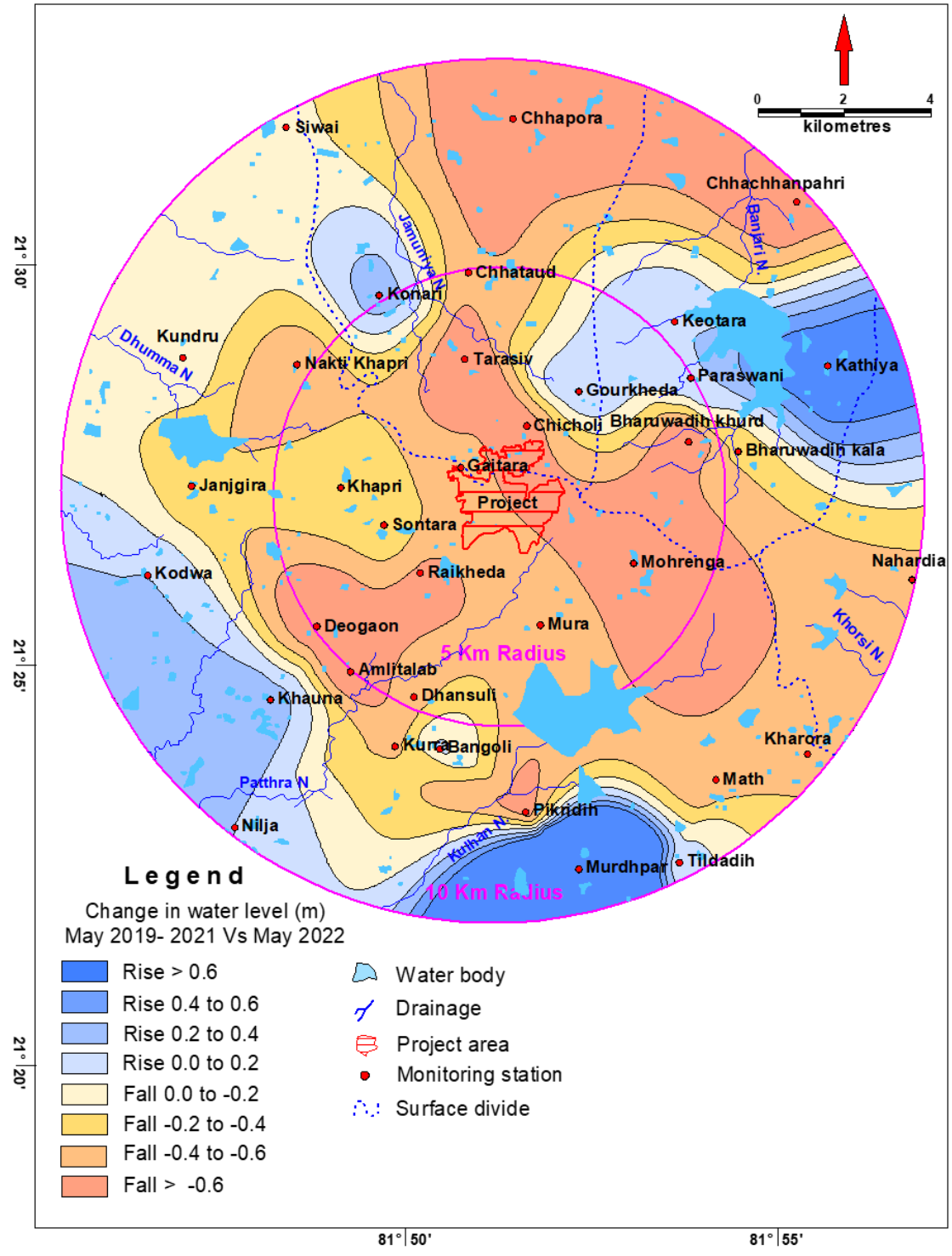


Fig 5.4 : Pre-monsoon water level change (May'2019-2021 Vs May'2022)

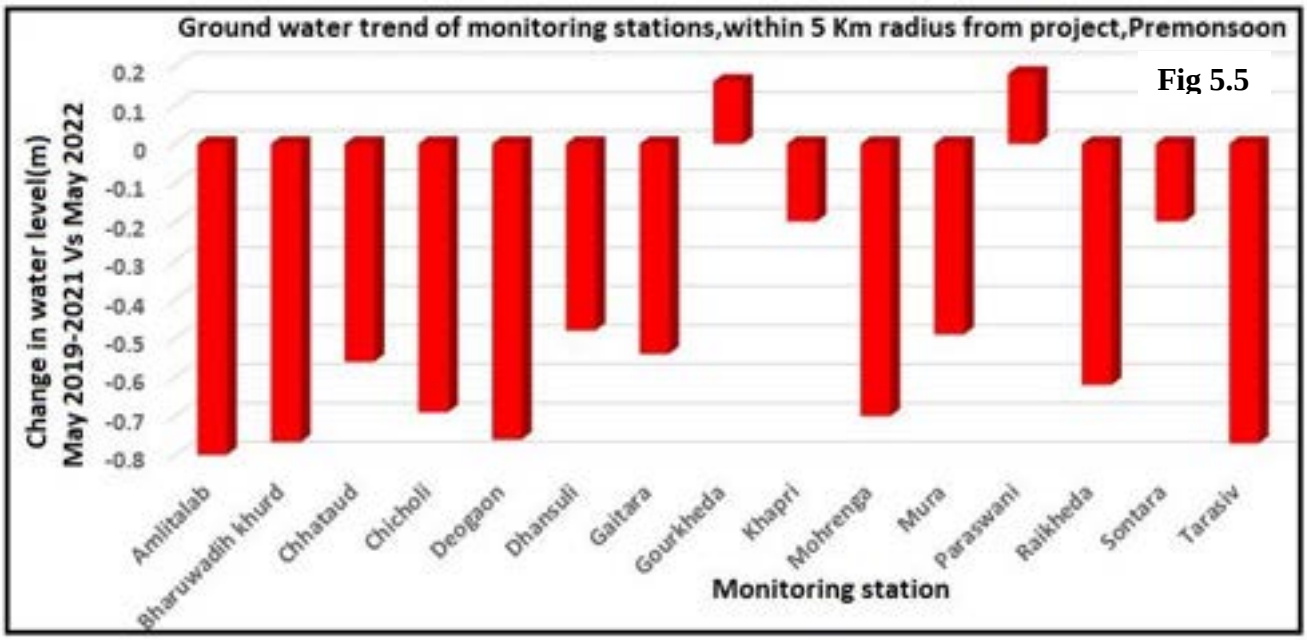


Fig 5.5

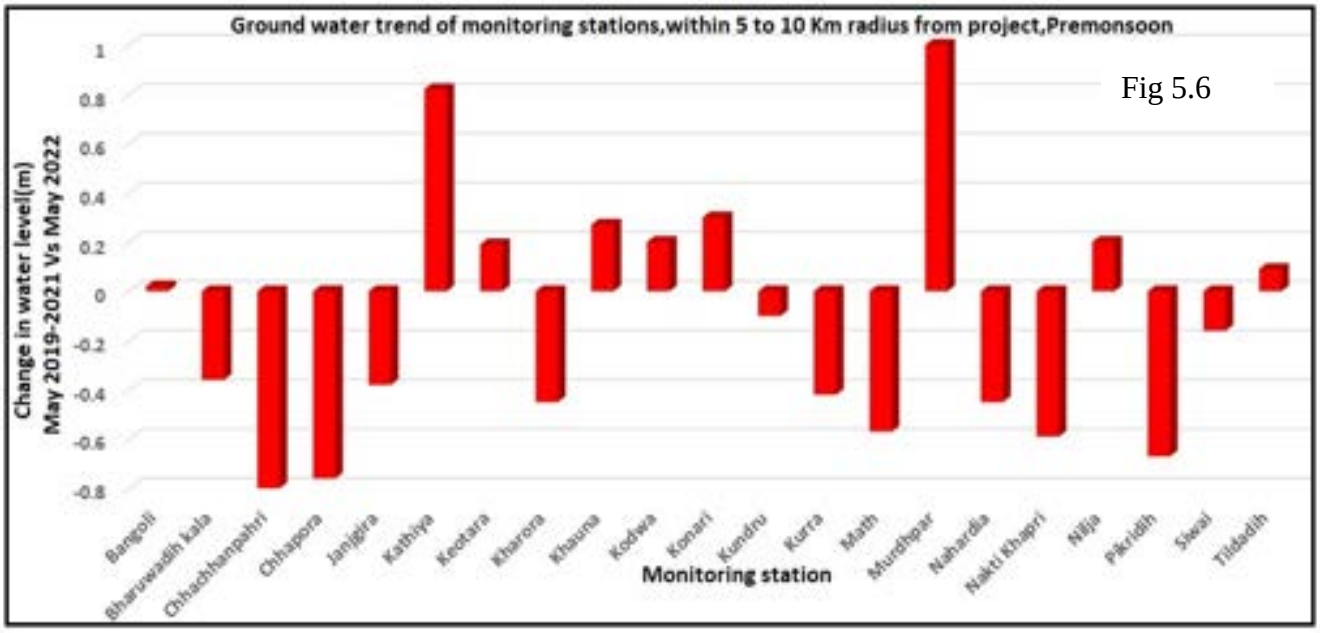


Fig 5.6

5.3.1.2 POST-MONSOON DEPTH TO WATER LEVEL TREND

While comparing mean post-monsoon average water levels of (2019-2021) with that of 2022 (Table 5.2), it is found that 80% the villages in core zone (5 Km Radius) which are considered for analysis showing decline in the range of -0.08 to -0.8 m. remaining 40% of wells are showing rising water level in the range of 0.23 to 1.0 m. 43% village are showing decline in water level of -0.35 to -0.8 m. and remaining 57% village are showing rise in water level of 0.04 to 3.5 m. **(Fig 5.7, Fig 5.8 and Fig 5,9).** The area showing falling trend more than 20 cm/yr are of considerable significance which is attributed to increase in draft in selective patches.

In conclusion, if the decline per year is more than 0.20 m then for the period of four years it will be more than 0.8 m which is considered as significant but in the present scenario all the villages of core zone and buffer zone considered for analysis shows decline less than 0.8 m over the period of four years, so it is evident that in there is a marginal decline in water level trend in post-monsoon period over the period of four years.

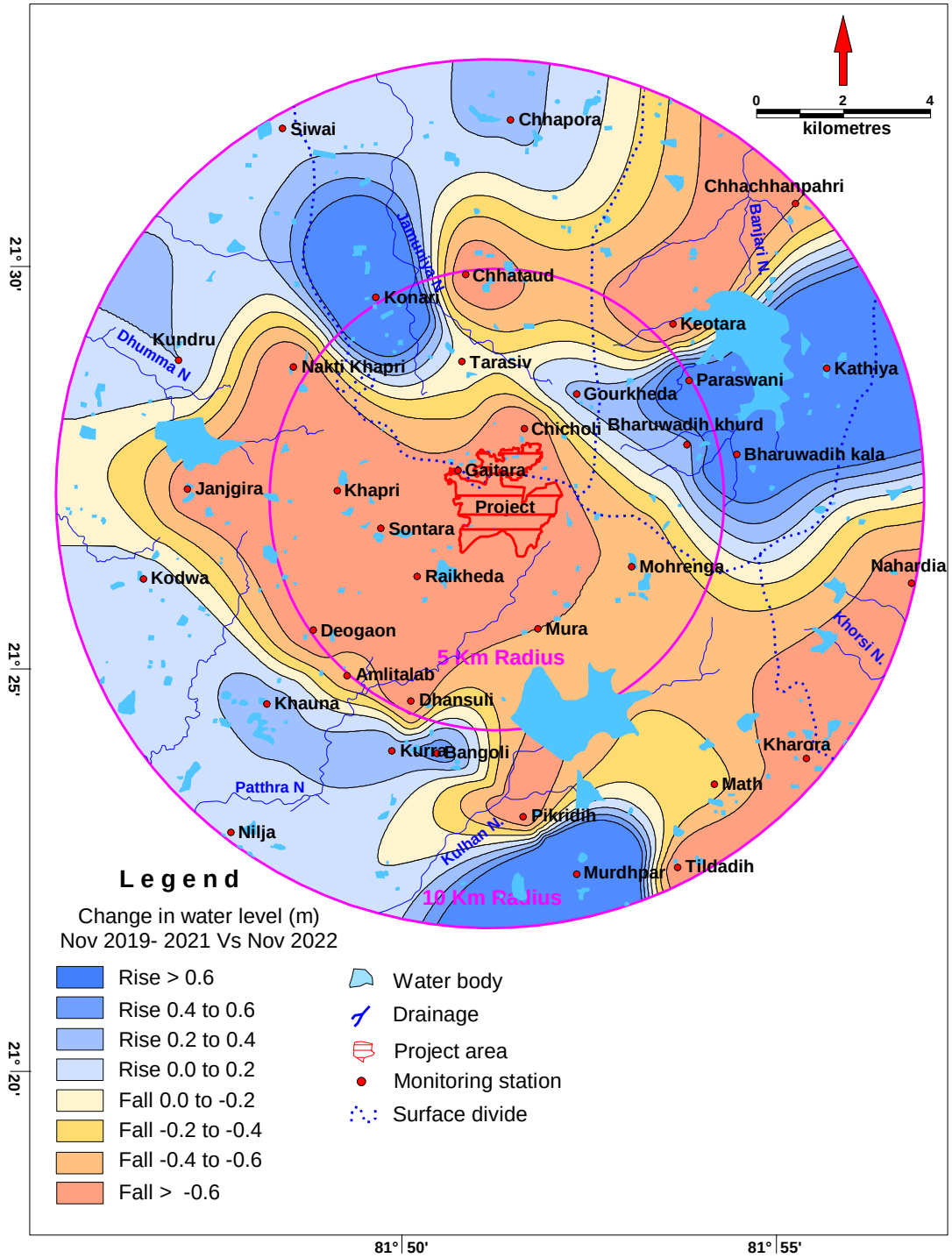


Fig 5.4 : Post-monsoon water level change (May'2019-2021 Vs May'2022)

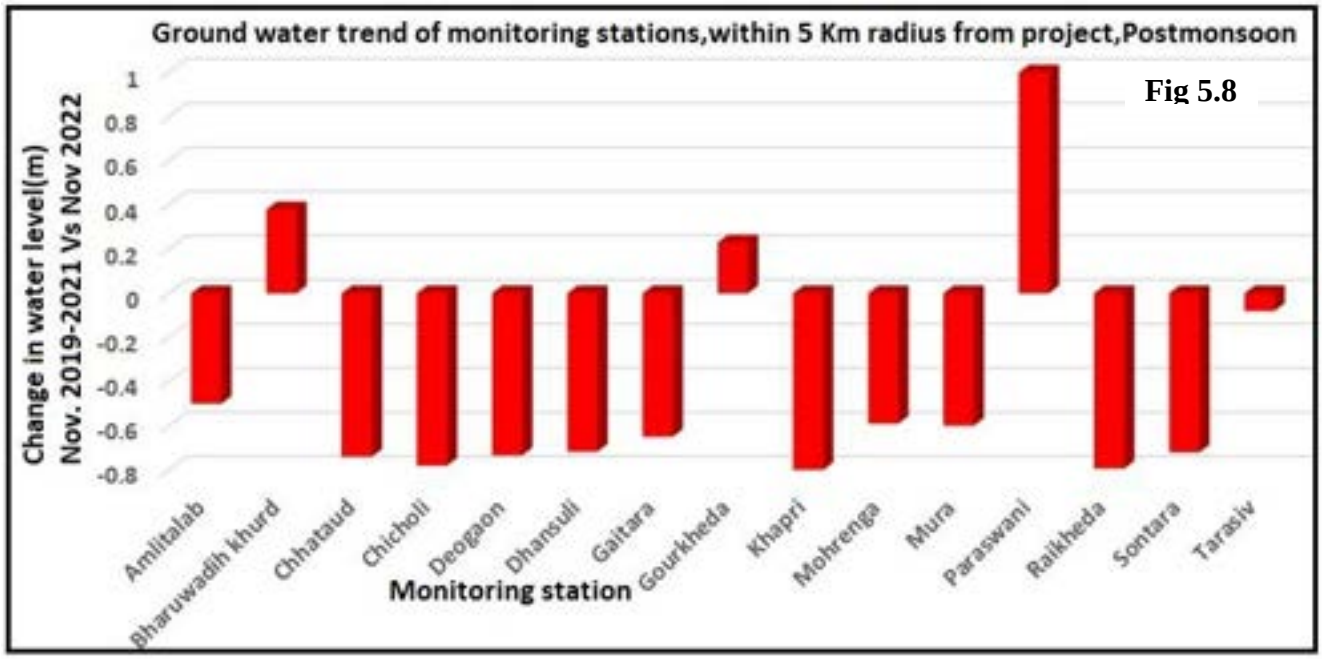


Fig 5.8

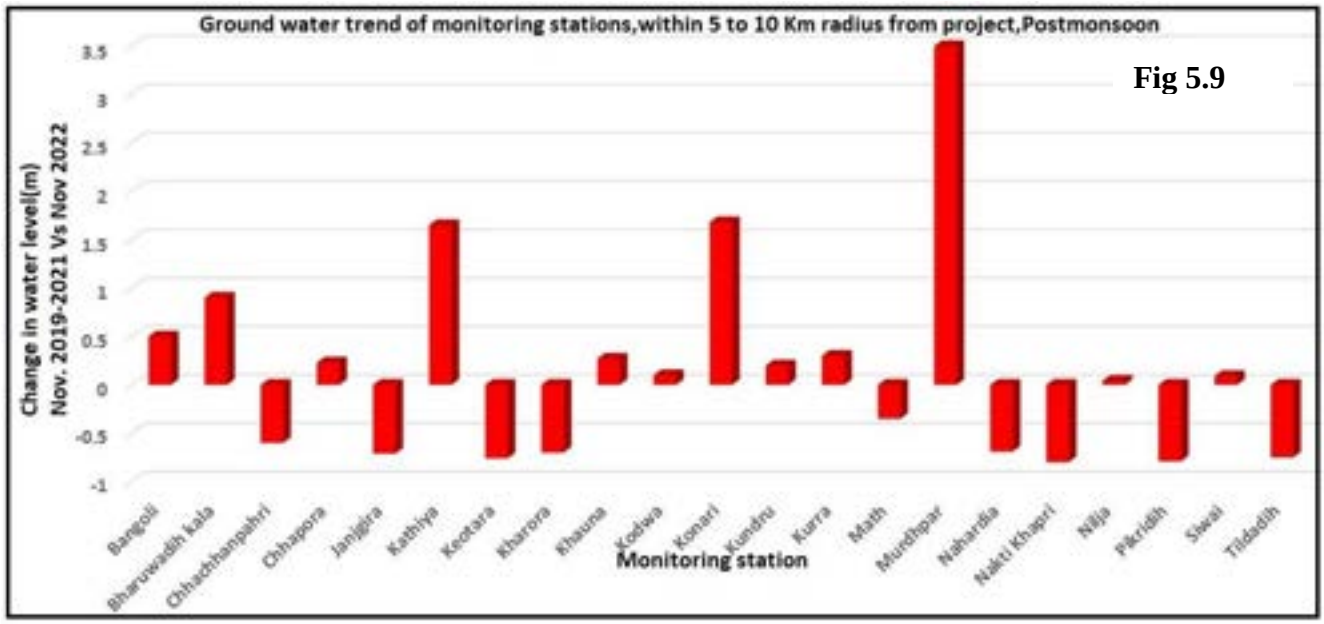


Fig 5.9

Overall, from the comparison of mean water levels of the year 2019 to 2021 with respect to the years 2022 in pre-monsoon period it is found that all the villages in core zone which are considered for analysis showing decline in the range of -0.2 to -0.8 m. except Gaukheda and Paraswani villages which are showing rise of water level in the ranges of 0.16 to 0.18 m and 57 % of the villages in buffer zone(10 Km Radius) are showing decline in range of -0.1 to -0.8 m while 43 % villages are showing rising in water level in the range of 0.02 to 4.96 m. In post-monsoon period, it is found that 80% the villages in core zone (5 Km Radius) which are considered for analysis showing decline in the range of -0.08 to -0.8 m. remaining 40% of wells are showing rising water level in the range of 0.23 to 1.0 m.In Buffer zone abour 43% village are showing

decline in water level of -0.35 to -0.8 m. and remaining 57% village are showing rise in water level of 0.04 to 3.5 m. The area showing falling trend more than 20 cm/yr are of considerable significance which is attributed to increase in draft in selective patches.

In conclusion, if the decline per year is more than 0.20 m then for the period of four years it will be more than 0.8 m which is considered as significant but in the present scenario all the villages of core zone and buffer zone considered for analysis shows decline less than 0.8 m over the period of four years, so it is evident that in there is a marginal decline in water level trend in pre and post-monsoon period over the period of four years.

5.4 HYDROGRAPHS:

The variation in ground water level recorded systematically for a longer period can be plotted in the form of graph (hydrograph). This trend is also depicted from the individual hydrographs of monitoring stations. Some representative hydrographs are given below for core and buffer zone for the period of January'2019 to November'2022 in **Fig 5.10 to Fig 5.15.** These representative hydrographs presented here also shows the decline in water levels over the period of observation. The decline rate is more in core zone and comparatively low in buffer zone.

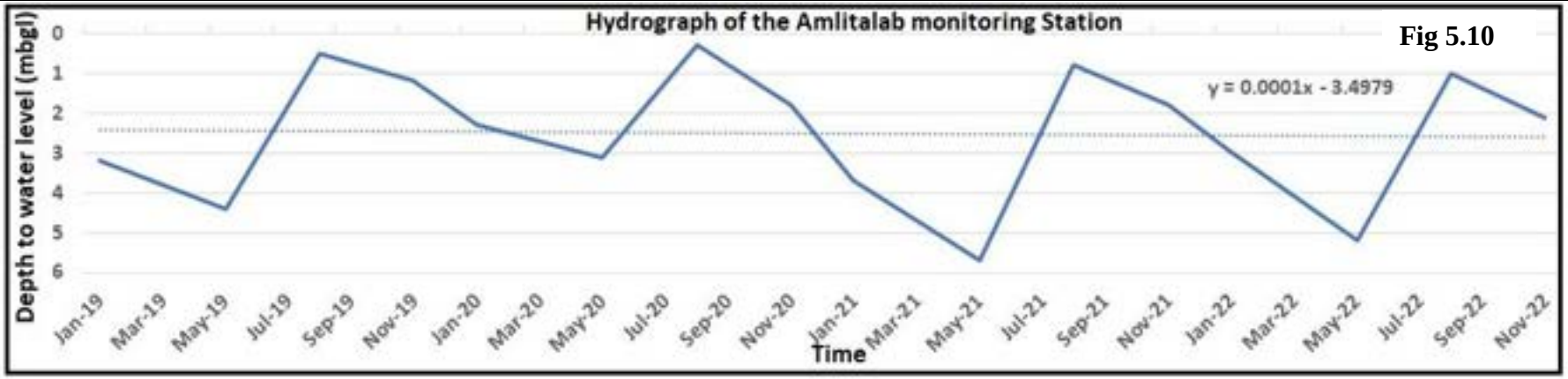


Fig 5.10

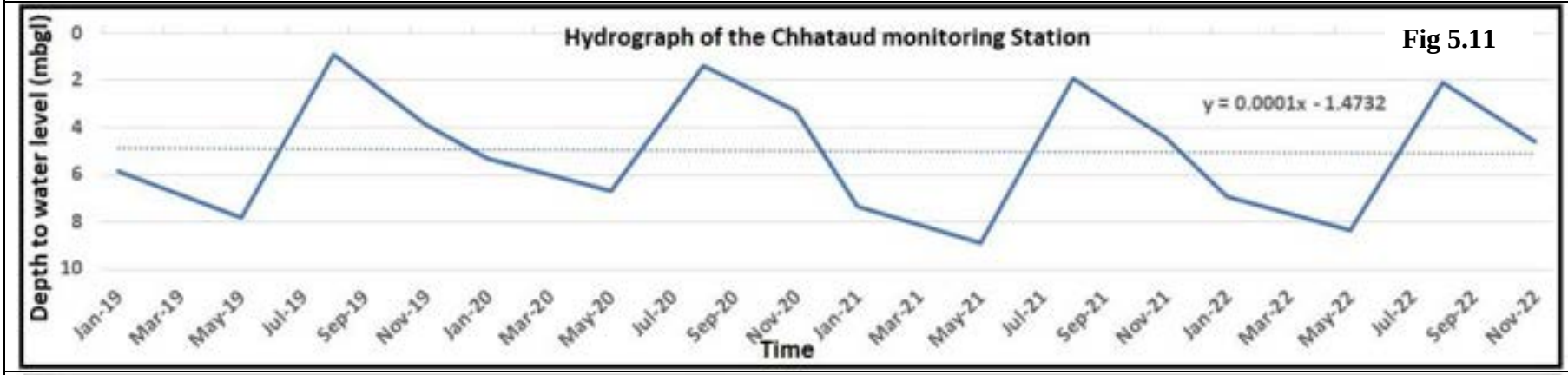


Fig 5.11

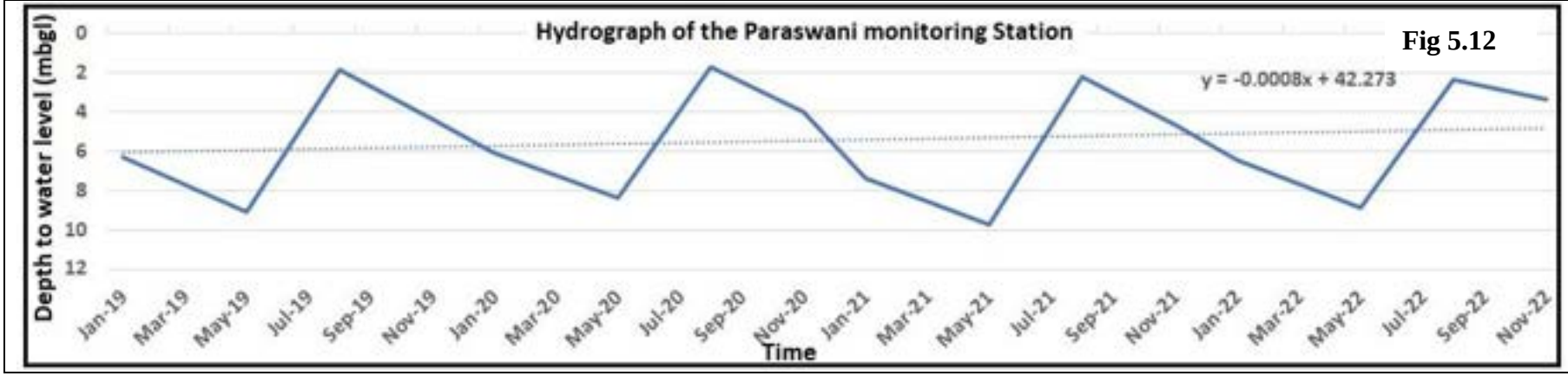


Fig 5.12

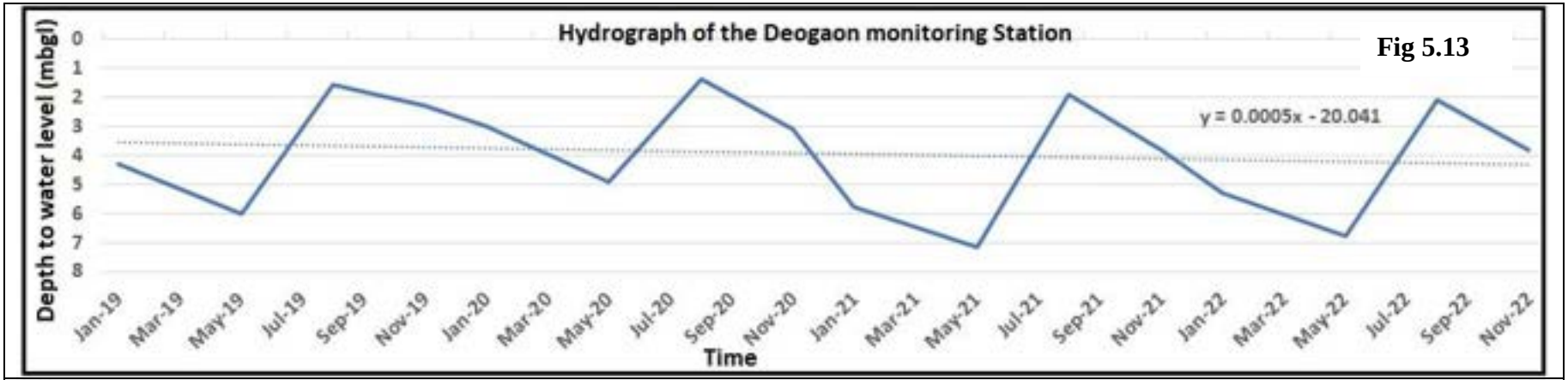


Fig 5.13

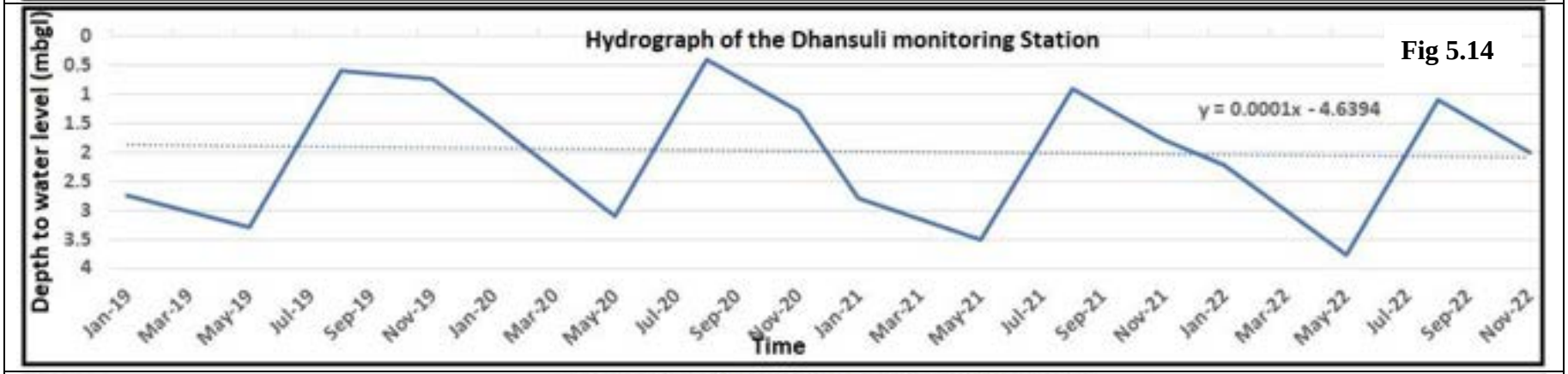


Fig 5.14

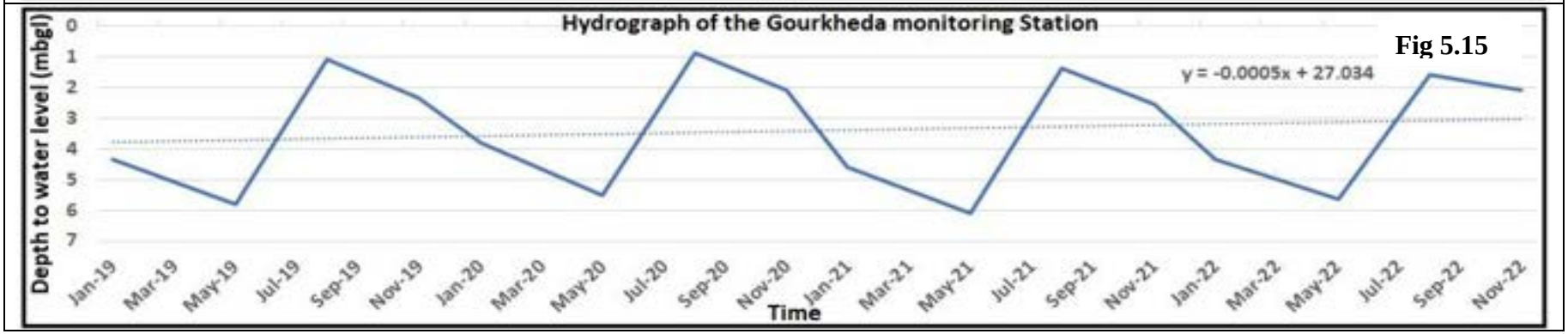


Fig 5.15

5.4 AQUIFER PARAMETERS:

The aquifer parameters are essentially required for the estimation of mine seepage as well as planning the ground water withdrawal for open cast mining. Accordingly, pumping test has been carried out for determination of aquifer parameters accurately. The aquifer parameters of study area covered by limestone 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 40 m^2/day. The potential fractures for boreholes up to 100 mbgl depth in the area are recorded at various depths i.e. 40-45, 60-65, 75-80, 90-95 mbgl and are 4 to 5 in numbers.

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 Raikeda and Mohrenga village (close to Project). The results and data interpretation is discussed below

Village	Raikheda
Block	Tilda
District	Raipur
State	Chattisgarh
Date	28/11/2019
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 5.3: 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 $X10^{-5}$

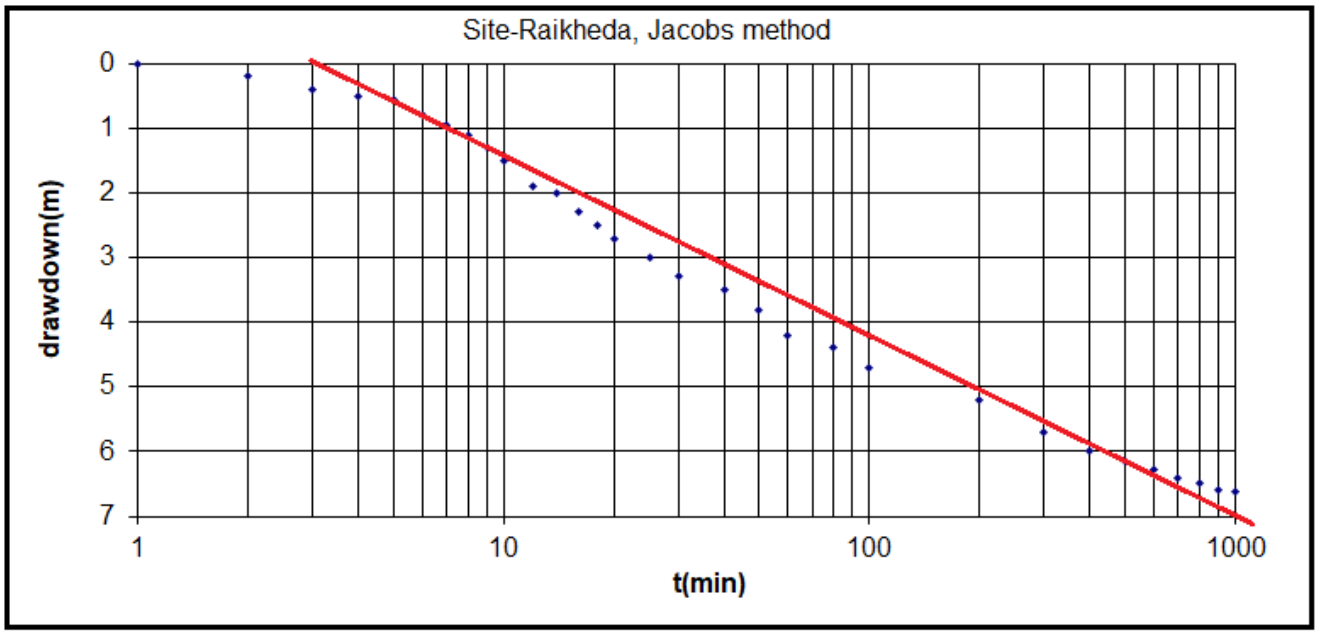


Table 5.3: Recuperation Data

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	

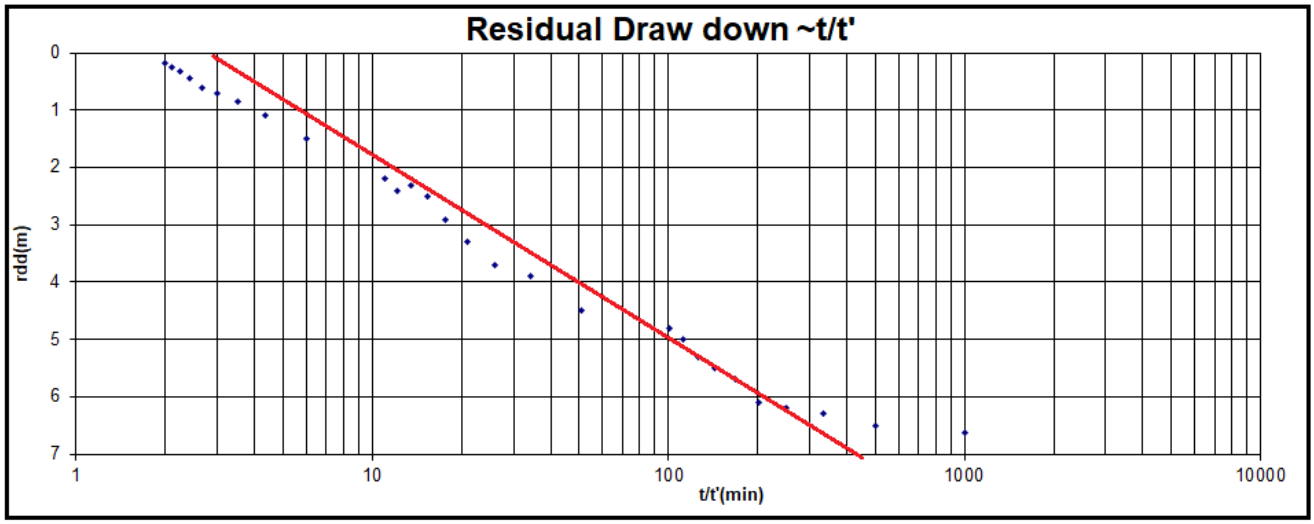
1003	3	334.33	20	7.1	12.9	6.4	
1004	4	251.00	20	7.29	12.71	6.21	
1005	5	201.00	20	7.4	12.6	6.1	
1006	6	167.67	20	7.5	12.5	6	
1007	7	143.86	20	7.66	12.34	5.84	
1008	8	126.00	20	7.89	12.11	5.61	
1009	9	112.11	16	4.1	11.9	5.4	
1010	10	101.00	16	4.5	11.5	5	
1020	20	51.00	16	5	11	4.5	
1030	30	34.33	16	5.6	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:

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

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

$T = 30.42\ m^2/day$, $K = 2.3765\ m/day$



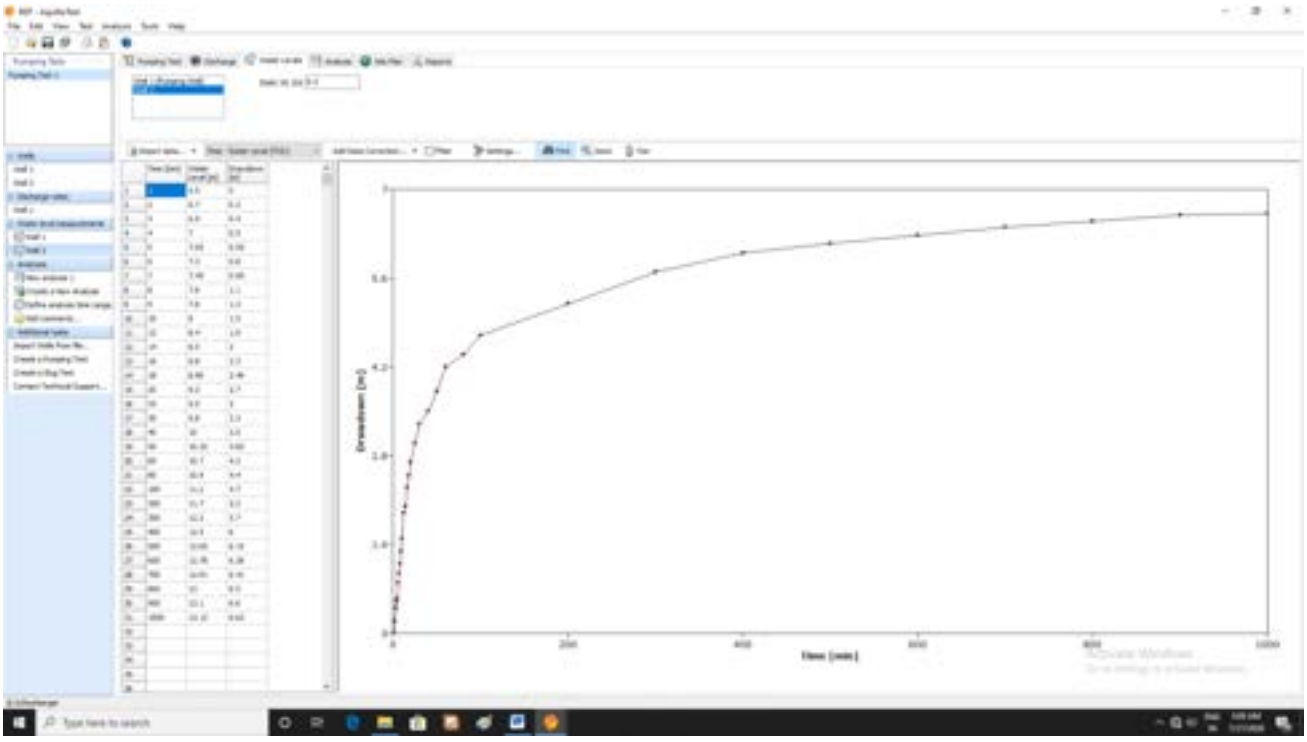


Fig 5.4: Pumping water level data plot in Aquifer test soft ware

Village				Mohrenga				
Block				Tilda				
District				Raipur				
State				Chattisgarh				
Date				26-11-2022				
Duration of test				300 minutes				
Capacity of pump				3 hp				

Distance of OW from pump well			30 m.				
Thickness of the aquifer			20				
MP(magl)			0.8				
SWL(mbmp)			9				
Discharge(lps)			4.8				
Pumping Data				**Recuperation Data**			
Sl.no.	Time since pumping started (min)	DTW (mbmp)	Draw Down (m)	Time since pumping started in min(t)	Time since pumping stopped in min (t')	t/t'	DTW (mbmp)	RDD (m)
1	1	9.1	0.1	301	1	301	15.4	6.4
2	2	9.5	0.5	302	2	151	14.3	5.3
3	3	9.8	0.8	303	3	101	13.7	4.7
4	4	10	1	304	4	76	13.3	4.3
5	5	10.2	1.2	305	5	61	13.2	4.2
6	6	10.45	1.45	306	6	51	13	4
7	7	10.6	1.6	307	7	43.86	12.9	3.9
8	8	10.78	1.78	308	8	38.5	12.8	3.8
9	9	10.9	1.9	309	9	34.33	12.67	3.67
10	10	11	2	310	10	31	12.6	3.6
11	12	11.3	2.3	312	12	26	12.2	3.2
12	14	11.56	2.56	314	14	22.43	11.9	2.9
13	16	11.7	2.7	316	16	19.75	11.7	2.7
14	18	11.89	2.89	318	18	17.67	11.4	2.4
15	20	11.97	2.97	320	20	16	11.1	2.1
16	25	12.3	3.3	325	25	13	11	2
17	30	12.7	3.7	330	30	11	10.9	1.9
18	40	13	4	335	35	9.57	10.7	1.7
19	50	13.2	4.2	340	40	8.5	10.5	1.5
20	60	13.37	4.37	350	50	7	10.2	1.2
21	80	13.6	4.6	360	60	6	10	1
22	100	13.8	4.8	370	70	5.29	9.9	0.9
23	120	13.9	4.9	380	80	4.75	9.8	0.8
24	140	14	5	390	90	4.33	9.7	0.7
25	160	14.09	5.09	400	100	4	9.6	0.6
26	180	14.21	5.21	450	150	3	9.51	0.51
27	200	14.3	5.3	500	200	2.5	9.39	0.39
28	250	14.9	5.9	550	250	2.2	9.27	0.27
29	300	15.3	6.3	600	300	2	9.2	0.2

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.D= Thickness of aquifer

Q = Discharge m^3/day

r = Distance (m) between PW & OW

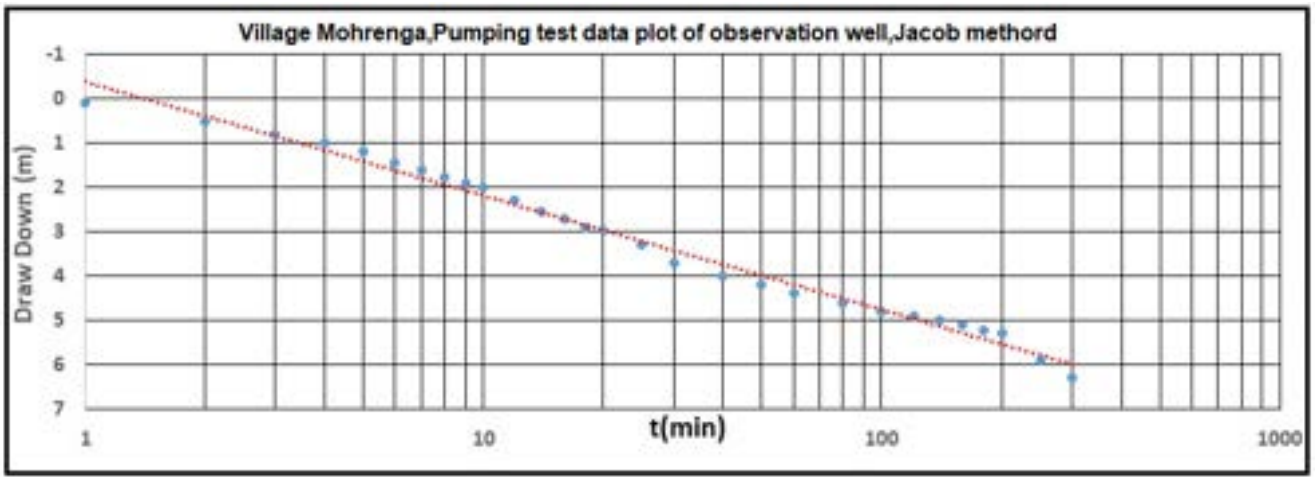
Δs = Slope of straight line per log cycle of time

S = Storage coefficient

t_o= time in days at zero drawdown

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

$T= 38.33\ m^2$/day, K=1.91 m/day& $S= 3.83\ X10^{-5}$

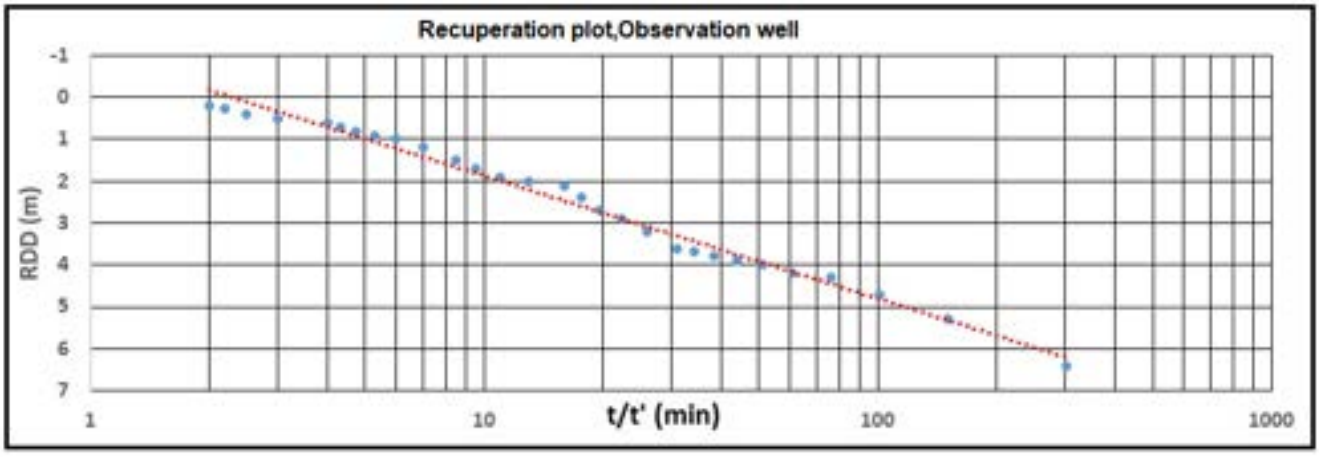


Formulae:

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

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

$T= 34.37\ m^2$/day, K=1.718 m/day



6. SURFACE GEOPHYSICAL SURVEY

Surface geophysical survey comprised of Ten Vertical Electrical Sounding (VES) have been conducted at ten different locations after S1 during the period 01.07.2020 to 11.07.2020 & 10.11.2022 to 15.11.2022 to know the subsurface condition in parts of Tilda block, Raipur district, Raipur, Chhattisgarh. The VES location is given in Fig No: 6.1.

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 center 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).

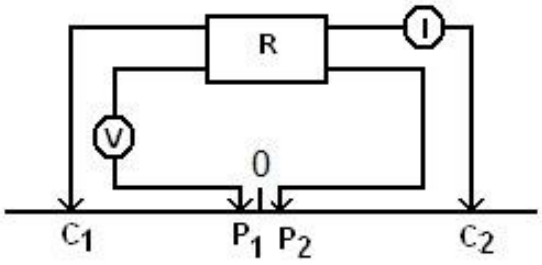


Fig 6.2 (A): Schlumberger electrode configuration

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

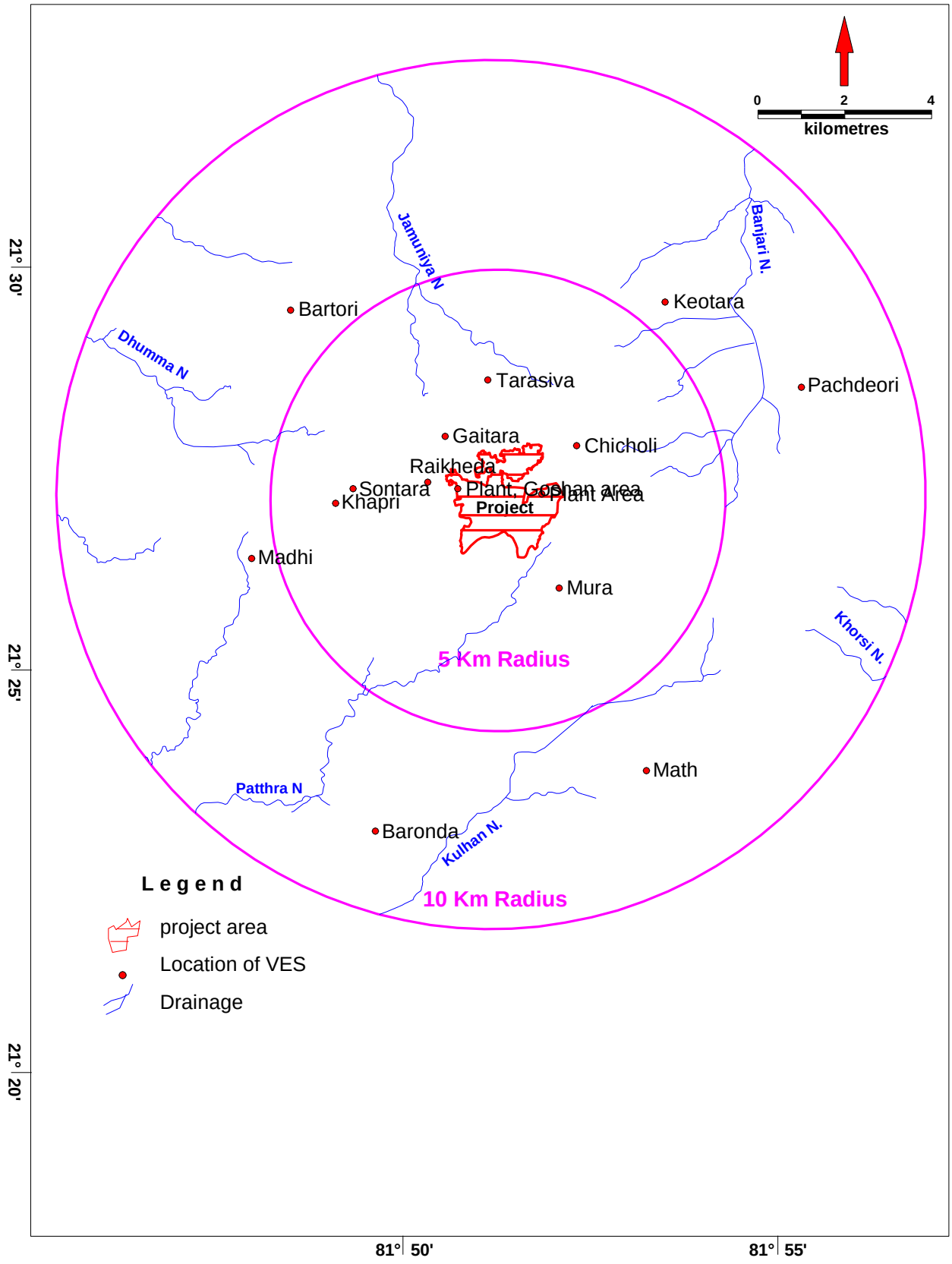


Fig-6.1: Location of VES

6.3 Data Analysis and Interpretation

Surface geophysical survey comprised of nine Vertical Electrical Sounding (VES) has been conducted at ten different locations during the period 01.07.2020 to 11.07.2020 & 10.11.2022 to 15.11.2022 to identify the subsurface condition of the study 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-$C_1C_2/2$ 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 interpreted results are given in the table 6.3.The field curves of VES are given in Fig 6.3, 6.4, 6.5 ..…… 6.12 and the field data of VES are shown in Table 6.1 and 6.2.

6.4 Discussion of result

A total 15 numbers of VES has been carried out at various villages of the study area (Details of locations is given in fig.6.1). Aquameter CRM 500 Resistivity meter has been used for conducting the VES. Schlumberger and half Schlumberger configurations have been used for conducting the VES survey. The maximum current electrode spread for conducting VES was 240m (AB). Location of VES points are given below in fig.-6.1.

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 the resistivity and thickness of different layers are given in table 6.3.

VES-1:

It is a HA type curve and it has four layer. The topmost layer having resistivity value of 112 Ω-m may be laterite whereas the second layer may be weathered limestone with resistivity of 23.5 Ω-m. The third layer may be fractured limestone with resistivity of 110 Ω-m while, the last layer may be massive

limestone having resistivity of 1405 Ω-m. The thickness of topmost layer was1.7 m and the second layer & third layer thickness were 5.4 and 4.8 m respectively.

VES-2:

It is also a HA type curve and it has four layer. The topmost layer having resistivity value of 50 Ω-m may be top soil whereas the second layer may be weathered limestone with resistivity of 10.5 Ω-m. The third layer may be highly fractured limestone with resistivity of 28 Ω-m while, the last layer may be massive limestone having resistivity of 235 Ω-m. The thickness of topmost layer was1.5 m and the second layer & third layer thickness were 18 and 16 m respectively.

VES-3:

It is also a HA type curve and it has four layer. The topmost layer having resistivity value of 215 Ω-m is lateritic soil whereas the second layer is weathered limestone with resistivity of 30 Ω-m. The third layer may be fractured limestone with resistivity of 125 Ω-m while, the last layer may be massive limestone having resistivity of 550 Ω-m. The thickness of topmost layer is 2.1 m and the second layer & third layer thickness were 14.3 and 10.4 m respectively.

VES-4:

It isa QH type curve and it has four layers. The topmost layer having resistivity value of 175Ω-m is lateritic soil whereas the second layer is weathered limestone with resistivity of 62 Ω-m. The third layer may be highly fractured limestone with resistivity of 16.5 Ω-m while, the last layer may be massive limestone having resistivity of 175 Ω-m. The thickness of topmost layer is 1.3 m and the second layer & third layer thickness were 5 and 32 m respectively.

VES-5:

It is also a QH type curve and it has four layer. The topmost layer having resistivity value of 170 Ω-m is lateritic soil whereas the second layer is weathered limestone with resistivity of 30 Ω-m. The third layer may be highly fractured limestone with resistivity of 14 Ω-m while, the last layer may be massive limestone having resistivity of 165 Ω-m. The thickness of topmost layer is 1.5 m and the second layer & third layer thickness were 4 and 16.5 m respectively.

VES-6:

It is also a QH type curve and it has four layers. The topmost layer having resistivity value of 105 Ω-m is lateritic soil whereas the second layer is weathered limestone with resistivity of 23 Ω-m. The third layer may be highly fractured limestone with resistivity of 13 Ω-m while, the last layer may be massive limestone having resistivity of 105 Ω-m. The thickness of topmost layer is 1.8 m and the second layer & third layer thickness were 2 and 18 m respectively.

VES-7:

It is also a QH type curve and it has four layers. The topmost layer having resistivity value of 245 Ω-m is lateritic soil whereas the second layer is weathered limestone with resistivity of 78 Ω-m. The third layer may be highly fractured limestone with resistivity of 19 Ω-m while, the last layer may be massive limestone having resistivity of 220 Ω-m. The thickness of topmost layer is 1.8 m and the second layer & third layer thickness were 3.5 and 16 m respectively.

VES-8:

It is a HA type curve and it has four layer. The topmost layer having resistivity value of 115 Ω-m is lateritic soil whereas the second layer is weathered limestone with resistivity of 17 Ω-m. The third layer may be fractured limestone with resistivity of 120 Ω-m while, the last layer may be massive limestone having resistivity of 285 Ω-m. The thickness of topmost layer is 1.5 m and the second layer & third layer thickness were 8.5 and 11.3 m respectively.

VES-9:

It is also a HA type curve and it has four layer. The topmost layer having resistivity value of 50 Ω-m is top soil whereas the second layer is weathered limestone with resistivity of 22.5 Ω-m. The third layer may be fractured limestone with resistivity of 30 Ω-m while, the last layer may be limestone having resistivity of 65 Ω-m. The thickness of topmost layer is 1.3 m and the second layer & third layer thickness were 10.6 and 21.2 m respectively.

VES-10:

It is also a QH type curve and it has four layers. The topmost layer having resistivity value of 75 Ω-m is lateritic soil whereas the second layer is weathered limestone with resistivity of 38 Ω-m. The third layer may be highly fractured limestone with resistivity of 12.5 Ω-m while, the last layer may be massive limestone having resistivity of 160 Ω-m. The thickness of topmost layer is 2.8 m and the second layer & third layer thickness were 2.5 and 8.2 m respectively.

6.5 Conclusions & Recommendations

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

The thickness of lateritic topsoil varies from 1.3 meter to 2.8 meters with resistivity range from 50Ω-m to 245 Ω-m.

The thickness of weathered formation varies from 2.0 meter to 14.3 meters and the resistivity range is 10.5 Ω-m to 78 Ω-m.

Third layer mostly indicates fracture zones and the thickness of this layer varies from 4.8 meters to 23.2 meters and resistivity range is 13Ω-m to 125 Ω-m.

The last layer is massive formation which shows high electrical resistivity with the range of 65 Ω-m to 550 Ω-m.

Table-6.1: VES Data

VES 1		VES 2		VES 3		VES 4		VES 5	
Location: Mura		**Location: Chicholi**		**Location: Bartori**		**Location: Tarsiva**		**Location: Baronda**	
Latitude: N21°26' 17.52"		Latitude: N21°27' 46.93"		Latitude: N 21° 29' 27.83"		Latitude: N 21° 28' 35.50"		Latitude: N 21° 23' 04.37"	
Longitude: E 81° 52' 04.72"		Longitude: E 81° 52' 19.08"		Longitude: E 81° 48' 29.82"		Longitude: E 81° 51' 08.38"		Longitude: E 81° 49' 37.50"	
Date:		Date:		Date:		Date:		Date:	
Altitude: 303 m		Altitude: 314m		Altitude: 299m		Altitude: 310m		Altitude: 286m	
AB/2	**App. R**	**AB/2**	**App. R**	**AB/2**	**App. R**	**AB/2**	**App. R**	**AB/2**	**App. R**
2	98.69	2	37.57	2	205.53	2	268.75	2	224.69
3	74.32	3	34.38	3	153.85	3	179.55	3	174.34
4	58.50	4	26.14	4	121.97	4	127.57	4	131.31
5	47.81	5	19.52	5	94.65	5	92.70	5	102.46
6	38.02	6	15.49	6	76.03	6	70.40	6	76.03
8	32.60	8	12.54	8	52.67	8	45.14	8	42.64
10	35.30	10	11.77	10	43.14	10	62.76	10	23.53
12	39.68	12	11.70	12	35.78	12	47.75	12	15.25
14	44.12	14	11.77	14	35.53	14	36.38	14	11.77
16	48.26	16	11.23	16	33.31	16	31.04	16	10.30

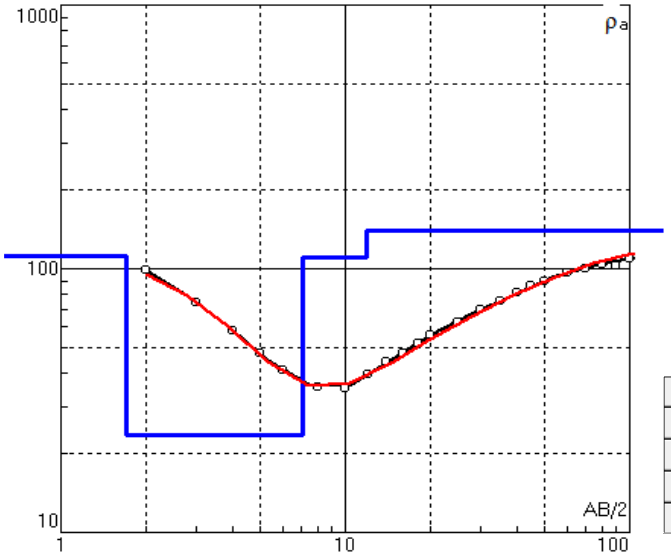
18	53.93	18	12.48	18	36.66	18	30.31	18	11.77
20	57.64	20	11.03	20	38.38	20	26.26	20	12.94
25	66.60	25	13.84	25	49.25	25	23.53	25	15.65
30	68.64	30	14.98	30	55.27	30	16.98	30	18.91
35	77.90	35	15.40	35	67.37	35	19.62	35	23.34
40	80.94	40	16.85	40	77.37	40	21.39	40	26.26
45	81.14	45	18.40	45	77.20	45	22.17	45	27.79
50	80.33	50	20.12	50	86.85	50	24.70	50	30.57
60	96.70	60	23.71	60	112.90	60	24.77	60	40.84
70	92.30	70	27.12	70	119.75	70	31.08	70	46.66
80	94.23	80	30.40	80	136.21	80	34.26	80	52.90
90	102.56	90	34.84	90	159.66	90	37.29	90	60.10
100	116.34	100	38.45	100	148.19	100	41.02	100	67.08

Table-6.2: VES Data

VES 6		**VES 7**		**VES 8**		**VES 9**		**VES 10**	
Location: Raikheda		**Location: Math**		**Location: Sontara**		**Location: Plant Area (Pump House)**		**Location: Plant Area (Goshan Area)**	
Latitude: N 21° 27' 19.50"		Latitude: N 21° 23' 44.91"		Latitude: N 21° 27' 15.25"		Latitude: N 21° 27' 10.55"		Latitude: N 21° 27' 15.19'	
Longitude: E 81° 50' 20.11"		Longitude: E 81° 53' 14.98"		Longitude: E 81° 49' 20.11'		Longitude: E 81° 51' 50.69"		Longitude: E 81° 50' 43.66"	
Date:		Date:		Date:		Date:		Date:	
Altitude: 311m		Altitude: 302m		Altitude: 301m		Altitude: 305m		Altitude: 308m	
AB/2	**App.**	**AB/2**	**App.**	**AB/2**	**App.**	**AB/2**	**App.**	**AB/2**	**App. R**
2	171.12	2	211.86	2	232.99	2	33.80	2	72.88
3	134.06	3	169.14	3	143.43	3	26.74	3	69.46
4	102.06	4	143.13	4	98.95	4	25.51	4	67.83
5	72.21	5	121.00	5	63.43	5	24.40	5	58.55
6	50.69	6	101.38	6	45.06	6	25.34	6	52.10
8	27.59	8	67.72	8	35.11	8	27.59	8	40.13
10	19.61	10	50.99	10	39.22	10	27.46	10	35.30

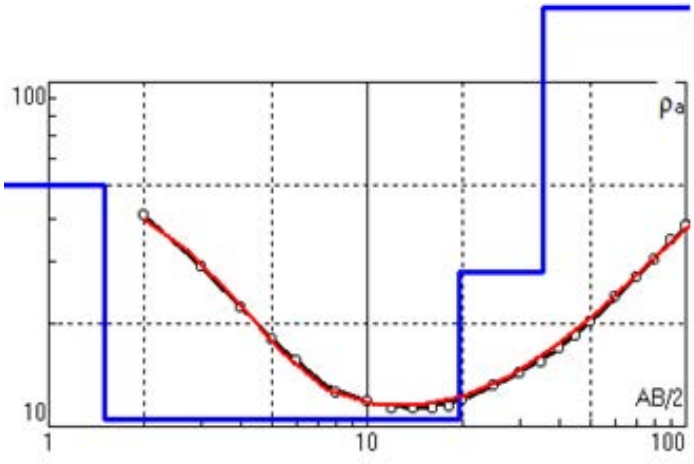
12	14.79	12	36.15	12	37.01	12	26.69	12	28.96
14	16.23	14	28.33	14	41.53	14	28.29	14	26.47
16	15.98	16	24.17	16	45.42	16	28.39	16	25.10
18	14.88	18	21.24	18	49.99	18	33.28	18	26.96
20	17.02	20	21.32	20	57.10	20	30.33	20	27.30
25	19.25	25	23.82	25	59.70	25	25.21	25	28.54
30	20.20	30	28.42	30	79.67	30	26.08	30	34.32
35	20.52	35	31.89	35	84.98	35	27.18	35	39.22
40	22.44	40	36.74	40	97.20	40	26.76	40	41.18
45	23.94	45	43.11	45	101.17	45	26.83	45	45.76
50	25.39	50	48.23	50	116.43	50	28.03	50	48.53
60	29.54	60	59.11	60	133.82	60	28.77	60	58.42
70	34.73	70	69.09	70	157.82	70	29.06	70	63.73
80	36.15	80	81.91	80	177.55	80	30.16	80	62.74
90	39.92	90	91.63	90	201.04	90	32.67	90	66.39
100	44.46	100	101.13	100	209.26	100	33.46	100	65.72

Table-6.3: Interpreted Results of VES							
VES No	Layer Resistivity(in Ohm-m)				Layer Thickness(in m)		
	ρ_1	ρ_2	ρ_3	ρ_4	h_1	h_2	h_3
VES-1	112	23.5	110	140	1.7	5.4	4.8
VES-2	50	10.5	28	235	1.5	18.0	16.0
VES-3	215	30	125	550	2.1	14.3	10.4
VES-4	175	62	16.5	175	1.3	5.0	32.0
VES-5	170	30	14	165	1.5	4.0	16.5
VES-6	105	23	13	105	1.8	2.0	18.0
VES-7	245	78	19	220	1.8	3.5	16.0
VES-8	115	17	120	285	1.5	8.5	11.3
VES-9	50	22.5	30	65	1.3	10.6	21.2
VES-10	75	38	12.5	160	2.8	2.5	8.2



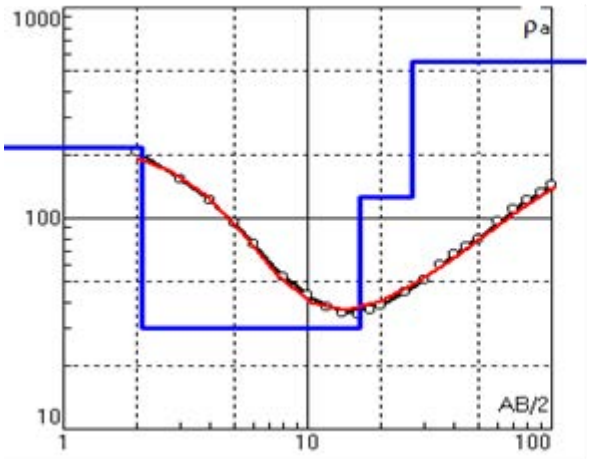
N	ρ	h	d
1	112	1.7	1.7
2	23.5	5.4	7.1
3	110	4.8	11.9
4	140		

Fig-6.3: VES Curve and interpreted results at Mura (VES 1)



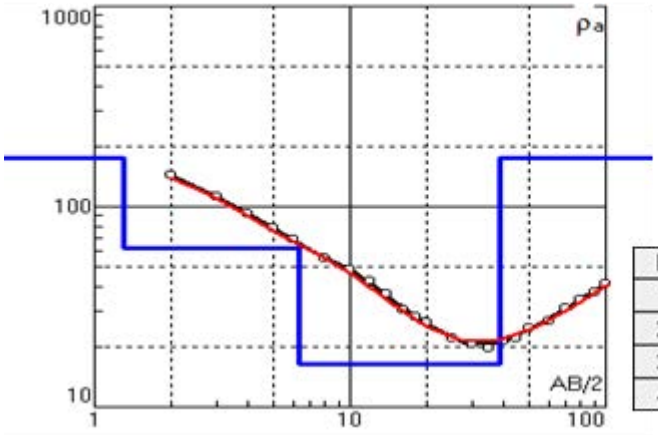
N	ρ	h	d
1	50	1.5	1.5
2	10.5	18	19.5
3	28	16	35.5
4	235		

Fig-6.4:VES Curve and interpreted results at Chicholi (VES 2)



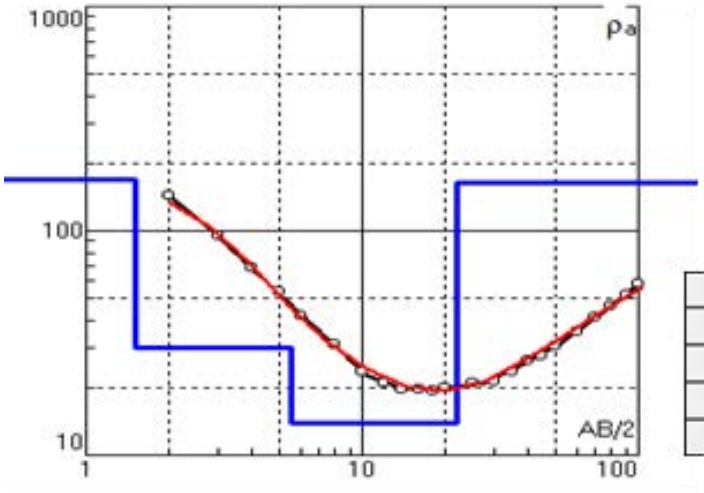
N	ρ	h	d
1	215	2.1	2.1
2	30	14.3	16.4
3	125	10.4	26.8
4	550		

Fig-6.5: VES Curve and interpreted results at Bartori (VES 3)



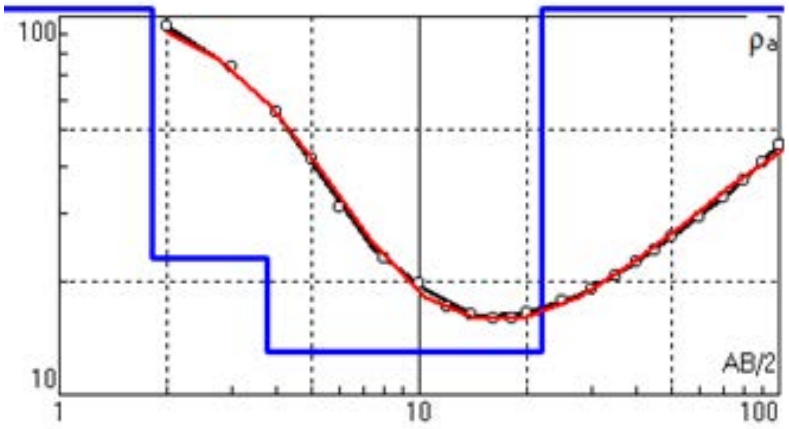
N	ρ	h	d
1	175	1.3	1.3
2	62	5	6.3
3	16.5	32	38.3
4	175		

Fig-6.6: VES Curve and interpreted results at Tarsiva (VES 4)



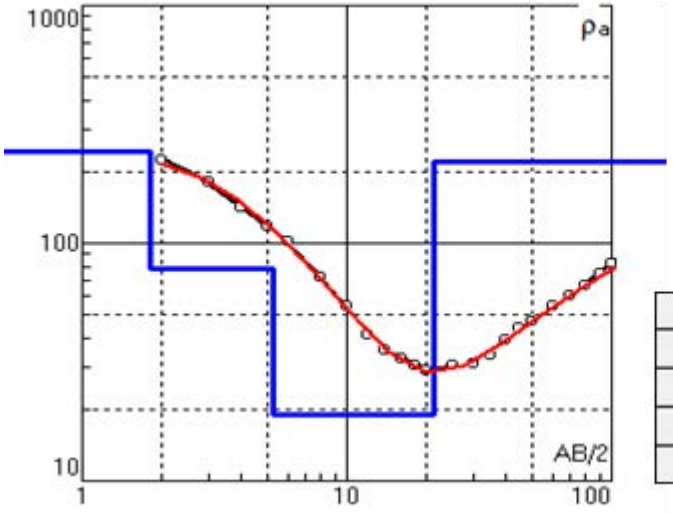
N	ρ	h	d
1	170	1.5	1.5
2	30	4	5.5
3	14	16.5	22
4	165		

Fig 6.7: VES Curve and interpreted results at Baronda - (VES 5)



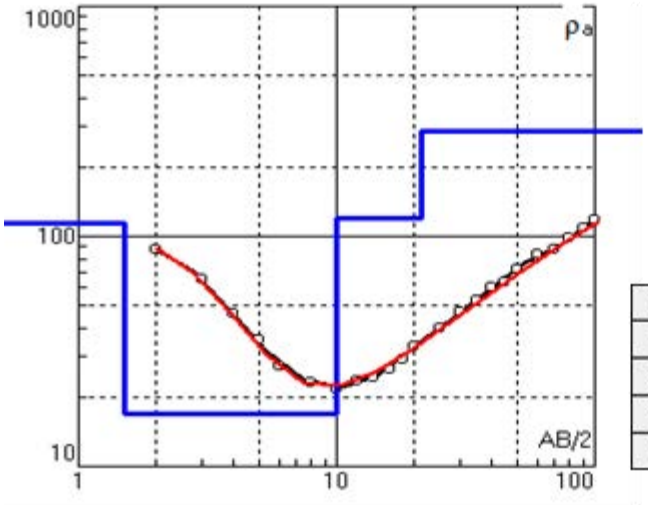
N	ρ	h	d
1	105	1.8	1.8
2	23	2	3.8
3	13	18	21.8
4	105		

Fig-6.8: VES Curve and interpreted results at Raikheda - (VES 6)



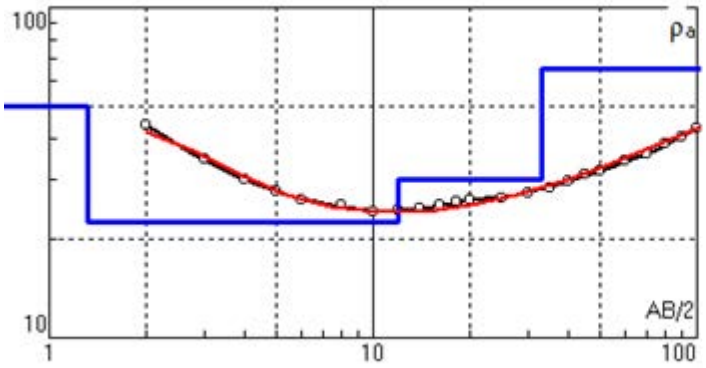
N	ρ	h	d
1	245	1.8	1.8
2	78	3.5	5.3
3	19	16	21.3
4	220		

Fig-6.9: VES Curve and interpreted results at Math(VES 7)



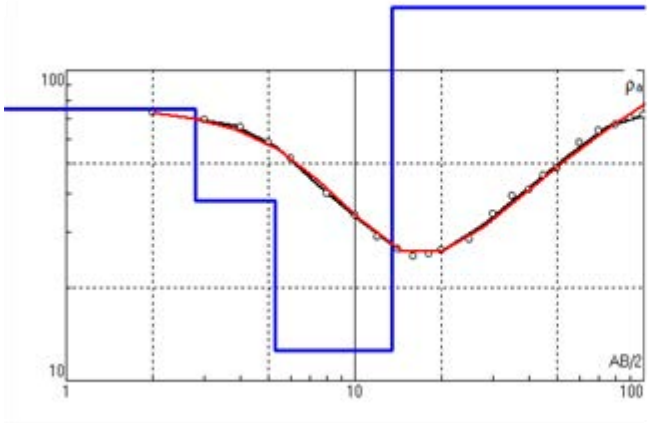
N	ρ	h	d
1	115	1.5	1.5
2	17	8.5	10
3	120	11.3	21.3
4	285		

Fig-6.10: VES Curve and interpreted results at Sontara(VES8)



N	ρ	h	d
1	50	1.3	1.3
2	22.5	10.6	11.9
3	30	21.2	33.1
4	65		

Fig-6.11: VES Curve and interpreted results at Plant Area (Pump House)(VES 9)



N	ρ	h	d
1	75	2.8	2.8
2	38	2.5	5.3
3	12.5	8.2	13.5
4	160		

Fig-6.12: VES Curve and interpreted results at Plant Area (Goshan Area) (VES10)

FIG 6.13: PHOTOGRAPHS OF GEOPHYSICAL SURVEY IN VARIOUS VILLAGES IN STUDY AREA

7. GROUND WATER RESOURCES

The ground water resources for the study area were assessed as per methodology recommended by ground water estimation committee'2015. The resources were calculated by Infiltration method due to non-availability of long term water level data and fluctuation in the area. The rain fall recharge was calculated by Rainfall Infiltration method. Domestic water requirement has been estimated based on population as per Census 2011 by taking the average per capita consumption as 60 liter per day by considering 100% dependence of total population on ground water. The ground water draft for irrigation was calculated from number of ground water abstraction structure.

7.1: GROUND WATER RECHARGE:

a) Total geographical area in ha. = 31400

b) Area not suitable for ground recharge in ha. =Nil

c) Area suitable for ground recharge in ha. =31400

d) Average water level:

Pre-monsoon = 6.81mbgl.

Post-monsoon = 1.88mbgl.

e) Normal annual rain fall = 1.04 m.

f) Normal monsoon rain fall = 0.88 m.

g) Normal non monsoon rain fall = 0.16 m

h) Ground Water Recharge by rain fall infiltration method - The rain fall infiltration factors for different formations have been taken as those recommended by GEC 2015 .The equation used for computation of recharge is

$R_{rf} = NAR \times A \times RFI$

Where,

R_{rf}= Recharge from rainfall

NAR = Normal annual rain fall

A = Area of the unit in ha

RIF = Rain fall infiltration factor

Recharge from rainfall = 1.04 × 31400 × 0.06

= 1959.36 ham.

Return seepage from surface water irrigation

Crop type	Area irrigated (ha)	Average depth of water applied (m)	Irrigation water applied (ham)	Water delivered at 80%efficiency	Seepage factor	Seepage (ham)
Paddy	3239	0.4	1295.6	1619.5	0.4	647.8

i) Seepage from tanks/ ponds

No of tanks = 278

Total water spreaded area in ha = 1570

Seepage factor (m/year) = 0.6

Total non monsoon seepage (ham) = 942

j) Annual ground water recharge =

Rainfall recharge + Seepage from irrigation + Recharge from tanks/ponds

= 1959.36+ 647.8 + 942

= 3549.16 ham

K) Annual Extractable Ground Water Recharge

Annual Extractable Ground Water Rechargehas been computed by deducting the unaccounted natural discharge from the total annual recharge as per the criteria recommended by GEC'2015.In the study area 10% of replenishable ground water is considered to deduct from total recharge as it goes as base flow.

Annual Extractable Ground Water Recharge= Total annual recharge- Base flow

= 3549.16 ham – 354.9 ham

= 3194.26 ham

7.2: ANNUAL GROUND WATER EXTRACTION:

7.2.1: Domestic purposes:

Water draft has been estimated based on population. The average per capita consumption has been taken as 60 liters per day by considering 100% dependence on the ground water. The total annual demand is calculated as follows

Total annual demand in ham = Population × 60 × 365 /1000 × 1000

= 90074× 60 × 365 / 1000 × 1000

= 197.26 ham

7.2.2: Ground water draft for irrigation:

Ground water draft for irrigation was calculated from number of ground water abstraction structures present in the area.

Ground water structure	No of G W structure	Unit draft in ham	Gross extraction in ham
Dug wells	520	1.0	520
Tube wells	500	2.0	1000

7.3: Ground water balance (ham) :

= Annual Extractable Ground Water Recharge – Gross ground water extraction

= 3194.26 ham-1717.26 ham

= 1477.0 ham

From the above it may be seen that the balance ground water resources in the area is of the order of 1477 ham

7.4: Stage of ground water Extraction:

= Gross ground water extraction × 100/Annual extractable ground water recharge

= 1717.26 *100/3194.26= **53.76 %**

According to recommended methodology stage of ground water extraction below 70% is considered safe under all circumstances whereas stage of extraction up to 90% is considered safe, if the long-term water levels do not show any declining trends. So the present study area is come in “SAFE” category.

8. 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 – **3439950 sq.m.**

Rainfall – 1145 mm. (60-65 rainy days)

Formations –Laterite and Limestrone.

A. Runoff Available for Recharge:

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.	Building/ sheds	1719975	1.14	1960771.5	0.85	1666655.77
2.	Green belt area Approx.	1133160	1.14	1291802.4	0.15	193770.36
3.	Open land area	343995	1.14	392154.3	0.20	78430.86
4.	Road area	242820	1.14	276814.8	0.65	179929.62
5.	Total Area	**3439950**	……	……	…….	**2118786.61**
6.	Assuming 10% is not Suitable for recharge, hence available quantum of Rain water for Recharge is about **1906907.95m^3** [90% **2118786.61 m^3**]					

From the above, it is observed that a total potential of **1906907.95** cum of rainfall runoff can be harvested at feasible, viable and sustainable location annually.

B. Estimation of Peak Rain fall Runoff:

Sr. No.	Type of land-use	Area [in m^2]	Peak Rainfall [in m/ hour]	Coefficient of runoff	Rain water collected [in m^3/ hour]	Runoff for 15 min peak intensity (Cu.Mtr)
1.	Building/ sheds	1719975	0.035	0.85	51169.25	12792.31
2.	Green belt area	1133160	0.035	0.15	5949.09	1487.27
3.	Open land area	343995	0.035	0.20	2407.96	601.99
4.	Road area	242820	0.035	0.65	5524.15	1381.03
5.	Total Area	**3439950**	---	…….		16262.6
6.	Assuming 10% is not suitable for recharge, hence available quantum of Rain water for recharge is about **14636.34 m^3**[90% of **16262.6 m^3**]					

Details of Rain water Harvesting Structure Implemented in plant Premises:

Sl No	Name of Structure	Length (In Mtr)	Width (In Mtr)	Depth (In Mtr)	Total Area (In M^3)
1	**Recharge Pond**	**70**	**55**	**10**	**38500**
2	**Recharge Pond**	**48**	**46**	**10**	**22080**

Total recharge potential is received from plant premises is diverted to Recharge pond to recharge the ground water level in the plant premises.

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 Raipur Energen 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.

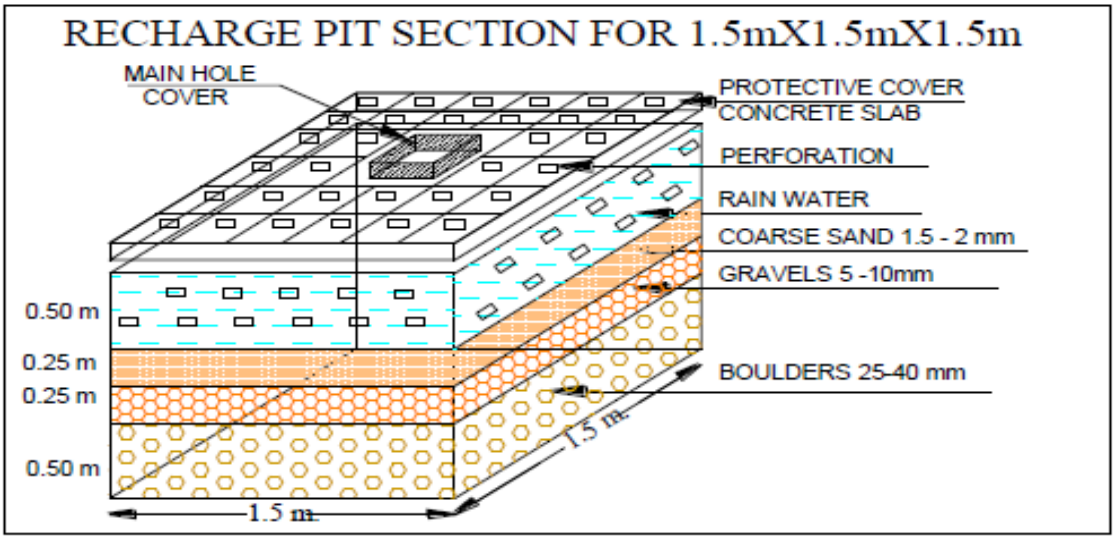
Since, the selection and design of artificial recharge and water harvesting structures are highly dependent on the local feasible and suitable conditions and the availability of local materials for their construction. A successful design of artificial recharge and rain water harvesting structures necessitates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

percolation pits may be with dimension as 1 m (length) x 1 m (width) x 2 m (depth) with 8" dia. injection well of 90 m depth having 8" plain pipe up to 6 m depth Thereafter, 7" dia. necked borehole

in rock may be made up to 84 m depth by DTH drilling machine. Each structure made at minimum spacing of 100 m may be made capable of recharging 195 m^3/day by each pit. The inlet of the structure may be kept 1 m above pond bed leaving, 1 m water column for settlement of silt/dust etc. The annual cleaning/ removal of silt/ dust from the pond bed are suggested before monsoon for efficient working of system. We have already two no's of Recharge pond to recharge the ground water of the study area.

Photographs of Rain water harvesting Structure in Plant Premises:

RECHARGE PIT: On the bed of recharge pit of 1.5m x 1.5m x1.50m will be constructed as per design of pit given in **Figure 8.1.**



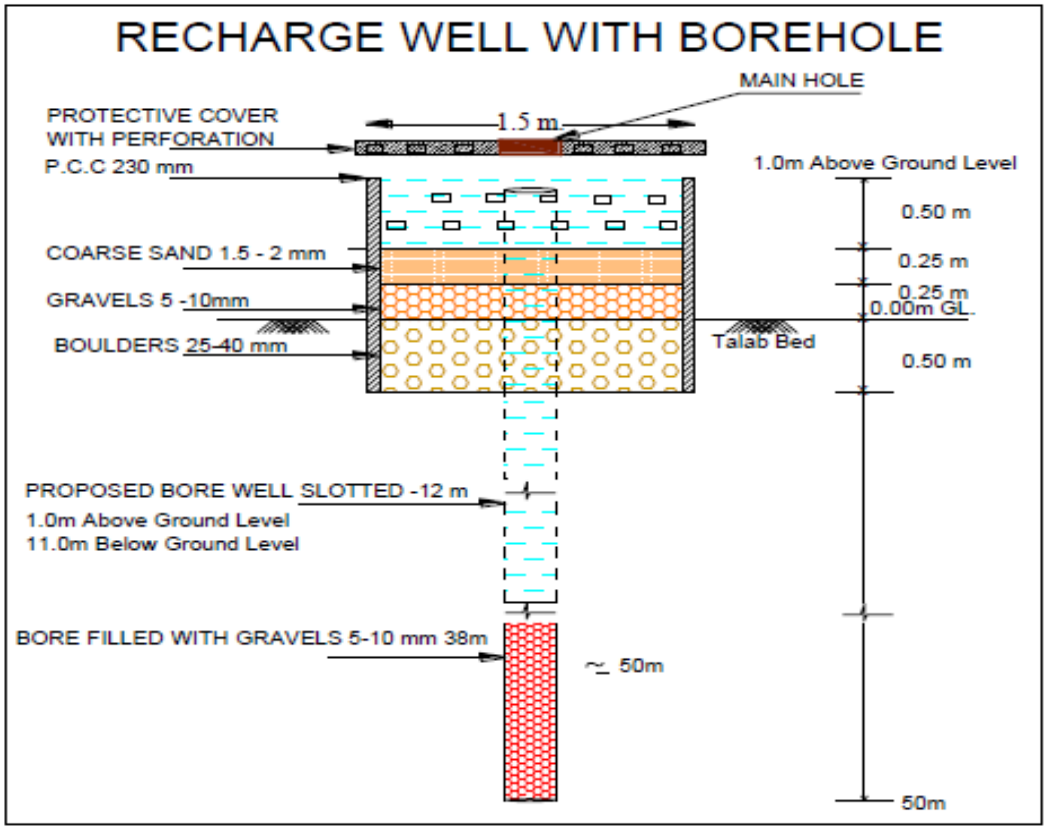


Fig 8.1 Recharge pit with bore well

BOREWELLDESIGN:

The depth of each new bore well will be 90m.The depth of bore well will be 90m below ground level and one meter above ground level that is pit bed. The diameter of bore well will be 150 mm. The cased portion will be top 06 meter and remaining 84 m will be uncase filled with gravel.

The casing of bore wells are slotted down to the depth of 6.00 m. the upper portion of casing above bottom of recharge pit is only 1.00m.This portion will be circumference with coir rope so that entry of fine sand and sl it can be avoided. The top of casing should be capped with stain less steel wire mesh so that clear water can be recharged directly without any floating particle. The relevant design is placed **Figure 8.2**

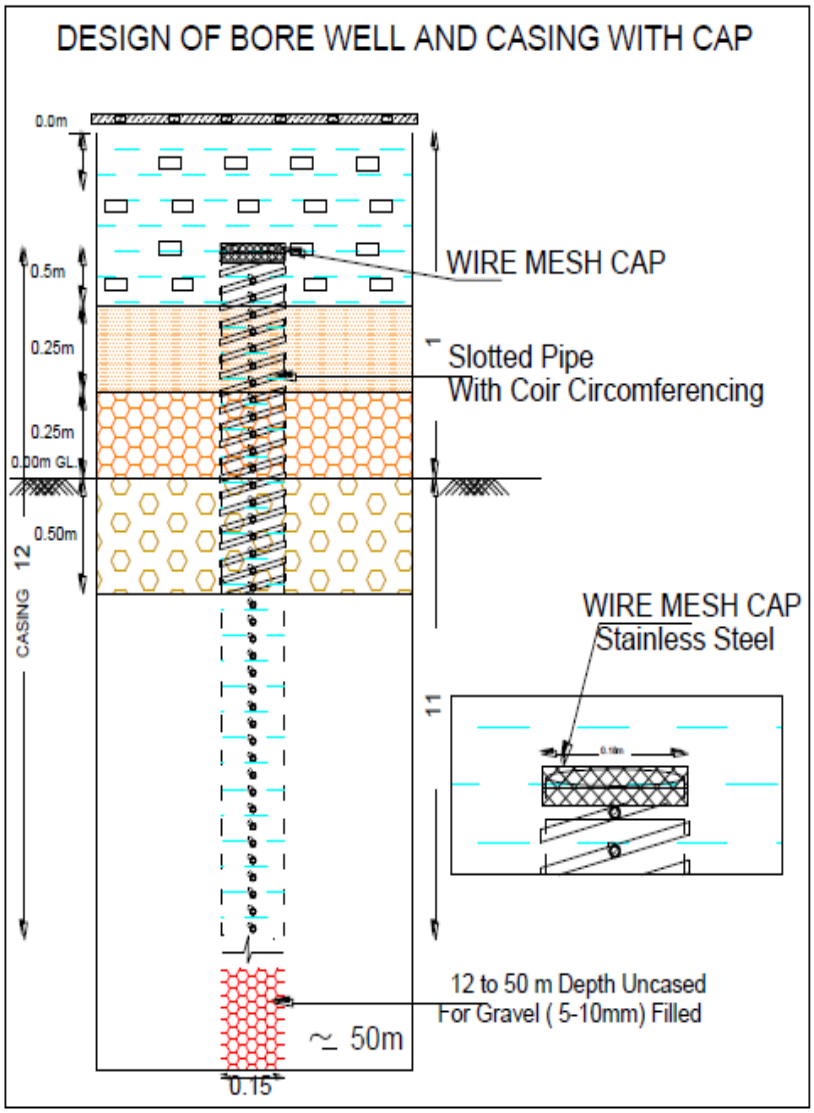


Fig 8.2: Bore well design

COVER TO RECHARGE PIT:

The cover for recharge pit is essential. The rain water harvesting is proposed to catch monsoon months. The recharge pit cover also safe guards the external pollutant like leaf and other local material. It is strongly recommend covering recharge pit by concrete slab with perforation. The design of recharge pit cover is exhibited in design at **Figure No 8.3.**

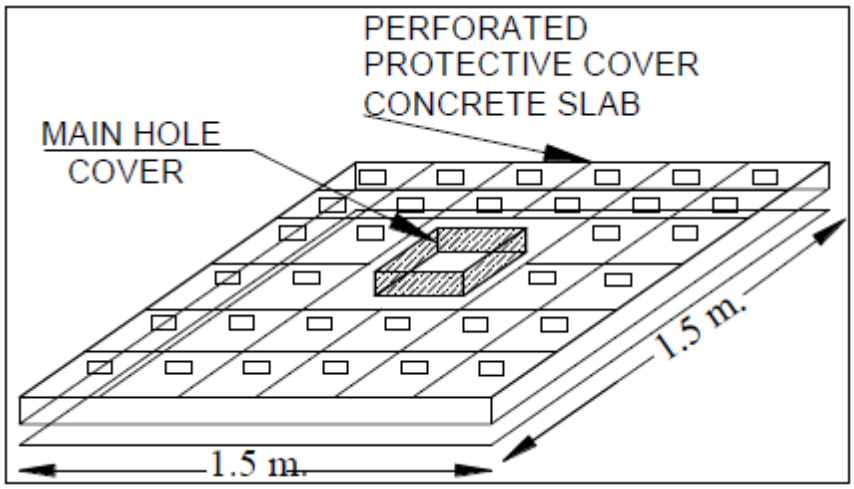


Fig 8.3 Design of recharge pit cover

SIDEWELLOFRECHARGEPIT:

The all four side wall of recharge pit will be perforated down to the depth of 0.50 m from top. The area occupied by perforated portion is in clear water above filter media filling. The design of recharge pit wall is given in **Figure8.4**

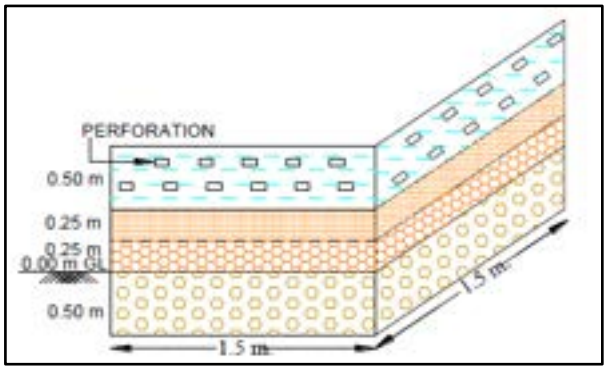


Fig 8.4 Perforation in side wall of recharge pit

9. 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, 15 ground water & Surface Water samples have been collected from 10 k.m. radius area. The ground water samples were analyzed for major as well as heavy chemical constituents. The ranges of different chemical constituents present in ground water are given in Table 9.1 and details are given in **Annexure I** and location of water sampling is given in **fig 9.1**.

Table 9.1: Aquifer wise ranges of chemical constituents

SN	Parameters	Prescribed limits as per IS 10500 2012		Observed value	
		Desirable limit	Permissible limit	Min	Max
1	PH Value	6.5-8.5	No relaxation	6.98	7.98
2	Turbidity (NTU)	1	5	0.22	6.3
3	Total Disolved Solid (mg/l)	500	2000	100	700
4	Total Hardness (as Caco3) (mg/l)	200	600	108	512
5	Calcium (Ca) (mg/l)	75	200	33.66	147.49
6	magnesium (As mg) (mg/l)	30	100	0.97	58.32
7	chloride (As Cl) (mg/l)	250	1000	20.27	141.94
8	Fluride (as F) (mg/l)	1	1.5	0.05	2.98
9	Sulphate as So4	200	400	3	115
10	Iron as Fe	0.3	No relaxation	<0.1	0.03
11	Nitrate (As No3) (mg/l)	45	No relaxation	<1	2.2
12	Sodium (Na) (mg/l)			4	28
13	Potasium (K) (mg/l)			1	12

SN	Parameters	Prescribed limits as per IS 10500 2012		Observed value	
		Desirable limit	Permissible limit	Min	Max
14	manganese as Mn	0.1	0.3	<0.1	<0.1
15	Barium as Br	0.7	No relaxation	<0.7	<0.7
16	Copper (as Cu) (mg/l)	0.05	1.5	<0.05	<0.05
17	Aluminium as Al	0.03	0.2	<0.03	<0.03
18	Lead as Pb	0.01	No relaxation	<0.01	<0.01
19	Silver as Ag	0.1	No relaxation	<0.1	<0.1
20	Boron as B			<0.1	<0.1
21	Arsenic as As			<0.1	<0.1
22	Chromium as Cr			<0.1	<0.1
23	Carbonate Hardness			27.306	235.06
24	Bi-carbonate as Hardness			40.262	349.72

According to above table, majority of chemical constituent of all samples are within permissible limit and suitable for drinking, irrigation and industrial use, fluoride contamination is observed only at Bottom Ash Pond 02, Plant Area may be due to ash, and Iron concentration is slightly higher in all sample due to leaching of iron from laterite. Higher concentration of Mn observed at Mohrenga village and Mg contamination observed at Mura. Rest of the parameters is within permissible limit.

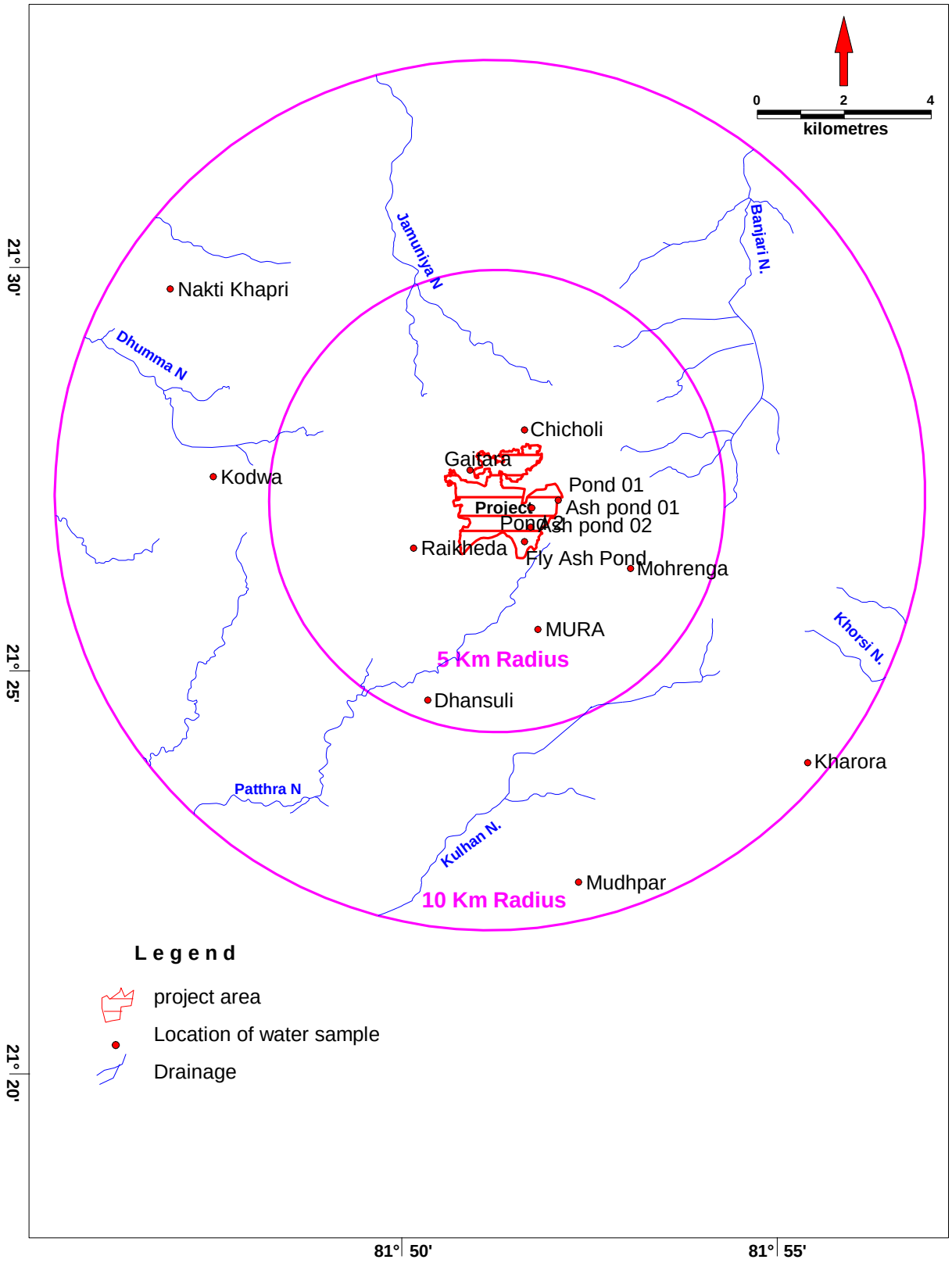


Fig-9.1: Location of water sampling

9.1 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/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, **Table 9.2.** The type of ground water found in each ground water sample collected is given in the **Table 9.2**.

Table 9.2: The type of ground water

S. N	Sample ID	Village	X	Y	Elevation (m(asl)	Water Type
1	SW1	Reservoir Pond 01	81.86806	21.45194	295	Ca-HCO3-Cl
2	SW2	Reservoir Pond 2	81.86194	21.45027	296	Mg-Ca-HCO3-Cl
3	SW3	Ash pond 01	81.86222	21.45028	298	Ca-Mg-HCO3-Cl
4	SW4	Ash pond 02	81.86195	21.44639	299	Ca-Mg-Cl-HCO3-SO4
5	SW5	Fly Ash Pond	81.86056	21.44333	293	Ca-Mg-Cl-SO4
6	SW6	Raikheda	81.83593	21.44197	290	Ca-Mg-HCO3
7	SW7	Chicholi	81.8606	21.4664	310	Ca-Mg-HCO3-Cl
8	SW8	Dhansuli	81.83915	21.41056	276	Ca-Mg-HCO3
9	SW9	Gaitara	81.84848	21.45809	300	Mg-Ca-HCO3
10	SW10	Nakti Khapri	81.78195	21.49554	299	Ca-Mg-Cl-HCO3
11	SW11	Kharora	81.92344	21.39763	304	Ca-Mg-HCO3-Cl
12	SW12	Kodwa	81.79152	21.45681	283	Ca-Mg-HCO3
13	SW13	Mohrenga	81.88416	21.43777	300	Ca-Mg-HCO3-Cl
14	SW14	Mudhpar	81.87262	21.37294	292	Ca-Cl-HCO3
15	SW15	MURA	81.86354	21.42523	292	Mg-Ca-HCO3-Cl

9.2 SUITABILITY OF GROUND WATER FOR DRINKING AND IRRIGATION PURPOSE

9.2.1 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-2003, 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 9.3**

Table 9.3: Classification of Ground Water Samples for Drinking Purposes.

Parameters	Drinking water Standards (IS-10500-91, Revised 2003)		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	15	0	0	15	100	0	0
TDS (mg/L)	500	2000	15	8	53.33	7	46.67	0	0
TH (mg/L)	300	600	15	6	40	9	60	0	0
Ca (mg/L)	75	200	15	5	33.33	10	66.67	0	0
Mg (mg/L)	30	100	15	9	60	6	40	0	6.67
Cl (mg/L)	250	1000	15	15	100	0	0	0	0
SO_4 (mg/L)	200	400	15	15	100	0	0	0	0
NO_3 (mg/L)	45	-	15	15	100	0	0	0	0

It is observed from the above **table 9.3**, that than 100% of samples are suitable for drinking purposes. It is also observed that only 39% of samples show the PH,TH, Mg and Ca concentration above the Desirable Limit but below maximum permissible limit of BIS Standards. Therefore, it is concluded that the portability of ground water in major part of study area.

9.2.2 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 action 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.

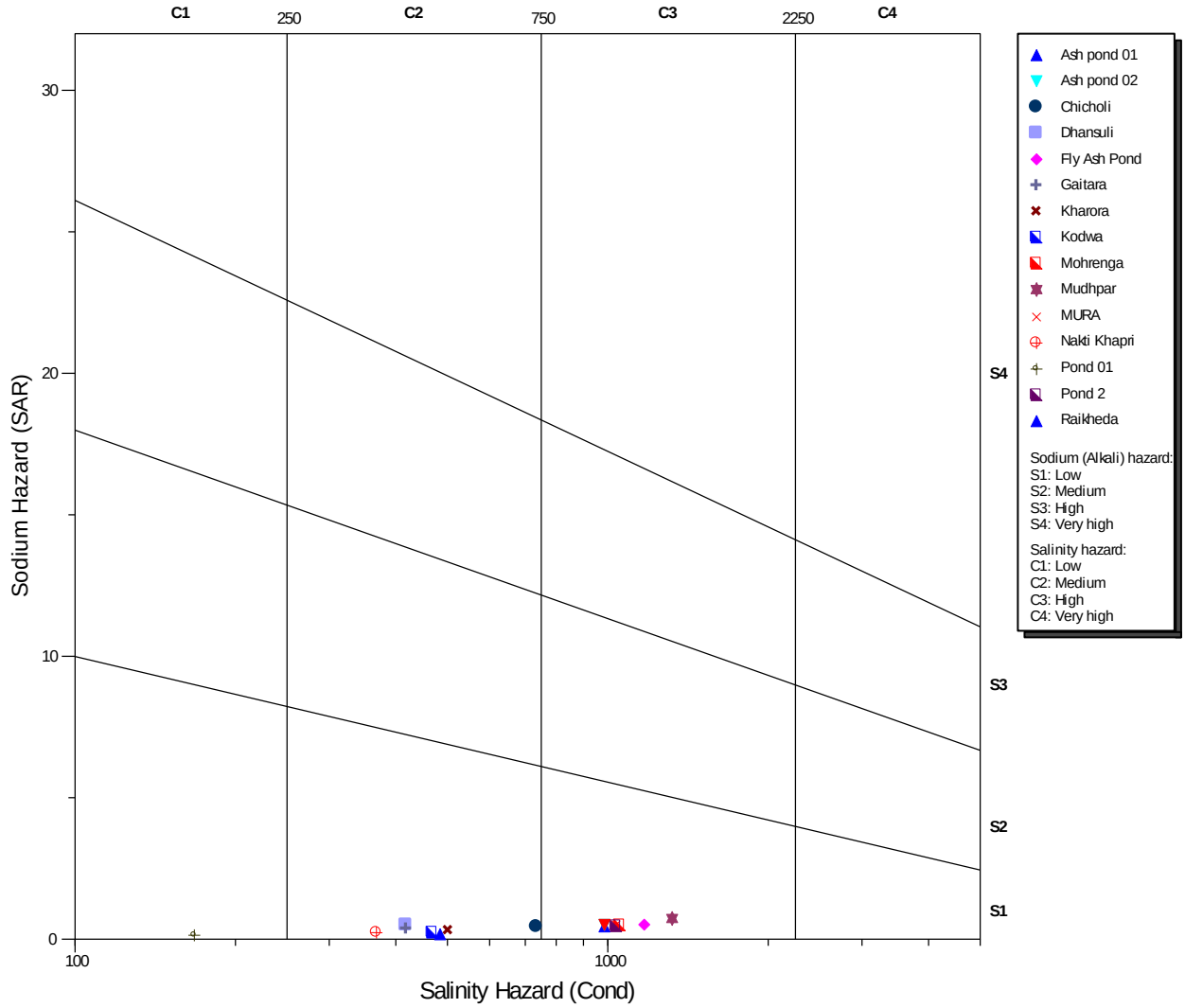


Fig 9.2 Wilcox Diagram

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 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 is given in the **Table 9.4**, and the EC and SAR values are plotted in **Wilcox Diagram (Fig 9.2)** and **Piper (Fig 9.3).**

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 9.4.**

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)	7	7	-	-	-
750-2250 (C3)	7	7		-	-
2250-5000 (C4)					
> 5000					
Total	15	15			
Overall Percentage		100%			

From the Table 9.4, 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 15 samples 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.

Based on above **table 9.4**, ground water samples are classified with respect to salinity and sodium hazard is presented in **Table 9.5.**

Table 9.5: Classification of ground water samples with respect to salinity and sodium hazards

Type of Classification	Characteristics	No. of samples falling	%
C1S1		1	8
C1S2			
C2S1	Medium salinity and low sodium water	7	46
C3S1	High salinity and low sodium water	7	46
C4S1	Very high salinity and low sodium water		
Total		**15**	**100**

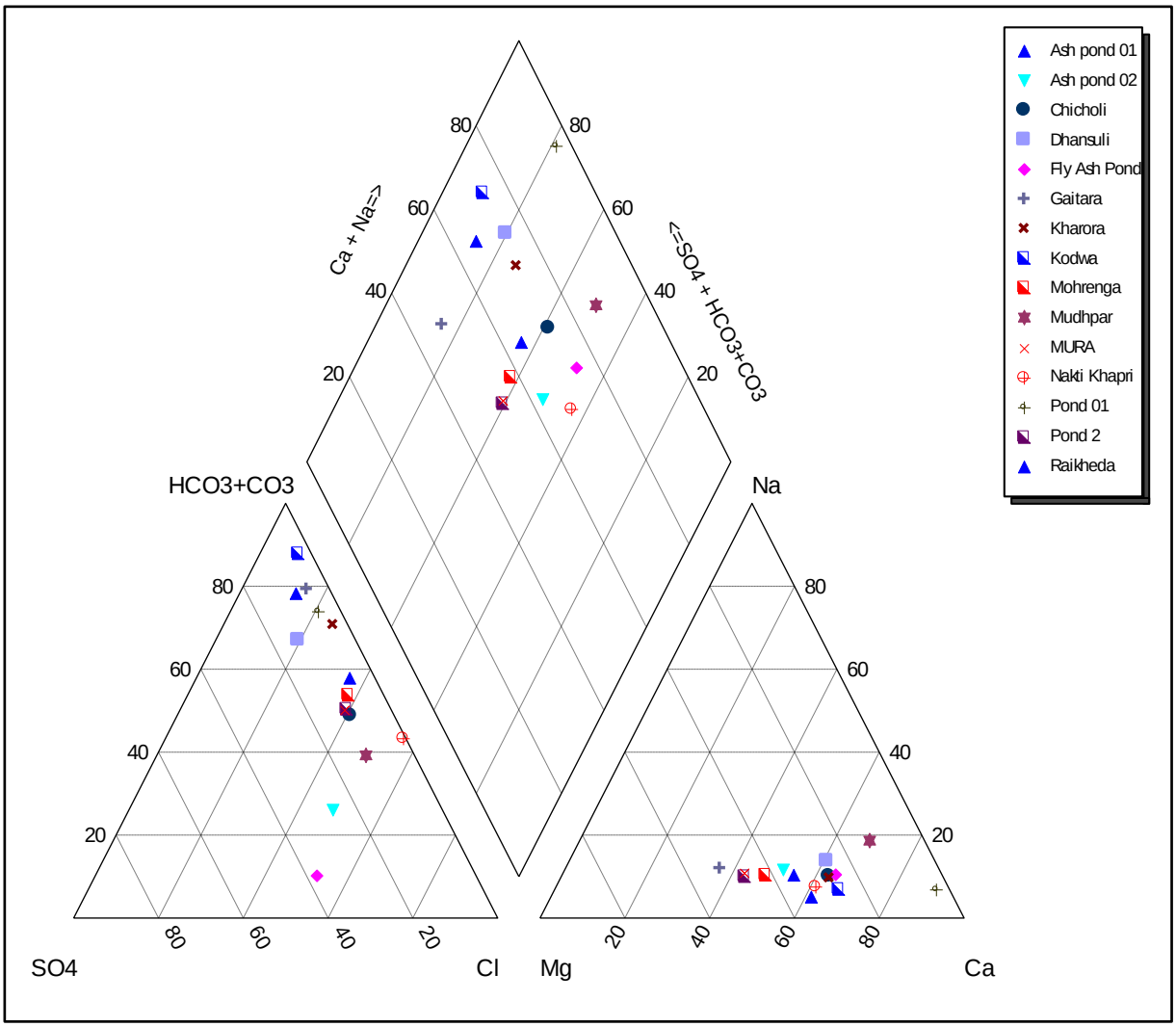


Fig 9.3: Trainer piper diagram

10. IMPACT ASSESSMENT OF THE STUDY AREA

10.1: IMPACT ON THE GROUND WATER REGIME

The REL occupies a small part of Tilda Block of Raipur district. The total area of Tilda Block is 740 sq km (Dynamic Ground Water Resource Estimation as on 2022). The stage of Ground water extraction in Tilda Block is 53.76%, as discussed earlier. The block has been categorized as "Safe". There is an improvement in category of the block as compared to 2020 categorization.

from the comparison of mean water levels of the year 2019 to 2021 with respect to the years 2022 in pre-monsoon period it is found that all the villages in core zone which are considered for analysis showing decline in the range of -0.2 to -0.8 m. except Gaukheda and Paraswani villages which are showing rise of water level in the ranges of 0.16 to 0.18 m and 57 % of the villages in buffer zone(10 Km Radius) are showing decline in range of -0.1 to -0.8 m while 43 % villages are showing rising in water level in the range of 0.02 to 4.96 m. In post-monsoon period, it is found that 80% the villages in core zone (5 Km Radius) which are considered for analysis showing decline in the range of -0.08 to -0.8 m. remaining 40% of wells are showing rising water level in the range of 0.23 to 1.0 m. In Buffer zone about 43% village are showing decline in water level of -0.35 to -0.8 m. and remaining 57% village are showing rise in water level of 0.04 to 3.5 m. The area showing falling trend more than 20 cm/yr are of considerable significance which is attributed to increase in draft in selective patches.

In conclusion, if the decline per year is more than 0.20 m then for the period of four years it will be more than 0.8 m which is considered as significant but in the present scenario all the villages of core zone and buffer zone considered for analysis shows decline less than 0.8 m over the period of four years, so it is evident that in there is a marginal decline in water level trend in pre and post-monsoon period over the period of four years.

10.2: IMPACT ON SURFACE WATER SOURCES

• In the study area around the REL, ground water occurs in the weathered and the cavernous part of the formation and also the fractured zones in the area. The top soil and shallow aquifer existing down to the depth of about 20 metres below ground level generally supports the dugwells which is used for domestic purpose only.

• There are several water bodies including ponds and tanks, which are natural water conservation structures and also augment the ground water resources through natural recharge. Presence of river and

canals running from north to south are additional water sources in the area. The availability of surface water through rivers and ponds etc, release the stress on ground water resources.

• Thus, a good annual rainfall along with favourable features such as landuse, water bodies, rivers, canals etc. makes the area excellent repository of ground as well as surface water sources.

As per the water level trend analysis from the year 2019-2022 in the study area indicates that the decline in water levels over the period of observation. The decline rate is more in core zone and comparatively low in buffer zone.

10.3: IMPACT ON WATER QUALITY

From the water testing report of the study area 100% of samples are suitable for drinking purposes. It is also observed that only 39% of samples show the PH,TH, Mg and Ca concentration above the Desirable Limit but below maximum permissible limit of BIS Standards. Therefore, it is concluded that the portability of ground water in major part of study area.

The chemical analysis of water samples for major parameters indicates that there is no visible or significant adverse impact on groundwater quality of buffer zone due to Plant activities. All the parameters are under permissible limit of as per drinking water norms IS: 10500 from chemical analysis of ground water collected in the study area it is evident that ground water quality is well within permissible limits for domestic as well as irrigation purposes

10.4: MITIGATION MEASURES

From the well inventory data, it can be clearly established that most of the villages have good ground water source and the water level is also shallow. In general, the hydrogeological condition varies depending on the geological and climatological setting of the project site. Hydrogeological consequences of plant area are governed by the nature and duration of rainfall. And it can be seen from the hydrographs that there is a declining trend which creates the potential zone for recharging. The industry has to adopt measures for recharging ground water within the premises and adopting suitable water conservation techniques such as recycling and reuse. Through RWH recharging the rainwater in to aquifer has been undertaken in the premises of the plant. During monsoon rain water in the plant is stored, used and re-circulated for industrial use. Since, plant is operating above water table and zero discharge; there will not be any adverse effect on local water body due to plant activity.

10. CONCLUSIONS & SUMMARY

Adani Power Limited (APL), India's largest private sector thermal power producer, announced the completion of acquisition of Raipur Energen Limited, which owns and operates a 1,370 MW (2 X 685 MW) Supercritical power plant at Raikheda village, in Raipur District of Chhattisgarh.

The area is drained by tributaries of Seonath River especially by Banjari River and Khorsi nala. Banjari River is north flowing tributary to Seonath River and flows in the western part of the project area while Khorsi nala flows in the east of project area.

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.

Geomorphologically the study area is represented by Pediment, Pediplain, Buried plain and Flood Plain. The Pediplain is developed in the major parts of the study area. They are also control by fractures and joints. They are having gently sloping smooth surface of erosional bed rock.

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. limestone & shale at depths.

The depth to water level on ground water of May 2022, it is observed that the overall depth to water level remains between 3.69 to 12.7 meters below ground level. The pre-monsoon depth to water levels ranges between 5 and 10 mbgl in 5 km radius 60% of the villages, water levels more than 10 mbgl are observed in the villages namely Bharuwadih khurd villages and less than 5 observed in 33% villages. In 10 km radius depth to water levels ranges between 5 and 10 mbgl observed in 76% of the villages, water levels more than 10 mbgl are observed in remaining 24 % villages of buffer zone. Water level less than 5 mbgl. recorded at Mohrenga,Dhansuli,Raikheda,Murra and Khapri villages .

The depth to water level of Nov 2022 remains between 1.3 and 7.7 meters below ground level. The post-monsoon depths to water level range of 0 to 3 mbgl are observed in 66% villages of core zone (5 km Radius), about 26% villages shows water level in the range of 3 to 5 mbgl and more than 5 mbgl at Bharuwadih khurd village. In the area of 10 km radius ground water levels less than 3 mbgl are observed in the 42% villages, about 29% villages shows water level in the range of 3 to 5 mbgl and more than 5 in 29% villages.

Seasonal ground water level fluctuation in the study area is varies from 1.59 to 7.16 meters. Lower range of water level fluctuation is also observed along the river course followed by > 6. 4 to 6, & 2 to 4.

Overall, from the comparison of mean water levels of the year 2019 to 2021 with respect to the years 2022 in pre-monsoon period it is found that all the villages in core zone which are considered for analysis showing decline in the range of -0.2 to -0.8 m. except Gaukheda and Paraswani villages which are showing rise of water level in the ranges of 0.16 to 0.18 m and 57 % of the villages in buffer zone(10 Km Radius) are showing decline in range of -0.1 to -0.8 m while 43 % villages are showing rising in water level in the range of 0.02 to 4.96 m. In post-monsoon period, it is found that 80% the villages in core zone (5 Km Radius) which are considered for analysis showing decline in the range of -0.08 to -0.8 m. remaining 40% of wells are showing rising water level in the range of 0.23 to 1.0 m.In Buffer zone abour 43% village are showing decline in water level of -0.35 to -0.8 m. and remaining 57% village are showing rise in water level of 0.04 to 3.5 m. The area showing falling trend more than 20 cm/yr are of considerable significance which is attributed to increase in draft in selective patches.

In conclusion, if the decline per year is more than 0.20 m then for the period of four years it will be more than 0.8 m which is considered as significant but in the present scenario all the villages of core zone and buffer zone considered for analysis shows decline less than 0.8 m over the period of four years, so it is evident that in there is a marginal decline in water level trend in pre and post-monsoon period over the period of four years.

In the study area, the ground water flow direction is towards north-east and north- west. However, in the core zone, the flow direction is North-West and South-East. A local variation in flow direction is also observed, the mining lease is located in the zone of surface water divide.

In the major portion of the area the yield ranges between 1 to 5 lps indicating the area is covered by flaggy limestone and cavernous while in rest of the area it is 1to 3 lps covered with shale.

In the study area both shallow and deep aquifer occurs. The shallow aquifers of the study area occur within an average depth of 20 m. In general, the yield of dug wells ranges from 40 to 60 m^3/day. Deep aquifer system in the area mainly formed by the Raipur group of rocks mainly Chandi formation which comprises of limestone and shale. The deep aquifers of the area are mostly developed by way of bore wells in the area whose depth varies from 60 to 80m. Tarenga formation in the area is more productive & yield around 1to 8 lps, while limestone in the area along & nearby river courses yield 1to5 lps of water.

The aquifer parameters of the study area covered by limestone 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. The potential fractures for boreholes up to 100 mbgl depth in the area are recorded at various depths i.e. 40-45, 60-65, 75-80, 90-95 mbgl and are 4 to 5 in numbers.

The ground water resources within 10 km of radius estimated on the basis of norms as per GEC'2015 indicate that the total ground water resource of the present study area is of the order of 3549.16 Ham while the total extractable ground water resources in the area are of the order of 3194.26 Ham. Gross ground water extraction in the area is around 1717.26 Ham while Balance ground water resources are1477 Ham. The stage of ground water extraction in the area is around 53.6 % which comes in "SAFE" category.

Total recharge potential of **1906907.95** 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.

percolation pits may be with dimension as 1 m (length) x 1 m (width) x 2 m (depth) with 8" dia. injection well of 90 m depth having 8" plain pipe up to 6 m depth Thereafter, 7" dia. necked borehole in rock may be made up to 84 m depth by DTH drilling machine. Each structure made at minimum spacing of 100 m may be made capable of recharging 195 m^3/day by each pit. The inlet of the structure may be kept 1 m above pond bed leaving, 1 m water column for settlement of silt/dust etc. The annual cleaning/ removal of silt/ dust from the pond bed are suggested before monsoon for efficient working of system. We have already two no's of Recharge pond to recharge the ground water of the study area.

The detailed chemical analysis for water samples drawn at six locations at plant area (Ash Dyke ponds RESERVOIR POND) and 9 villages of buffer zone for non-metallic ingredients like pH, Turbidity, TDS, TSS, CaCO3, Ca, Cl, Mg, SO4 & SiO2 and metallic ingredients like Pb, Hg, Ag,Mn,Zn, Fe, & Cr etc. were done in-2020. The data indicates that the ground water quality is improved in downstream for most of metallic and non-metallic ingredients and most of the ingredients are in permissible limit as per IS:10500-2012.

The majority of chemical constituent of all samples are within permissible limit and suitable for drinking, irrigation and industrial use, fluoride contamination is observed only at Bottom Ash Pond 02, Plant Area may be due to ash, and Iron concentration is slightly higher in all sample due to leaching of

iron from laterite. Higher concentration of Mn observed at Mohrenga village and Mg contamination observed at Mura. Rest of the parameters is within permissible limit.

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.

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

List of Pollution Control Equipment/Devices

Sr. No.	Plant Activities	Pollution Control Measures
1	Coal Yard	Dust Suppression System
2	Coal Handling system: • Wagon Tippler • Crusher House • Coal Bunker • Coal Transfer House	 Dust Suppression System Dust Extraction & Dry fog diffusion systems Dust Extraction System Dry Fog diffusion system
3	Boilers	Electrostatic Precipitators (ESPs)
4	DM Plant	ETP & Neutralization Pit.
5	Domestic Effluent	Sewage Treatment Plant (STP)
6	Fly Ash Storage Silos	Dust Extraction System (Bag Filters)
7	Fly Ash & Bottom Ash Disposal	Ash Pond /Dyke
8	Vehicle Movement	Concrete Road & Road Sweeping Water Sprinkling System in Ash Dike Area.
9	Dispersion of Emission	275 m Height Chimney
10	Reduction of Gaseous Emission	Low NOx Burners FGD for SO2 removal (proposed)
11	Flue Gas Desulphurization System (FGD)	As per MoEF&CC's Notification dated 31st March 2021, Raipur TPP is falling under Category "C" Non- retiring TPPs and the timelines for compliance of SO2 emission is up to December 2024. Accordingly, the work is under progress

Annexure - VI

MINISTRY OF POWER
CENTRAL ELECTRICITY AUTHORITY
THERMAL CIVIL DESIGN DIVISION

Monthly Abstract of Ash Generation and Utilization

(For the Period from 1st April 2022 to 31st March 2023)

Name of Power Utility / Company: Raipur Energen Limited

NAME OF THERMAL POWER PLANT: Raipur Energen Limited
Village: Raikheda, Block: Tilda,
District: Raipur (Chhattisgarh)

INSTALLED CAPACITY (Total): 1370 MW
PERIOD OF REPORT: 1st April 2022 to 31st March 2023

Sl. No.	ASH GENERATION AND UTILIZATION (in LMT)						MODE OF ASH UTILIZATION AND UTILIZATION IN EACH MODE (in LMT)										
	Month	Coal Consumption	Ash Content of Coal %	Ash Generation	Ash Utilization	% age Utilization	Fly ash based products viz. bricks, blocks, tiles, fibre cement sheets, pipes, boards, panels;	Cement manufacturing, ready mix concrete;	Construction of road and fly over embankment, Ash and Geo-polymer based construction material;	Construction of dam;	Filling up of low lying area;	Filling of mine voids;	Manufacturing of sintered or cold bonded ash aggregate;	Agriculture in a controlled manner based on soil testing;	Construction of shoreline protection structures in coastal districts;	Export of ash to other countries;	Any other eco-friendly purpose as notified from time to time.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1	April-22	5.08861	38.40	1.95377	1.95377	100.00	0.02512	0.88128	0.02271	0.00000	0.15470	0.86996	0.00000	0.00000	0.00000	0.00000	0.00000
2	May-22	4.72315	38.30	1.80873	1.80873	100.00	0.02328	0.87927	0.01288	0.00000	0.14750	0.74580	0.00000	0.00000	0.00000	0.00000	0.00000
3	Jun-22	4.56584	38.68	1.76584	1.76584	100.00	0.02333	1.05651	0.00974	0.00000	0.11878	0.55748	0.00000	0.00000	0.00000	0.00000	0.00000
4	Jul-22	3.63813	38.45	1.39886	1.30459	93.26	0.01344	0.97439	0.00676	0.00000	0.02720	0.28280	0.00000	0.00000	0.00000	0.00000	0.00000
5	Aug-22	3.00506	37.85	1.13726	1.06331	93.50	0.01772	0.90852	0.00264	0.00000	0.01800	0.11644	0.00000	0.00000	0.00000	0.00000	0.00000
6	Sep-22	3.71054	38.08	1.41279	1.30683	92.50	0.02210	1.05624	0.00430	0.00000	0.01820	0.20600	0.00000	0.00000	0.00000	0.00000	0.00000
7	Oct-22	2.79147	38.64	1.07848	1.10488	102.45	0.01296	1.05751	0.00651	0.00000	0.02790	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	Nov-22	3.92263	39.14	1.53512	1.53327	99.88	0.02150	0.85205	0.01183	0.00000	0.12550	0.52239	0.00000	0.00000	0.00000	0.00000	0.00000
9	Dec-22	5.35879	39.59	2.12128	2.07481	97.81	0.09932	0.93314	0.01337	0.00000	0.71805	0.31093	0.00000	0.00000	0.00000	0.00000	0.00000
10	Jan-23	4.65575	42.13	1.96148	2.09785	106.95	0.04931	0.88924	0.01875	0.00000	0.63485	0.50570	0.00000	0.00000	0.00000	0.00000	0.00000
11	Feb-23	4.69104	41.40	1.94221	1.92553	99.14	0.01669	0.78217	0.02172	0.00000	0.66729	0.43766	0.00000	0.00000	0.00000	0.00000	0.00000
12	Mar-23	5.17696	41.48	2.14766	2.33617	108.78	0.00246	1.22169	0.01078	0.00000	0.22735	0.87389	0.00000	0.00000	0.00000	0.00000	0.00000
TOTAL		**51.32797**	**39.48**	**20.26348**	**20.27557**	**100.06**	**0.32721**	**11.49201**	**0.14198**	**0.00**	**2.88532**	**5.42905**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: (i) Ash means all type of ash including Fly Ash, bottom Ash and Pond Ash etc

(ii) Quantity of ash may be provided in Lakh Metric Ton (LMT) upto five decimal places

(iii) Ash utilisation in Column (6) shall be equal to summation of modes of ash utlisation in each mode i.e. summation of column (8) to column (18)

Abbreviation:

MW - Mega Watt
TPS- Thermal Power Station
KM - Kilometer
LMT - Lakh Metric Tonne
Kcal - Kilocalories

Adani Power Limited, Raipur

1370 MW (2x685 MW) Coal Based Thermal Power Plant

Annexure VII

Green Belt Development Details at Adani Power Limited, Raipur

Sl. No.	Description	Quantity / Unit
1	Plantation on 33% land of 850 acres	280 acres
2	Density of plantation	2500 plants / Hectare
3	Area required per plant	4.0 SQM
4	Total no. of plantation since commissioning	217762 Nos.
5	Total no. of plantation in FY 2021-22	6714 Nos.
6	Total no. of plantation in FY 2022-23 (till 31.03.2023)	16172 Nos.
7	Survival Rate	>90%

Plant species Planted at Adani Power Limited, Raipur

Sr. No.	Location	Area in (Hect.)	Tree (No.)	Tree Spp.	Remarks
1	Different locations inside premises	2.84	5318	Ficus religiosa, Ficus bengalensis, Conocarpus, Mimusoaps illengii, Pongamia pinnata, Azadiracta indica, Anthocephalus cadamba, Cassia fistula, Delonix regia,	Planted in June & July 2022
2.	CWPH & SYCR Between area.	0.61	450	Putranjeeva, Casuarina, Mahogany, Bauhinia blackiana, Cassia fistula, Conocarpus,	Planted in June & August 2022
3.	All internal approach roads of plant premises.	2.94	7368	Teak	Planted in September 2022
4.	Precision Workshop surrounding.	0.14	90	Bauhinia blackiana, Ficus bengalensis, Swietenia macrophylla, Azadirachta indica	Planted in October 2022
5.	Safety Park	0.41	1031	Mixed Plantation (Mahogany, Conicarpus, Ficus Black, Cassia fistula, Delonix regia, Bauhinia blackiana)	Planted in December 2022
6.	Security main Gate to CSR premises, Safety Park back side and Hostel premises.	0.96	180	Mahogany, Delonix regia, Ficus black, Avelandea, Sizizium cumini,	Planted in December 2022
7.	Helipad Ground	0.76	937	Conocarpus, Bougainvillea, Casuarina	Planted in December 2022
8.	WTP	1.07	288	Plumeria & Pulchurima, Casuarina, Bogunvellia, Mahogany	Planted in January 2023
9.	NDCT Central and South.	1.48	510	Mixed plants (Bauhinia, A. indica, Mahogany, Putranjeeva, Bakul, Delonix, Cassia fistula)	Planted in January 2023
	Total	**11.21**	**16172**		

Annexure - VIII

2022-23

adani Foundation

Annual Progress Report - RAIPUR

Deepak Kumar Singh

4/2/2023

Table of Contents

Preface

Adani Foundation Raipur under the guidance of Adani Power Limited, Raikheda started the CSR activities since October 2019 after the handover & take over from GMR Group. Initially we took 6 core villages under CSR arena ie; Raikheda, Bhatapara, Gaitra, Khapri, Chicholi, Gourkheda villages. And other 10 villages constitute from Railway siding & others like Khamahariya, Konari, Bartori, Bahesar, Tulsi, Tarashiv, Murra, Chhattoud, Sontara, Samoda. During the initial phase of in 2019-20, AF continued with need-based analysis study & undergone the primary level basic village survey in all 16 villages. Identified core areas of working in the field of Education, Health, Sustainable Livelihood & community infrastructure Development. As the site is located near to State capital therefore, it has a huge potential of addressing development initiatives & partnering growth together in association with community. Raipur Energen Limited is located at third phase of Raipur Industrial area "Bartori". Village Bartori represents Industrial Park & also shadows under Railway village of REL plant.

We started with Navodaya Coaching Centers & immediately the results floated in colors. Initial year of 2019, 8 students got selected in Jawahar Navodaya Vidyalaya, Raipur. Since then, the selection wheel paced with 32 students in 4 years of Adani Foundation's aegis. Now, 12 Navodaya Coaching Centers are running under Adani Foundation Raipur. Another program under Education vertical is "Nooni Laari", benefits 60 college girls to avail free transportation Bus service to commute to-fro from villages to College, Tilda. School events binds the student interest towards education, school, teaching, learning environment & also enables student to develop learning behavior. Many sports events like Chhattisgarh Olympics at Raikheda School, football tournament at Kharora, Bahesar, children's Day, Science project in school.

We also initiated Mobile Medical Health Care Unit Van with Tilda Jan Jagaran Swasthya avm Paryavaran Sewa Samiti for doorstep facilitation of primary health services. The average annual patients' beneficiaries of MHCU stands 30,000 per year including specialized health camps, blood donation camps, health awareness. Suposhan program was introduced in F.Y 2020, addressing the malnutrition in women & child & suitable

interventions to provide immediate basic health care, counselling to the patients, with referral facilities at beneficiaries' doorsteps.

In Sustainable Livelihood Development Adani Kamdhenu Program (launched in 2022, 16 villages) has opened with an alternate livelihood option for marginal farmers of 16 villages. Through artificial insemination traditional cattles are converted into cross breed to enhance milking capacity of cattles. Enabling marginal farmers to add more monitory benefits in long run. SRI & Backyard BADI Development programs have led to village household families to gain more cultivation from their limited farmland through hybrid seeds & learning technical cultivation techniques. 100 farmers including SHG women gained knowledge of modern farming techniques through exposure visits at KVK, Raipur & developed Gouthan.

Adani Mahila Movement for Advancement introduced in year 22-23, 50 underprivilege women & girls are learning sewing & tailoring art & again get engaged in Garment Production Center, run by Saheli Mahila Swa -Sahayata Samuh, Raikheda. Adani Foundation support in operation, mentoring, guiding the overall operation of garment production center. GPC achieves highest production of 96,662 nos. with total revenue earned or women's income stands to Rs. 4,19,956/- in year 2022-23. During the initial phase, 20 girls' trainees associated with GPC & during the month of Dec'23 to Feb'23 additional 30 women from Tarashiv village joined at sewing training center. Post sewing training of two months, they shifted to Garment Production center for commercial stitching & individual earning started. Now the center is running in two batches. Adani Foundation objective through Garment Production Center is to develop more women earning hands & attain sustainable livelihood for community.

During this year, Adani Foundation explored possibility of Natural Resource management "Water". Chhattisgarh Stands low underground water table resulting in scarcity of water at summers, irrigation & agriculture gets disturb, domestic water dependency of villagers faces difficult due to pond drying ect. We conceded 22,500 Cum water harvesting by deepening 6 ponds in village: Raikheda, Gaitra, Chicholi, Murra & Tulsi.

Message from Business Head

It gives me immense pleasure to present the Annual Report of Adani Foundation – Raipur for FY 2022-23. As a responsible corporate citizen, we always believe in creating long term values for our stakeholders with the motto of "Growth with Goodness". We are committed to building a sustainable future by driving positive changes in the areas of Education, Healthcare, Sustainable livelihood Development and Community Infrastructure Development.

Over the past year, we have continued to focus on our core values of integrity, teamwork, excellence, and customer focus. Our efforts have resulted in achieving good bonding between communities where we serve. We are proud to report that our CSR initiatives have touched the lives of thousands of people directly or indirectly across the intervention area.

Our education programs have provided quality education to underprivileged children, our Healthcare interventions have brought medical facility close to the communities, and our Sustainable Livelihood Programs have empowered many people with skills and resource to become self-reliant. We have supported community SHG women to operate Garment Production Center, that provides self-employment opportunity to 50 Women & earn fruitful sustainable livelihood for themselves. Expansion of unit is planned in preceding years to add more operational hands in center & facilitate more income generating women entrepreneurs in community.

I am feeling delighted to share with you that, our operational Navodaya Coaching Center has facilitated 10 students to clear Jawahar Navodaya Entrance exam resulting students in getting standard education with free loading & boarding facility. The selection counting has added 32 students since 2019.

Our efforts will give sustained access to health, sustainable livelihoods, access to quality education which will eventually upgrade their standard of living. We would like to take this opportunity to thank our employees, partners and stakeholders for their unwavering support and commitment towards our shared vision of a better tomorrow. We remain

steadfast in our commitments to creating positive impact and contributing to the sustainable development of the communities we serve. We hope you find this report informative and insightful, and we look forward to your continued support as we embark on another year of Growth with Goodness.

Demographic Profile

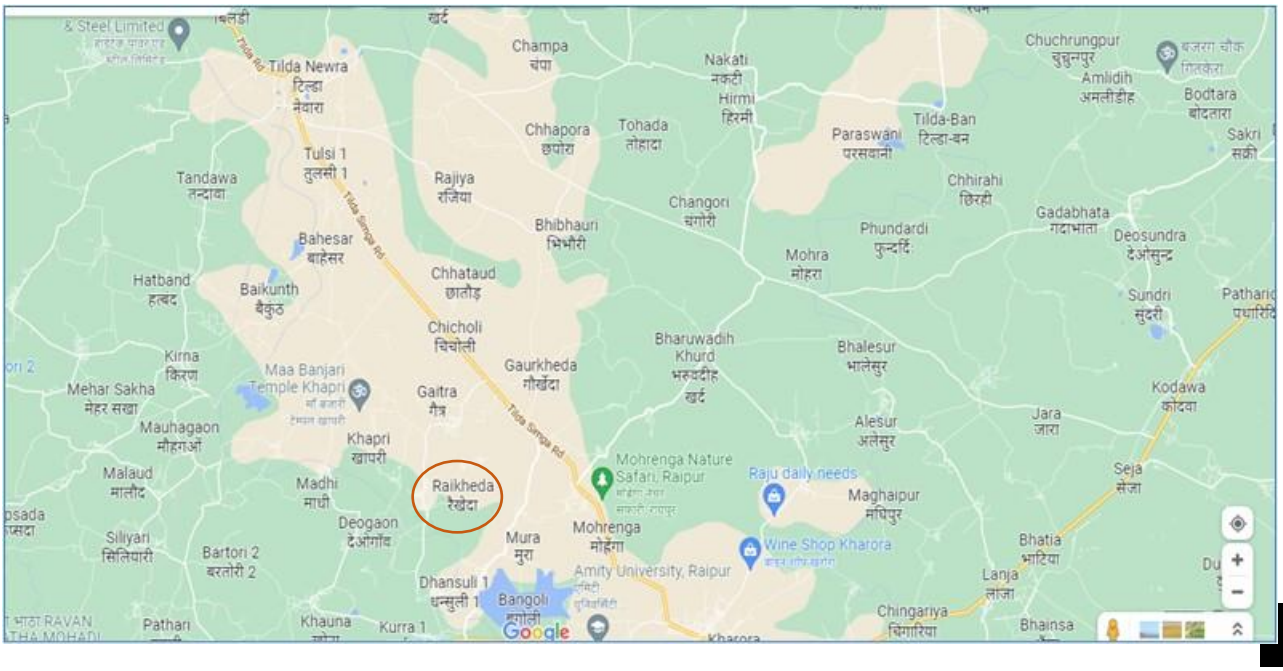
Adani Power Limited (Raikheda) is located at village Raikheda which is about 20 Kms from Tilda & comes between Tilda Kharora Road. The nearest railway station, Bus stand, CHC, & Degree college is located at Tilda Town. Nearest Police Station is located at Kharora town which is 12 kms from plant. Tilda is well connected with state Capital Raipur by rail & road route. Block administration officials like SDM, Tehsildar, BMO, BEO, BMO offices are place at Tilda. Block is boon with Government College, ITI college, for higher education, Community Health Center, NRC, Mission Hospitals to avail health services,

Vision: -

To accomplish a passionate commitment to social obligations towards communities, fostering sustainable and integrated development, thus improving quality of life"

Mission: -

"To play the role of a facilitator for the benefit of the people without distinction of caste or community, sector, religion, class, or creed, in the field of education, community health and promotion of social and economic welfare and upliftment of the people in general".



Executive Summary

Adani Power Limited Raipur in Chhattisgarh are focused in 16 villages near to POWER Station (2x685 MW) Super critical Thermal Power Project and its Railway Corridor in Tilda Block of Raipur district. The villages covered under CSR activity is namely Raikheda, Bhatapara, Chicholi, Gaitra, Gaurkheda and Murra (Project Affected Villages) and Tulsi, Bahesar, Khamharia, Konari, Bartori, Tarashiv, Chhattod. (Railway siding Village). Approximate population of these villages is 37,000. While the rapport building activities in the project area started in March 2009, the actual work started in June 2009. Till March 2022 CSR Activities of REL is focused in 16 Project affected Villages. REL-AF Team at Chhattisgarh comprises of Program Manager, one Senior Project officer, three Project officers, 17 field volunteers.

1.1 Education

NAVODAYA COACHING CENTER: In view of the Jawahar Navodaya school entrance examination, foundation has established 12 Navodaya Coaching Centers at villages Raikheda, Bhatpara, Gaitara, Khapari, Tarashiv, Chhatoud, Sontara, Mura, Konari, Khamharia, Gaurkheda and Chicholi. Since inception of the program, total 55 students from our coaching centers have secured their seats and currently studying in Jawahar Navodaya school–Mana. Total of 120 Students are registered for the Navodaya Coaching in 2022-23 session at Adani Foundation's running Navodaya Coaching Center. Online classes as well as offline center-based classes are continued in our 12 centers. Navodaya faculties conclude students counselling, parents counselling & extended service of individual's child home visit.

Navodaya Vidyalaya Coaching Centre -Successful Students

Laxman Verma (Konari)

Shital Sen (Tarashiv)

Ragini Dhruv (Gourkheda)

Arpit Harvansh (Tarashiv)

Ghanisht Verma (Gaitra)

Ayush Verma (Tarashiv)

Sakshi Verma (Tarashiv)

Prachi Verma (Raikheda)

Kavya Sahu (Chhatoud)

Jattin Verma (Chhatoud)

Total Seat at	Total Seat	Total Seats (Urban–Tilda)	Total Seats	Adani Foundation Navodaya	Success (%) (Under Rural Quota Base)

Navodaya School (Raipur District)	(Tilda Block)		(Rural-Tilda)	**Successful Candidates.** (2021-22)	
80 Nos.	**20 Nos.**	**6 Nos.**	**14 Nos.**	**8 Nos.**	**57.14%**

NONI LAARI: - Transportation facility "Noni Laari" exclusively for girls for their further studies from our 6 Project Affected Villages (PAV), The girl students who desire to pursue their higher education can opt for this facility for commuting to PG College-Tilda, which is about 25 kms. away from PAV.400 girls from PAV's have completed their graduation from PG College so far as there was no transport facility available to reach out for college & peruse their studies. The connection between the girls' students & their studies was re-established by adani foundation. Availing this free facility by girls, in return they are providing free coaching to children at their village. Each girl will provide education to minimum 5 students as **"Swa-daan".** It will help in raising the primary level education standard in villages. Swa-Daan benefits approximately 250 -300 primary & Middle school students of local communities.

PRAYAS Coaching: - Prayas career coaching center was established at village Tarashiv with a motive to benefit the job aspirant's youth who are preparing for competitive exams. A batch of "Prayas-30" was made by selection of 20 students from an entrance exam. 30

students from local villages are preparing for Defense/ Police Force entrance exam from our Prayas Coaching center located in Tarashiv Village.

Prayas Students (Police Written Exam Cleared)

Dhaleshwar Kumar

Kailash Verma

Prakash Kumar

Infrastructure Development in Schools: -

Schools without basic infrastructure like building, toilets, water facilitation & educational infrastructure is like "vehicle without fuel". Adani Foundation envisages the growth engine by creating basic infrastructures in Schools. Adani Foundation conceded construction of additional rooms at Government Primary School, thematic & educational Bala painting work at 5 primary schools & water facilitation at Government Middle School, Raikheda benefitting around one thousand school students. Learning environment for students is as important as the lamp & a wick. Students'

Water Facilitation at Govt. Middle School- Raikheda

interest, attendance & concentration level gets motivated with only improved infrastructure in schools.

Awareness Programs: - ***It is well known That Awared & Educated citizens are pillars of a Developed Nation.*** Adani Foundation believe in raising the awareness levels of students with regards to disciplined life, social thought, community -Health & Safety awareness. Planet Earth, natural resources management, forest protection, Handwash day & environment safeguards. Continuation to it, several awareness sessions & programs were organized to raise students' curiosity regarding. Domestic 5S training by QCFI team, Community Road Safety trainings. Approximately 1600 students benefitted from awareness programs.

Important Days & Awareness: - Adani Foundation is always striving hard to strengthen those values & principles of the society. We respect the co-factors in the development of the society. Therefor we organize events celebration at schools & communities to honor the hands who laid support for society welfare & development. We organized various events as below: -

- National Day Celebration, World Environment/ Ozone/ Global Handwash/ Earth Day
- International Youth Day by supporting Sports Tournament at Kharora.
- School Sports Tournament "Chhattisgarh Olympics at Raikheda.
- Football Tournament at Gram Panchayat Bahesar.
- International Women's Day Celebration.

S.L	Activity: -	No. Of Beneficiary	Target Group
1.	Safety training for Community & Students	30 Nos.	Students
2.	5S training for community students	90 Nos.	Students
3.	Earth Day celebration & awareness session	80 nos.	Primary School Students
4.	Organized first Aid safety training for Community Students	80 Nos.	Students
5.	Environment Day Celebration at School	100 Nos.	Students
4.	International Yoga Day Celebration	100 Nos.	Community
5.	**Shala Parvesh Utsav-** School Bag distribution at Primary School, Raikheda, Bhatapara, Gaitara, Chicholi, Gaurkheda & Mura	800 Nos.	Students
6.	Inauguration of Renovated School Building, Raikheda by REL HR Head, Stakeholders.	100 Nos.	Students, Raikheda
7.	**Fire safety training** for School teacher's at Raikheda, Gaitra & Chicholi under "*Mukhyamantri Suraksha Avm Apda Prabandhan Prasikshan Karyashala*	35 Nos.	Government School Teachers
8.	**Electrical Safety Talk** & awareness session	60 Nos.	Students and community members
9.	**Community safety awareness program** for school children at High School, Raikheda	50 Nos.	Students
10.	**Plant Exposure visit & Awareness Session: -**	40 Nos. Students	Briton International School, Raipur
11.	**Ozone Day Awareness Program, Raikheda** 16 sep'22 with support from REL Environment Dept, Ozone Day awareness program about saving earth/ mankind/ humanity by saving Ozone layer was organized at Govt. Higher Secondary School, Raikheda.	400 Nos.	School Students

12.	**Experience sharing program Organized** - experience sharing program at Navodaya Coaching Center & books distribution by COO- AF, Raikheda.	180 Nos.	Navodaya students, Parents
13.	**Handwash Day** Celebration at Govt. School Chicholi, Gourkheda. 100 students participated & learned good habits of cleanliness & discipline life.	100 Nos.	School students
14.	Competitive books distributed to Prayas Coaching Students.	30 Nos.	College students
15.	**Children's Day Celebration** at Middle School- Raikheda, all project villages schools participated in competitions like drawing & painting, best classroom decoration, sports, essay writing etc. Sports material with kits distributed to 16 schools. Prizes distributed to 175 students/ winners. Teachers were also facilitating during the event.	1050 Nos.	School students, Teachers, Stakeholders, Parents.
16.	**5S training** & awareness session for students of Government high School, Raikheda.	60 Nos.	School students
17.	**5Straining** & awareness session for Community Members of Raikheda, Gaitra, Chicholi villages.	50 Nos.	Women's, College girls
18.	**Road Safety awareness** program at Primary, Middle & High School, Raikheda & Mura. 1. Drawing & Painting Competition. 2. Quiz competition 3. Awareness Session by REL Safety Team.	120 Nos.	School students
19.	**Sports Promotion/ Local Festival-**	31 Nos.	Students
20.	**26th Jan Republic day** cultural program was held at Tarashiv, Raikheda, Sontara and Khamaria.	300 Nos.	School Students
21.	**5S awareness camp** at Government Higher Secondary School, Raikheda. The school is adopted under 5S & various IT & Electrical, Bala Painting & Civil work is ongoing.	400 Nos.	Students
22.	**International Women's Day**	250 Nos.	Women Beneficiaries

Glimpse of Programs: -


adani
Foundation
Embrace Equity


adani
Foundation
Embrace Equity


adani
Foundation
Embrace Equity

1.2 Community Health

Mobile Medical Health Unit Clinic – "Swasthya Apke Dwaar": - To provide best primary medical facilities to community majorly addressing on women, child & old age's health issues, area specific dieses like diabetes, hypertension, BP & general health problems. Below table gives a glimpse of monthly patients diagnosed with disease category wise.

Adani Foundation operates Mobile Medical Health Clinic Van in and around 16 villages of REL site areas. The mobile clinic visits villages on daily basis & Medical team consists of doctor; pharmacist & Nurse provide free primary medical treatment to patients & medicines are given free of cost. Total patients benefitted through Mobile Medical Health Care Unit during the months April' 22 to March 2023 is 29081 nos.

Apart from regular mobile medical health Care unit, Adani Foundation organized several Health initiatives like specialized health Camps like Gynecology, Pediatric & Orthopedic & Yoga health Camps. Focusing more on women & child health care services & also organized cardiac health talk session for community targeting old age, women, child, cardiac patients. Adani Foundation organized Blood Donation Camp to support critical blood required patients with support of Red Cross Society, REL employee, business associates & community people. Total of 635 units of blood units collected & handed over to Red Cross Society Raipur.





S. L	Annual Health Camps	Units (No)	Beneficiaries	Villages: -
1.	**Gynecology Camp**	12	1255	Raikheda, Bhatapara, Gaitra, Chicholi, Gourkheda
2.	**Multispecialty Camp**	1	275	Raikheda- Bhatapara, Gaitra
3.	**Blood Donation Camp**	1	635	REL Staff, Business Associates,
4.	**Cardiac Health Talk with community**	1	50	Raikheda, Bhatapara, Gaitra, Chicholi, Gourkheda
5.	**Eye Health Camp**	**1**	**427**	All Villages

6.	Yoga Health Session	1	150	Chirag Mahila Samuh Members
	Total Beneficiaries: -		2792	

1.3 Sustainable Livelihood Development

Systematic Rice Intensification- (SRI) Chhattisgarh being a rice cultivation state is so called **"rice bowl"** of the country. The state has more than 20000 types of rice variety & state economy depends on it. Systematic Rice Intensification (SRI) is a method to enhance productivity of rice per acre. Adani foundation Raipur with an objective to enhance rice production & income of farmers, foundation collected information by surveying the farmers of the area, the method of agriculture and the status of irrigation. From this it became known that there are more marginal farmers in the area, who cultivate paddy by their traditional method. There is also not enough means of irrigation, farmers are able to do their farming only during the rainy season. Since the cultivation of paddy by traditional method requires more amount of water, for which it is necessary to have a means of irrigation. The farmer of this area was not aware of Shri Vidhi and did not want to change his old method. Keeping all these circumstances in mind, agriculture, bringing changes in the way of cultivating paddy. To fulfill this objective, we undergo with 50 farmers of 6 panchayats Raikheda, Chicholi and Gaitra, Bartori, Khamariya, cultivated paddy in total 50 acres by SRI method.

The main objective of this program was to increase productivity by providing information about the scientific method of training to farmers through the support of Agriculture Department and Krishi Vigyan Kendra, all information about SRI Vidhi was made available. During the training, they were given the name of the improved seed,

treatment method of seed, making nursery beds, plowing the land, method of planting and planting seedlings from the nursery, Application of manure, Date of planting and transplanting plant from nursery, Plant to plant distance, Planting from Qatar, The use of paddy wider for weeding, the consumption of water in the ground and proper care of the crop, etc. subject were made aware by the Department of Agriculture. In this way, those farmers got complete information regarding the cultivation of paddy through scientific method. Inspired by this, 50 out of 55 farmers have cultivated paddy in the 50-acre land by SRI method. The average estimation of total production of cultivation done by this method increased the crop production 30-40 percent in comparison to the traditional method. Farmers have started their crop harvesting at their farm fields.

Backyard BADI Development: -

Chhattisgarh state is a land of forest, eco- tourism & paddy, but horticulture activities are kept behind due to negligence. Chhattisgarh stands with low nutrition level in India, where Chhattisgarh 39.6% of children under five years are stunted and 39.2% of children are underweight due to chronic malnutrition. Backyard BADI can play a pivotal role in this issue. Nutrition level of children can be raised through Badi development. Like development of kitchen garden, backyard farming, small horticulture development ectrs. Chhattisgarh is well known for its different varieties of green leafy vegetables, which contributes to rich source of nutrients, vitamins & minerals. Household family can raise Badi & cultivate various varieties of fruits as main crop & green leafy vegetables as intercrop.

Adani's Mahila Movement for Advancement Centre: -

Saheli Mahila Shashakt Silai Samuh (Garment Production Center): -

(Supported By Adani Foundation, Raikheda)

Adani Power Raikheda under the scope of CSR activities operates SAKSHAM Sewing training center at REL plant fence area. During the year 2021, 15 women & girls' trainees of sewing center constitute together to form Self Help Group under the core guidance of Adani Foundation, named as Saheli Mahila Shashkt Silai Samuh, Raikheda. With the common interest to collectively involve in sewing work as an economic activity & earn their livelihood. Saheli Mahila Shashkt Silai Samuh was formed on dated 25.06. 2021 to run the garment production center.

Adani Foundation Raipur team provided them sewing & embroidery artwork & also supported them with clothes amount to Rs. 2 Lakhs as raw material for their initial startup cost. SHG opened their bank account at nearest IDBI bank with small saving of Rs. 5000.00.

All the SHG members are from REL core villages like Raikheda, Gaitra, Chicholi, Gourkheda. SHG identified & selected their core representatives as President, Secretary & treasurer & fixed their roles & responsibility by themselves. With initial support & guidance from Adani Foundation team, SHG manufactured various types of materials like

Bags, school Bags, women garments, nose masks, uniforms. Adani Foundation support in operation, mentoring, guiding the overall operation of garment production center. GPC achieves highest production of **96,662** nos. with total revenue earned or women's income stands to Rs. **4,19,956**/- in year 2022-23. Initially 20 girls associated with GPC & during the month of Dec'23 to Feb'23 additional 30 women from Tarashiv village joined to sewing training center. Post training, they shifted to Garment Production center for commercial stitching & individual earning started.

Kamdhenu Program (In Association with BAIF):

With a vision to improve the livelihoods of farmers in the project villages, Kamdhenu Program was launched in October'22 in auspicious presence of Adani Foundation COO Sh. Chandrashekhar Gowda Ji. Based on the perception, Livestock rearing is a major source of rural household income and has been practiced as an allied vocation in concurrence to agriculture. Livestock development program of BAIF covers large ruminants like; Cow, Buffalo, goat & Poultry medical veterinary services, which costs high in ratio for farmers. A holistic approach of integrating different aspects of breeding, nutrition, health, management ectrs is followed for augmenting income and strengthening farmer's or cattle rearer's secondary income source for the family. Extended doorstep service is provided to farmers for lowering hurdle & pain of transportation & cattle medical expenditure. The most important service of Artificial Insemination at doorstep of farmer's house is key component

of program. The focus has been to upgrade dairy breeds like Jersey, Holstein Friesian & to promote indigenous breeds like Sahiwal, Gir, Red Sindhi, Tharpakar, Ongole etc, in Raipur project site villages.

Adani Foundation Kamdhenu programs covers all aspect of veterinary services like vaccination, deworming, artificial insemination, infertility & general treatment of all milking & meat raised cattle.

S. L	Interventions	No. of Beneficiaries
1.	Artificial Insemination	193
2.	Seasonal fodder demonstration/ Perennial fodder demo Barshim	1
3.	Wall Painting- "Pashudhan Sanvarjan"	35
4.	Farmers' Training on Dairy Development	5
5.	Fodder demonstration Napier Grass	6
6.	Pashusakhi Training	1
7.	Veterinary Health Camps (12 Nos. Unit)	2804

During the F.Y 22-23 (Nov'22- March'23), explored all ways of awareness among the community for dairy development as best alternative source of income for farmers. Through small group meetings, household surveys, wall writings, Farmer's training on Dairy development, tried to catch up the objective of program. Total 193 AI of milking cattles conceded, 12 veterinary Health Camps organized covering in 10 villages & 2804 cattles benefitted. Green fodder demonstration to farmers to explore potential green nutrients rich fodder at their own farmland.

1.4 Community Infrastructure Development

Adani Foundation contributes as CSR arm of Adani Group of Companies. Adani Foundation operates CSR activities in the field of Education, Health, Sustainable Livelihood programs & Community Infrastructure development activities in project villages of Raipur Energen Limited, Thermal Plant (Capacity- 13,70 MW- 2* 685 MW) located in village Raikheda, Block Tilda, District Raipur of Chhattisgarh State. The site is located approx. 40 Kms from state Capital Raipur city & lies between Tilda Kharora Road. Chhattisgarh state registers

approximately 1292 mm annual rainfall, but due to uneven rainfall since last year in Tilda area, the situation of water crises is raising affecting ground water table, agriculture, animal husbandry at large. In Chhattisgarh, community ponds are the essence of local tradition & culture with daily routine life starts & ends with it. Essential water requirement is affected due to less rainfall & ponds silt deposition effects the water holding capacity of ponds. Gram Panchayat PRIs have not given much stress on deepening & desilting of ponds since past years. Gram Panchayat PRIs requested Adani Foundation to undergo pond deepening activities in villages. On request from Gram Panchayat, Adani Foundation team conducted the survey of ponds & farms fields & household families located near ponds. Raikheda Bandha Talab was identified for pond deepening. Bandha Talab lies in 99 acres of catchment area, located near to community. Many villagers depend on this pond for their source of Income & daily routine activity.

Pond Deepening, Raikheda

Pond Deepening, Gaitra

S.L	Activity	Gram Panchayat	Beneficiaries (Approx.)
1.	Pond Deepening & Desilting "Bandha Talab"	Raikheda	5000
2.	Pond Deepening & Desilting "Dabri Talab"	Gaitra	2000
3.	Pond Deepening & Desilting "Bakshi Talab"	Chicholi	2500
4.	Pond Deepening & Desilting "Khadan Talab & Naya Talab"	Murra (2)	2000
5.	Pond Deepening & Desilting "Bandha Talab"	Tulsi	7000

6.	Gaushala Shed Construction at Banjari Community Place	Khapri	Local Community
7.	Drinking Water Facilitation at Govt. Middle School	Raikheda	500 Students
8.	Murra Bhatapara Road Repair & Culvert Construction	Bhatapara	Entire village Population
9.	Construction of School Building, Govt. Primary School	Gourkheda	100 Students
10.	Construction of Drainage line (Ward No.13-14)	Bahesar	Local Villagers

Raikheda Bandha Talab is spread over the size of 35 acres & catering the needs of water usages for 5000 population for their domestic water usages. Pond is surrounded by community household & farmlands & Bhatapara village road. Approx. 6480 cum soil excavated to deepen the pond. Tulsi Bandha Talab is spread over the size of 22 acres & catering the needs of water usages for 5000 population for their domestic water usages. Approx. 6553 cum soil excavated to deepen the pond.

Pond Deepening-1, Murra

Pond Deepening- 2, Murra

Murra Khadaan Talab is located at Khadaan Mohalla & spread over 2 acres of area, but major area of land is encroached by farmers whose farmland lies adjacent to pond. Another pond excavated was Naya Talab located near Murra Bhatpara road & spread over 2.5 acres. Approx. 400 families will get benefitted from the above activity. Approx. 2154 cum soil excavated to deepen the pond. Gaitra Dabri Talab & Chicholi Bakshi Bandh is spread over 4.5 acres & 10 acres respectively. Local community residing near the pond uses pond for their domestic water usages like bathing, clothes & utensils washing, animal rearing ectrs.

Approx. 3625 cum soil excavated to deepen the pond. Bakshi Talab Chicholi is spread over 3 acres of land with murrum based (Red) soil texture & located at the entry point of village. It is covered from three sides through school para community & one side through Farm field. Approx. 3631 cum soil excavated to deepen the pond.

Murra Bhatapara Road Repair& Culvert Construction

Gaushala Shed -Banjari -Khapri

1.2 Special Programs – SuPoshan- Adani Wilmer

Project Fortune SuPoshan – an initiative of Adani Wilmer & implemented by Adani Foundation. Initiated in 2019 at site Raikheda, adopted 06 villages from core area. Its aims to reduce the prevalence of malnutrition in children under the age of 5 years, along with overall improvement in the nutritional status of adolescent girls & women of reproductive age. This has come due to various health awareness trainings to Suposhan Sanginis to become true warrior in guarding the community's health interest & bring positive behavioral change in society. The project supplements government nutrition – related schemes through supposal sanginis, locally empowered women, who work in tedem with the government resources make the program accessible to all. Presently the project covers 3 lakh plus households in more then 1200 villages across 12 states in India. In Chhattisgarh SuPoshan is covered 1477 household in 6 villages of Raipur site. India has a malnutrition rate of 31.1% lower than as compared to Chhattisgarh 31.3%. The food habits of people in Chhattisgarh neglects nutritional meals like pulses, egg, milk ectrs. There are

huge variety of vegetable grown in Chhattisgarh especially leafy vegetables. There is huge requirement to aware community for nutritional thaali specially for pregnant- lactating mother & infants & growing children.

Adani Foundation Raipur has covered 1477 household in 6 villages, covering population 12000. Intervention focused group discussion (FGD) 637, Family counselling stands 629, small village day celebrations 48 nos, annual screening of children (0-5) aged group 3600 nos. Seed distribution for Kitchen garden development in 70 household families, Sneh Shivir organized for SAM children, refresher trainings for sanginis for new born care week celebration. Suposhan program has positive impacts upon community with drastic change in behavior regarding malnutrition.

1.3 Employee Volunteering Program (EVP)

Employee volunteer is an integral part of our CSR program. It involves employee individual's participation for contribution for the development of society where we stay & live. As a part of employee volunteerism program, Adani Power employees take part actively in all CSR programs of Adani Foundation implemented in periphery villages of station. Knowledge sharing is a most effective way to educate societies for their self-awareness. Various topics has been chosen by APL employees like environment day, ozone day, water day, women's day, workplace management in schools (5S), road safety awareness between children were done through Employee volunteering programs. Employee volunteering by staff & employees enhances relationship between community & industry & facilitate bonding. Employees contribution towards socio, economic & moral growth of community through imparting livelihood trainings, facilitating shramm- daan promotes sustainable development of society. Adani Power employees believes in giving better shape to community's development through integrated efforts. Adani Foundation

Raipur Energen Limited Raikheda praise those employee's volunteer efforts that motivate, gear up, groom, guide community for strong developed citizenship.

1.4 Case stories :-

Yogita Nishad D/o Sh. Mukhiram Nishad: -

1)Yogita Nishad age 23 years is a resident of village Gourkheda, a dependent village of Chicholi Gram Panchayat. She completed BA from local government college, Tilda. Her father is a farmer by occupation, holds 3 acres of land & cultivates only paddy to feed his family which is negligence while compared to cost vs income. Yogita's mother Smt. Amrika Nishad works as labor & earns on daily wages. She finds difficulty in getting year-round work in her surrounding area. Sometimes they find difficulty in getting daily income for their family either from farming or labor. She is the only girl between her two brothers. Both the brothers are seasonal labors.

During the year 2021-22, Yogita came to know about sewing training from one of her friends about the adani Foundation's sewing training program which was operation at CSR campus at Raipur Energen Limited. Raikheda. Training venue was approx. 5 kms from her residents & it was difficult for a girl to allowance from her family to attend the training on daily basis. Many stigmata like sending girl alone to training center was not prevailing in local villages. But during the initial, her family supported her to undergo the sewing art training at adani Foundation training center. She usually comes together with her friends in the village. She undergoes initial sewing training for 6 months & post completion she retains in production center to earn livelihood for her family. She learnt various things like; selection of cloths, measurement, drawing & sketching on paper, scaling, cutting, neck design, stitching on normal machine & industrial machines. During the initial phase of training, sometimes due to household occupancies she was irregular in training sessions but adani foundation team motivated her to regular attend her training and avoid loss or missing of course content. All

the infrastructure pertaining to training like cloths, raw materials, machine was facilitated by adani foundation at the center. She started with normal sewing machine & now working uninterruptable on industrial machine. Now she stitches approx. 50-60 women garments per day (6 hours) at CSR production center. Women garments like nighties, ethnic wear, baby suits are stitched at CSR production center & available for sale at local market. It is one stop facility for local communities to learn stitching, become employable & earn handsome livelihood for them consequently for their family. During the season she ables to earn 4000-6000 per month from stitching center which is being operated by Saheli Mahila Shashakt Silai Samuh (Chirag). AF team facilitated her in opening bank account, now she learned banking account operation also. Yogita reveals during a medical emergency in his family father got admitted at hospital at Tilda. Their family faced severe financial crises at that time. Her savings in bank account make her family to get out of that puzzled situation. Her father feels very proud of her & says "he has three sons". Yogita thanks Adani Foundation (Raipur Energen Limited) for arranging sewing training/ production center facility near to her village & the consistence support driven from Adani Foundation REL team. It would have not been possible for her to financially support her family. This makes a woman a true Lakshmi.

2) **Nooni Laari**- For many girls living in remote villages of rural India, the single biggest problem in continuing their education is the commute. During our need assessment for education program in Raipur, Chhattisgarh, it came to our notice that the enrollment of girls in the villages' government school was equal to boys. However, very few girls were enrolled for college education compared boys and even if enrolled, the dropout rate is higher for girls than boys. In the villages of Raipur, parents send their children to school simply so that they get their meals. Most of them belong underprivileged section of the society who work as daily wage laborer. For such families, the quality or continuity of education is not really a priority even for boys, leave alone girls. The nearest Government PG College in Tilda is an average of 20 km away, one-way, from the villages where they live. Even if public transport

is available, affordability and safety are a big concern for parents. After a lot of deliberation among the Adani Foundation management, site team, parents, and students it was decided that we must support the girls to start and complete of their college education. The solution was a regular, cost-free bus service called Noni Laari. "Noni" in local parlance is used to address a young, sweet girl. The designated driver was a local and hence known to many parents. All the college girls would commute together and would be given their individual travel pass. However, this was not all. To make this intervention more fruitful, an appeal was made to the beneficiaries.

For availing this bus service, each girl had to devote an hour of her time, six days a week, towards teaching students of classes 1-5. This arrangement of free tuition was conceptualized and titled "Swadaan", with a vision to create a ripple effect in the community. So, when Noni Laari was officially flagged off in December 2021, 60 girls began their teaching journey. After returning from college every evening, they teach the primary school children (classes 1 – 5) in their neighborhood. They conduct the classes at their own home and were monitored regularly by the Adani Foundation team.

The girls has been instructed to focus on foundational literacy and numeracy in the evening classes and not necessarily adhere to the school syllabus. The priority is to help these children get their basics right, like tables, basic calculations, the alphabet, reading and writing etc. Together, these 60 girls are teaching 300 kids in their villages! Some enjoyed it right from the beginning, others took a while to gain confidence in their abilities.

Take for instance, 20-year-old Radhika Sinha, is a third-year student of B. Sc (Mathematics). She lives in Chicholi village, and her father is a farmer. She teaches 8 children from her village and wants to continue her teaching journey in the future too while pursuing M.Sc. Ekta Sahu, a 19-year-old student at ITI Tilda who wants to become a computer operator didn't think that teaching is a skill she had. For Mahima Rajput, the 19-year-old B. Sc student who is in her second year of college, teaching the kids in her village ensures that her basics

are constantly being revised. She finds this helpful as she is preparing for civil services examination.

For parents of many such girls like Radhika, Ekta and Mahima, it is a relief that their daughters are commuting safely but it is also a matter of great pride that they are helping younger children in their studies. Getting guidance from these girls has sparked an interest in kids towards academics and ignited a hope that it may lead them to a brighter future. The community members, including the village Panchayat members have appreciated the Foundation's efforts. Education is the single most powerful tool that can change lives. With support from the Adani Foundation, these girls are writing their own life story, and positively influencing the society around them.

3) **RAGINI DHRUV (2022-23): -**During the 2021-22, Ragini Dhruv successfully cleared the entrance exam held by Navodaya Vidyalaya for class 6th. She became a great source of inspiration for the people of her village Gaurkheda. Daughter of sh. Ramesh Dhruv, a poor farmer, who also plays Casio in band parties for extra income. Ragini has two mothers, and they are five siblings in total. It was a poverty-stricken and quarrelsome household. A thousand praises will fall short for little Ragini, who so bravely and determinedly worked hard and became the first girl from her village to get admission in Navodaya Vidyalaya which is run by Adani Foundation. Navodaya Coaching Center helped Ragini to achieve her goal. Under the guidance of excellent teachers provided by Adani Foundation, Ragini overcame her difficulties with mathematics, and nothing stopped her from shining bright. Ragini's father conveys his immense feeling of gratefulness to Adani Foundation and says- "My daughter is able to reach her full potential all because of Adani Foundation." Ragini set a very wonderful example by being an ardent student and her efforts are praiseworthy and applauded all over her village.

1.5 Media coverage

अदाणी फाउंडेशन द्वारा संचालित नवोदय कोचिंग के 10 बच्चों का नवोदय विद्यालय में चयन

अमृत संदेश । अंबिकापुर

केंद्र सरकार की बोर्डिंग स्कूल जवाहर नवोदय विद्यालय के प्रवेश परीक्षा में अदाणी फाउंडेशन के नवोदय कोचिंग के दस विद्यार्थियों ने बाजी मारी है। प्रवेश परीक्षा में इस कोचिंग संस्थान के कुल 10 बच्चों में से चार लड़कियों और छः लड़कों का चयन जवाहर नवोदय विद्यालय, माना-रायपुर में हुआ है। जवाहर नवोदय विद्यालय, माना कैंप, रायपुर का परिणाम पिछले शुक्रवार को घोषित किया गया। रायपुर एनेर्जेन लिमिटेड (आरईएल) के अदाणी फाउंडेशन द्वारा प्रतिभाशाली जरूरतमंद बच्चों को गुणवत्तापूर्ण शिक्षा प्रदान करने के उद्देश्य से शुरू किये गए जवाहर नवोदय कोचिंग केंद्र को आसपास के ग्राम रायखेड़ा, गैतरा, चिचोली, तराशिव, गौरखेड़ा इत्यादि सहित कुल बारह अलग-अलग ग्रामों में संचालित किया जा रहा है।

नवोदय प्रवेश परीक्षा के चयनित बच्चों में ग्राम ताराशिव से चार बच्चों जिनके नाम कुमारी शाक्षी वर्मा, कुमारी शीतल सेन, आयुष वर्मा और अर्पित हरवंश वहीं ग्राम छतौद से दो बच्चों के नाम क्रमशः कुमारी काव्या साहू, जतिन वर्मा जबकि ग्राम रायखेड़ा, गैतरा, कोनारी और गौरखेड़ा से एक-एक बच्चे क्रमशः कुमारी प्राची वर्मा, घनिष्ट वर्मा, लक्ष्मण वर्मा और कुमारी रागिनी ध्रुव का चयन हुआ।

उल्लेखनीय है कि आरईएल, अदाणी फाउंडेशन द्वारा आस पास के 14 ग्राम पंचायतों में शिक्षा, स्वास्थ्य, आजीविका संवर्धन और संरचना विकास के कई कार्यक्रम संचालित करता है। उत्कृष्ट शिक्षा के लिए इन नवोदय कोचिंग केंद्रों की स्थापना 10 वर्ष पूर्व तीन ग्रामों रायखेड़ा, गैतरा और चिचोली से की गई थी। जिसकी संख्या वर्ष 2021 तक बारह ग्रामों तक बढ़ायी गयी।

गत वर्ष तक कुल 45 बच्चे नवोदय स्कूल में पढ़ाई कर रहें हैं जहां सभी बच्चों को कक्षा 6 वीं से 12 वीं तक निःशुल्क शिक्षा के साथ-साथ रहने और खाने की भी सुविधा मुफ्त में प्रदान की जाती है। इससे गरीब माता पिता को उनके प्रतिभाशाली बच्चों के शिक्षा की चिंता नहीं रहती है। यही नहीं जो बच्चे इस केंद्र में पढ़ाई करते हैं उनका भी उनकी कक्षा में प्रदर्शन भी उत्कृष्ट हो जाता है। इसके अलावा अभी हाल ही में इस संस्थान द्वारा युवाओं के प्रतिस्पर्धात्मक सफलता के लिए किये जा रहे प्रयासों के बदौलत कोचिंग केंद्र से दो छात्रों का चयन छत्तीसगढ़ पुलिस बल सेवा में भी हुआ है।

रायखेड़ा मे मनाया गया प्रवेशोत्सव

श्रवबिंदु / तिल्दा नेवरा

शासन के निर्देशानुसार शासकीय प्राथमिक शाला , पूर्व माध्यमिक शाला एवम शासकीय उच्चतर माध्यमिक विद्यालय का प्रवेशोत्सव संयुक्त रूप से 28जून 2022 मंगलवार को मनाया गया। इस अवसर पर मुख्य अतिथि श्री देवेंद्र नायक ने अपने उद्बोधन में कहा कि आज के बच्चे कल का भविष्य है,इस लिए इसे संवारना आवश्यक है। अपने शिक्षकों को बच्चों के भविष्य को संवारने के लिए आह्वान किया। वैश्विक महामारी के कारण पिछले दो साल से पढ़ाई पर असर पड़ा है,इस कारण से मोहल्ला क्लास, ऑनलाइन क्लास, आदि से पढ़ाई को सुचारू रूप से संचालन किया गया। अध्यक्षता श्री देवव्रत नायक पूर्व जनपद पंचायत अध्यक्ष तिल्दा नेवरा, संतोष वर्मा पूर्व जनपद सदस्य, भूपेन्द्र सिंह बैस। एस आर डेव) अडानी फाउंडेशन, रायपुर एनर्जेन लिमिटेड रायखेड़ा,मोहन लाल नायक अध्यक्ष शाला विकास समिति, तामेश्वर वर्मा, ओम प्रकाश वर्मा, गजेन्द्र वर्मा प्रभारी प्राचार्य, विष्णु प्रसाद वर्मा प्रधान पाठक, चंद्रकला वर्मा प्रधान पाठक, जितेन्द्र वर्मा व्याख्याता, मोती सिंह ध्रुव,ज्योति कश्यप, अंजू वर्मा, टी पी नायक, यशवंत वर्मा दीपक सिंह , रितु इंद्रनील चौधरी, प्रीति प्रजापति, खिलेश्वर महमल्ला, दीपाली दास, दाऊ लाल कौशले, मुख्यमंत्री जी का संदेश वाचन सरपंच प्रतिनिधि श्री संतोष धुर्वे द्वारा किया गया अडानी फाउंडेशन रायखेड़ा के द्वारा कक्षा पहली से कक्षा पांचवी तक अध्ययनरत बच्चों को स्कूल बैग वितरण किया गया इससे पहले कार्यक्रम का शुभारंभ मां सरस्वती के तैल चित्र पर माल्यार्पण एवं दीप प्रज्वलित कर किया गया तत्पश्चात राज गीत के साथ कार्यक्रम का शुभारंभ किया गया।कार्यक्रम का संचालन संकुल समन्वयक श्री तुलसी राम साहू ने किया।

अदाणी फाउंडेशन में भी आयोजन

रायपुर, 21 जून (असं)। एनेर्जेन लिमिटेड (आरईएल) के अदाणी फाउंडेशन ने 8 वें अंतर्राष्ट्रीय योग दिवस पर योग शिविर का आयोजन किया। आज 21 जून को इस अवसर पर आरईएल के प्रांगण में योग शिविर आयोजित किया गया। इस शिविर का मुख्य उद्देश्य योग की महत्ता को समझाना और इससे होने वाले फायदों से लोगों को बीच जागरूकता फैलाना है। योगाभ्यास का शुभारंभ ओम के उच्चारण के साथ हुआ। योगाभ्यास शिविर में आरईएल के समीपस्थ ग्रामों रायखेड़ा, चिचोली, गैतरा इत्यादि सहित 150 से अधिक ग्रामीण नवजवान युवा बच्चे, स्व-सहायता समूह की महिलाएं इत्यादि द्वारा योग अभ्यास में बढ़ चढ़ कर हिस्सा लिया गया। शिविर के आरम्भ में सीएसआर टीम द्वारा योगाभ्यास के महत्व को बताया गया इस दौरान क्षेत्र के नौजवान योग शिक्षक श्री हितेश वर्मा द्वारा उपस्थित जनों को योगासन, ध्यान एवं प्राणायाम से संबंधित विभिन्न प्रकार की योग क्रियाओं अभ्यास कराया।

विश्व पर्यावरण दिवस पर पेंटिंग प्रश्नोत्तरी प्रतियोगिता का आयोजन

मानसून तक 10 हजार पेड़ लगाने का लक्ष्य

खरोरा-तिल्दा। अदाणी फाउंडेशन द्वारा रायखेड़ा में विश्व पर्यावरण दिवस के अवसर पर ग्राम पंचायत चिचोली के स्कूल परिसर में "केवल एक पृथ्वी" थीम पर पेंटिंग प्रतियोगिता का आयोजन किया गया। रायपुर एनर्जेन लिमिटेड (आरईएल), रायखेड़ा सयंत्र के इस कार्यक्रम में ग्राम पंचायत रायखेड़ा, गैतरा, चिचोली, गौरखेड़ा, ताराशिव, मुरा एवं छतौद के नवोदय कोचिंग क्लास के सौ से अधिक छात्रों ने भाग लिया। इसके पूर्व सयंत्र के आसपास के क्षेत्रों में मानसून तक हरियर छत्तीसगढ़ के अंतर्गत दस हजार से ज्यादा पौधों को रोपित करने का लक्ष्य निर्धारण कर आज पांच सौ से ज्यादा पौधे लगाए गए।

कार्यक्रम का मुख्य उद्देश्य पर्यावरण एवं जनजीवन के बीच आपसी संबंध व महत्व के बारे में जागरूकता प्रदान करना था। कार्यक्रम में छात्रों के द्वारा बनाए गए पर्यावरण पर आधारित चित्रों की प्रदर्शनी की गई और इसी विषय में प्रश्नोत्तरी कार्यक्रम का आयोजन भी किया गया, जिसमें छात्रों द्वारा पूरी तन्मयता के साथ सभी प्रश्नों की सटीक जानकारी प्रदान की। प्रतियोगिता में उत्कृष्ट प्रदर्शन पर छात्रों को पुरस्कार प्रदान किया गया।

विश्व पर्यावरण दिवस के बारे में विस्तृत जानकारी देते हुए आरईएल के श्री अमित श्रीवास्तव ने उपस्थित छात्रों को संबोधित करते हुए, कहा कि, "संयुक्त राष्ट्र द्वारा जून 5,1972 को स्टाकहोम कॉन्फ्रेंस दौरान वातावरण सुरक्षा की कार्रवाई को अमल में लाया गया था,जोकि पर्यावरण संरक्षण की दिशा में पहला कदम था। इसलिए हर वर्ष यह दिवस पांच जून को मनाया जाता है। उन्होंने कहा कि पर्यावरण संरक्षण के लिए हर किसी को अपना दायित्व समझते हुए आगे आना होगा। जिसमें युवाओं का योगदान सबसे महत्वपूर्ण होने वाला है। हमारी युवा पीढ़ी को अपने लिए और अपने आने वाले कल को सुरक्षित करने हेतु जागरूक होना होगा।"

उल्लेखनीय है कि अदाणी फाउंडेशन के लिए स्वास्थ्य, शिक्षा व स्वरोजगार सर्वोपरि है और इसके लिए फाउंडेशन की टीम पूरी तरह प्रतिबद्ध है और उनके द्वारा समय समय पर जागरूकता कार्यक्रम व स्वास्थ्य शिविरों का आयोजन कर के स्थानिकों को बेहतर लाइफ स्टाइल से जोड़ने की दिशा में कार्य कर रही है।कार्यक्रम में आरईएल के वरिष्ठ प्रबंधक श्री अमित श्रीवास्तव एवं श्री पृथ्वीराज लाहिरी सहित अदाणी फाउंडेशन से श्री दीपक कुमार सिंह , श्रीमती प्रीति प्रजापति,श्री दाऊलाल कौशले, कोचिंग क्लास के शिक्षक गण एवं गांव के अन्य स्कूल के छात्र एवं महिलायें उपस्थित रहे।

उन्नत धान बीज वितरण कार्यक्रम में सात गांव के किसान हुए लाभान्वित

दबंग रिपोर्टर » रायपुर

रायपुर एनेर्जेन लिमिटेड (आरईएल) की अदाणी फाउंडेशन द्वारा किसानों को उन्नत किस्म के बीजों का वितरण किया जा रहा है। इसमें अब तक संयंत्र के आस पास के ग्राम पंचायतों रायखेड़ा, चिचोली, गैतरा, तराशिव, खम्हरिया, बरतोरी और कोनारी सहित सात ग्रामों के किसानों को उन्नत किस्म की धान बीज का निःशुल्क वितरण किया गया। आरईएल के सामाजिक सहभागिता के अंतर्गत अदाणी फाउंडेशन का मुख्य उद्देश्य क्षेत्र के किसानों का पारम्परिक विधि में परिवर्तन कर उन्नत किस्म के धान का उत्पादन और वृद्धि तथा खेती की लागत में कमी कराना है। बीजों के वितरण के पूर्व सभी किसानों को कृषि की आधुनिक विधि श्री विधि अर्थात सघन धान रोपण पद्धति से उन्नत खेती का दो दिवसीय प्रशिक्षण का आयोजन कृषि विज्ञान केंद्र, रायपुर के सहयोग से किया गया। जिसमें उपरोक्त सभी ग्रामों के किसानों ने भाग लिया। अदाणी फाउंडेशन के ऑफिस परिसर में आयोजित इस कार्यक्रम में श्री ओम प्रकाश सेन (कृषि विज्ञान केंद्र के मास्टर ट्रेनर एवं प्रेसिडेंट- आरंग फार्मर्स प्रोड्यूसर कम्पनी, आरंग) ने किसानों को श्री विधि की संपूर्ण तकनीकियों की जानकारी दी और इसे अपनाने के फायदों को भी बताया। प्रशिक्षण के बाद सभी किसान कम पानी में धान की उपज और इसके उत्पादन की जानकारी पाकर संतुष्ट नजर आये और प्रशिक्षण एवं बीजों के लिए अदाणी फाउंडेशन और आरईएल को धन्यवाद दिया।

उल्लेखनीय है कि आरईएल, अदाणी फाउंडेशन द्वारा आस पास के 14 ग्राम पंचायतों में शिक्षा, स्वास्थ्य, आजीविका संवर्धन और संरचना विकास के कई कार्यक्रम संचालित करता है। वहीं समय-समय पर उत्कृष्ट कृषि के क्षेत्र में किसानों के आय में वृद्धि के लिए खेती के आधुनिक तकनीकों की जानकारी के साथ-साथ उनके पशुधन की पौष्टिक आहार को बनाने का प्रशिक्षण और चिकित्सकीय शिविर का आयोजन भी कराता रहता है।

Two-day blood donation camp organised

On occasion of b'day of Chairman Adani Group- Gautam Adani

Raipur, Jun 24: On occasion of birthday of Chairman Adani Group-Gautam Adani on Friday, a massive blood donation camp was organised not only in the Group's institutions in India, but abroad as well. In this series, special blood donation camps were organised in all the projects of Adani Group in Chhattisgarh viz. at Raipur office, Surguja and Raigarh district and efforts were made to rule out doubts related to blood donation.

A two-day blood donation camp was organised at REL located in Tilda block of Raiur district of Adani Group, under the guidance of Adani Foundation in the plant premises. In this two-day camp on Jun 23-24, the contractual employees working in the company along with all the officers and employees took part in blood doantion in large number. In these two days camp, a total of 340 unit blood was donated to Red Cross Society of India, Raipur. On this occasion the entire staff of Raipur office of Adani Group donated ration viz. rice, dal, and fruits to Old Age Home in Mana.

The objective of this blood donation camp is to remove all misconceptions related to it and create awareness amog people that by donating blood on regular basis, they can benefit a lot on health front. The camp began on June 23 at REL in Tilda by lighting of traditional lamp by Station Head Rambhav. In his address he held blood donation as the biggest of the all donations to the mankind and appealed all the employees to take part in the campaign extensively. The camp was conducted by Dr DV Baghel of Red Cross Society Raipur along with Deepika Yadu and other medical staff. First the registration of REL staff was donie and then blood donation camp was started. Afer this the contractual employees of the company viz. Philips Engineering Services, Sodexo India, Ion Exchange, Chekmate and others also donated blood.

The camp was organised by Adani Foundation and by HR department of REL and special assistance of Corporate Affairs department.

अदाणी फाउंडेशन ने किया मुरा शासकीय प्राथमिक स्कूल में बैग वितरण

प्रतिदिन नेटवर्क,रायपुर

अदाणी फाउंडेशन ने ग्राम पंचायत मुरा के शासकीय प्राथमिक स्कूल के बच्चों को स्कूल बैग वितरित किया है। रायपुर जिले के तिल्दा विकासखंड में स्थित रायपुर एनेर्जेन लिमिटेड (आरईएल) के पास के ग्राम मुरा के नवीन प्राथमिक स्कूल में कल आयोजित एक कार्यक्रम में प्राथमिक स्कूल तथा खदान क्षेत्र में निवासरत 200 से अधिक बच्चों को स्कूल बैग का वितरण किया गया। कार्यक्रम का मुख्य उद्देश्य ग्राम पंचायत – मुरा के स्कूलों में पढ़ने वाले विद्यार्थियों को शिक्षा के लिए स्कूलों में नियमित उपस्थित को प्रोत्साहित करना है।

कार्यक्रम के मुख्यअतिथि ग्राम पंचायत मूरा की सरपंच –श्रीमती नूतन ध्रुव तथा अध्यक्षता उपसरपंच – श्रीमती पुष्पा भगवती साहू ने की। साथ ही जनपद प्रतिनिधि – टोकेन्द्र गायकवाड़, लकेश्वर कोसले (राजीव गांधी युवा क्लब अध्यक्ष) रेशम वर्मा (कोषाध्यक्ष) पंचगण – श्रीमती मानकी कोसले, सुरेंद्र साहू, कुंजलाल पाल, श्रीमती कांति संजय वर्मा, श्रीमती दुर्गेश्वरी वर्मा, सचिव – बलराम दास बंजारे, रोजगार सहायक – नंदकिशोर पाल, प्रभारी प्राचार्य श्रीमती एस. देवांगन, समस्त शिक्षक गण तथा ग्रामवाशी उपस्थित थे। स्कूल बैग मिलने से जहां सभी विद्यार्थी अत्यंत प्रसन्न थे तो वहीं कार्यक्रम में उपस्थित सरपंच तथा अन्य पदाधिकारी व जनप्रतिनिधियों ने अदाणी फाउण्डेशन को धन्यवाद दिया और चलाए जा रहे विकास कार्यों की सराहना करते हुए कहा कि इस तरह की गतिविधियां बच्चों के शिक्षा के प्रति रुझान को बढ़ाने में सहायक होती हैं। कार्यक्रम का आयोजन अदाणी फाउंडेशन के सी एस आर प्रमुख दीपक सिंह के नेतृत्व में किया गया। मंच संचालन श्रीमती प्रीति प्रजापति ने किया। वहीं अदाणी फाउंडेशन के खिलेश्वर महमल्ला, दाऊलाल कोसले और सुदीपाली दास द्वारा विशेष सहयोग प्रदान किया गया। उल्लेखनीय है कि आरईएल, अदाणी फाउंडेशन द्वारा आस पास के 14 ग्राम पंचायतों में शिक्षा, स्वास्थ्य, आजीविका संवर्धन और संरचना विकास के कई कार्यक्रम संचालित करता है। वहीं शिक्षा के क्षेत्र में आसपास के सरकारी स्कूलों के होनहार बालकों को पढ़ाई में प्रोत्साहन हेतु निःशुल्क नवोदय कोचिंग की सुविधा भी प्रदान कर रहा है।

विश्व पर्यावरण दिवस पर पेंटिंग प्रश्नोत्तरी प्रतियोगिता का आयोजन

मानसून तक 10 हजार पेड़ लगाने का लक्ष्य

खरोरा-तिल्दा। अदाणी फाउंडेशन द्वारा रायखेड़ा में विश्व पर्यावरण दिवस के अवसर पर ग्राम पंचायत चिचोली के स्कूल परिसर में केवल एक पृथ्वी थीम पर पेंटिंग प्रतियोगिता का आयोजन किया गया। रायपुर एनर्जेन लिमिटेड (आरईएल), रायखेड़ा सयंत्र के इस कार्यक्रम में ग्राम पंचायत रायखेड़ा, गैतरा, चिचोली, गौरखेड़ा, ताराशिव, मुरा एवं छतौद के नवोदय कोचिंग क्लास के सौ से अधिक छात्रों ने भाग लिया। इसके पूर्व सयंत्र के आसपास के क्षेत्रों में मानसून तक हरियर छत्तीसगढ़ के अंतर्गत दस हजार से ज्यादा पौधों को रोपित करने का लक्ष्य निर्धारण कर आज पांच सौ से ज्यादा पौधे लगाए गए।

कार्यक्रम का मुख्य उद्देश्य पर्यावरण एवं जनजीवन के बीच आपसी संबंध व महत्व के बारे में जागरूकता प्रदान करना था। कार्यक्रम में छात्रों के द्वारा बनाए गए पर्यावरण पर आधारित चित्रों की प्रदर्शनी की गई और इसी विषय में प्रश्नोत्तरी कार्यक्रम का आयोजन भी किया गया, जिसमें छात्रों द्वारा पूरी तन्मयता के साथ सभी प्रश्नों की सटीक जानकारी प्रदान की। प्रतियोगिता में उत्कृष्ट प्रदर्शन पर छात्रों को पुरस्कार प्रदान किया गया।

विश्व पर्यावरण दिवस के बारे में विस्तृत जानकारी देते हुए आरईएल के श्री अमित श्रीवास्तव ने उपस्थित छात्रों को संबोधित करते हुए कहा कि, सयुंक्त राष्ट्र द्वारा जून 5,1972 को स्टाकहोम कॉफ्रेंस दौरान वातावरण सुरक्षा की कार्रवाई को अमल में लाया गया था,जोकि पर्यावरण संरक्षण की दिशा में पहला कदम था। इसलिए हर वर्ष यह दिवस पांच जून को मनाया जाता है। उन्होंने कहा कि पर्यावरण संरक्षण के लिए हर किसी को अपना दायित्व समझते हुए आगे आना होगा। जिसमें युवाओं का योगदान सबसे महत्वपूर्ण होने वाला है। हमारी युवा पीढ़ी को अपने लिए और अपने आने वाले कल को सुरक्षित करने हेतु जागरूक होना होगा।

उल्लेखनीय है कि अदाणी फाउंडेशन के लिए स्वास्थ्य, शिक्षा व स्वरोजगार सर्वोपरि है और इसके लिए फाउंडेशन की टीम पूरी तरह प्रतिबद्ध है और उनके द्वारा समय समय पर जागरूकता कार्यक्रम व स्वास्थ्य शिविरों का आयोजन कर के स्थानिकों को बेहतर लाइफ स्टाइल से जोड़ने की दिशा में कार्य कर रही है। कार्यक्रम में आरईएल के वरिष्ठ प्रबंधक श्री अमित श्रीवास्तव एवं श्री पृथ्वीराज लाहिरी सहित अदाणी फाउंडेशन से श्री दीपक कुमार सिंह , श्रीमती प्रीति प्रजापति,श्री दाऊलाल कौशले, कोचिंग क्लास के शिक्षक गण एवं गांव के अन्य स्कूल के छात्र एवं महिलायें उपस्थित रहे।

ग्रामीणों को स्वरोजगार और वैश्विक बाजार से जोड़ने अदाणी फाउंडेशन ने अहमदाबाद में आयोजित किया ग्राम भारती कार्यक्रम

कार्यक्रम में ग्राम रायखेड़ा की सहेली महिला सशक्त सिलाई समूह और ग्राम परसा की मब्स की भागीदारी

समवेत शिखर न्यूज

रायपुर। छत्तीसगढ़ के रायपुर और सरगुजा जिले की ग्रामीण महिलाओं के स्वरोजगार और उनके उत्पादों को वैश्विक बाजार में ख्याति दिलाने अदाणी समूह के अदाणी फाउंडेशन द्वारा अहमदाबाद स्थित मुख्यालय में तीन दिवसीय ग्राम भारती कार्यक्रम का आयोजन किया गया। रायपुर जिले के ग्राम रायखेड़ा में स्थित रायपुर एनेर्जेन लिमिटेड के आसपास के ग्रामों में अदाणी फाउंडेशन के सहयोग से चलाई जा रही सिलाई केंद्र की सहेली महिला सशक्त सिलाई समूह के बने उत्पादों की प्रदर्शनी भी ग्राम भारती कार्यक्रम का हिस्सा रही। कार्यक्रम का मुख्य उद्देश्य वोकल फॉर लोकल के तहत अन्य राज्यों में अदाणी फाउंडेशन द्वारा सामुदायिक सहभागिता के अंतर्गत गठित स्वसहायता समूहों, जो स्थानीय लोगों की उपयोगिता को ध्यान में रखते हुए, उत्पाद का निर्माण करते हैं, और अपने आजीविका विकास के कार्यों को गति देते हैं, को फाउंडेशन के हेड ऑफिस द्वारा एक मंच प्रदान करना था। कार्यक्रम में विभिन्न क्षेत्रों व राज्यों से 15 से अधिक समूहों ने हिस्सा लिया, जिनमें छत्तीसगढ़ के ही दूरस्थ आदिवासी जिले सरगुजा के ग्राम परसा की महिला उद्यमी बहुउद्देशीय सहकारी समिति (मब्स) की महिलाओं ने भी भाग लेकर अपने उत्पादों की प्रदर्शनी एवं बिक्री की। इसके आलावा उत्तरप्रदेश की प्रेरणा प्रोड्यूसर कंपनी लिमिटेड-वाराणसी इत्यादि, गुजरात की मेघधरुश सहेली स्वसहायता समूह मुंद्रा इत्यादि, तमिलनाडु की अर्हमान ओरगिणैथा पाने ओलै पोरोत्काल थ्यारिप्पू संगम कट्टुपल्ली इत्यादि, महाराष्ट्र की प्रगतिशील महिला प्रोड्यूसर कंपनी लिमिटेड तिरोरा इत्यादि शामिल हुए। इन सभी को अदाणी फाउंडेशन द्वारा चलाए जा रहे सीएसआर के कार्यक्रमों को वैश्विक गति प्रदान करने और ग्रामीण स्तर पर स्वसहायता समूहों के माध्यम से स्वरोजगार के क्षेत्र में जारी कार्यों के तहत तैयार हुए उत्पादों की प्रदर्शनी हेतु एक प्रभावशाली मंच उपलब्ध करा उन्हें रोजगार के लिए प्रेरित किया गया।

अदाणी फाउंडेशन के कार्यक्रम में 40 किसान हुए शामिल

कृषक भ्रमण कार्यक्रम में किसानों को मिली उन्नत खेती की जानकारी

हरिभूमि न्यूज ›› तिल्दा नेवरा

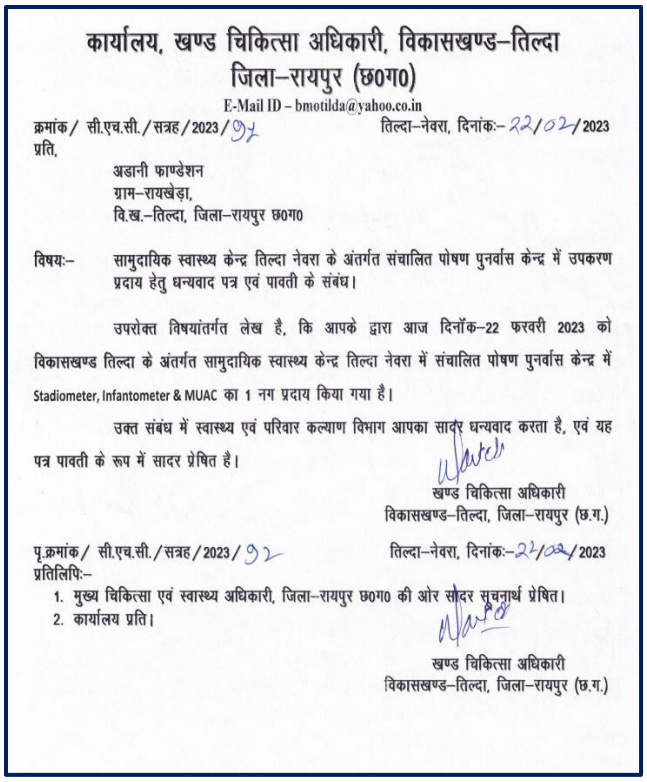
खेतों में पैदावार और किसानों की आय में वृद्धि के उद्देश्य से अदाणी फाउंडेशन ने गुरुवार को रायखेड़ा के आस पास के किसानों को कृषि विज्ञान केंद्र में शैक्षणिक भ्रमण कराया। रायपुर एनेर्जेन लिमिटेड के आसपास के ग्राम रायखेड़ा, चिचोली, ताराशिव, खम्हरिया एवं परतोरी के कुल 40 किसानों ने कार्यक्रम में भाग लिया।

इन किसानों को कृषि के लिए मिट्टी परीक्षण, जमीन तथा बीज की स्थिति, खाद एवं पानी की मात्रा, खरीफ फसल के अलावा नकदी खेती जो कि स्थानीय बाजार के मांग के अनुसार हो, व दलहन-तिलहन के साथ रबी फसल के संबंध में कृषि वैज्ञानिकों से सीधे बातचीत की। कृषि विज्ञान केंद्र, रायपुर के कृषि वैज्ञानिक डाक्टर उत्तम कुमार ने किसानों को कृषि केंद्र के प्रदर्शन फार्मों का अवलोकन कराते हुए संबंधित कृषि तकनीकियों का विस्तारपूर्वक जानकारी दिया। जिनमें धान के 24 प्रकार, 'श्री विधि' से धान की खेती तथा कम पानी वाला भाठा जमीन में दलहन- तिलहन के अंतर्गत सोयाबीन, मुंग, उड़द का उत्पादन, फल उत्पादन जिनके अंतर्गत आम के पौधे में कलम, बेर में कलम, नीबू में गुट्टी बांध कर फल के पौधे को हाईब्रीड में परिवर्तित करना आदि।

तकनीकी जानकारी उपयोगी

कृषक भ्रमण में मौजूद कृषक जालेश्वर वर्मा, ओमप्रकाश वर्मा, परस वर्मा, मंगलू वर्मा, तामेश्वर वर्मा, दीपक बंजारे एवं अन्य साथीयो ने कृषि विज्ञान केंद्र में मिली जानकारियों और तकनीकियों को उपयोगी बताया और इन्हें अपने कृषि में इस्तेमाल करने की बात कही। वहीं आरईएल और अदाणी फाउंडेशन को इसके आयोजन के लिए धन्यवाद दिया। अदाणी फाउंडेशन रायखेड़ा अपनी सामुदायिक सहभागिता के अंतर्गत क्षेत्र के किसानों को कृषि के आधुनिक विधि से जोड़ने हेतु विभिन्न प्रकार से सहयोग प्रदान कर रहा है। जिसमे पहले इन किसानों को धान के उन्नत खेती के लिए श्री पद्धति पर प्रशिक्षण, हाइब्रिड धान बीज वितरण तथा कृषि विशेषज्ञों से उन्नत खेती के सम्बन्ध मे जानकारी तथा प्रदर्शन फार्मों के लिए केवीके, रायपुर का भ्रमण इत्यादि शामिल है।

1.6 Appreciation letter from stakeholder(s)



कार्यालय, खण्ड चिकित्सा अधिकारी, विकासखण्ड–तिल्दा
जिला–रायपुर (छ0ग0)

E-Mail ID – bmotilda@yahoo.co.in

क्रमांक/ सी.एच.सी./सत्रह/2023/97 तिल्दा–नेवरा, दिनांक:– 22/02/2023

प्रति,

अडानी फाण्डेशन
ग्राम–रायखेड़ा,
वि.ख.–तिल्दा, जिला–रायपुर छ0ग0

विषयः– सामुदायिक स्वास्थ्य केन्द्र तिल्दा नेवरा के अंतर्गत संचालित पोषण पुनर्वास केन्द्र में उपकरण प्रदाय हेतु धन्यवाद पत्र एवं पावती के संबंध।

उपरोक्त विषयांतर्गत लेख है, कि आपके द्वारा आज दिनॉक–22 फरवरी 2023 को विकासखण्ड तिल्दा के अंतर्गत सामुदायिक स्वास्थ्य केन्द्र तिल्दा नेवरा में संचालित पोषण पुनर्वास केन्द्र में Stadiometer, Infantometer & MUAC का 1 नग प्रदाय किया गया है।

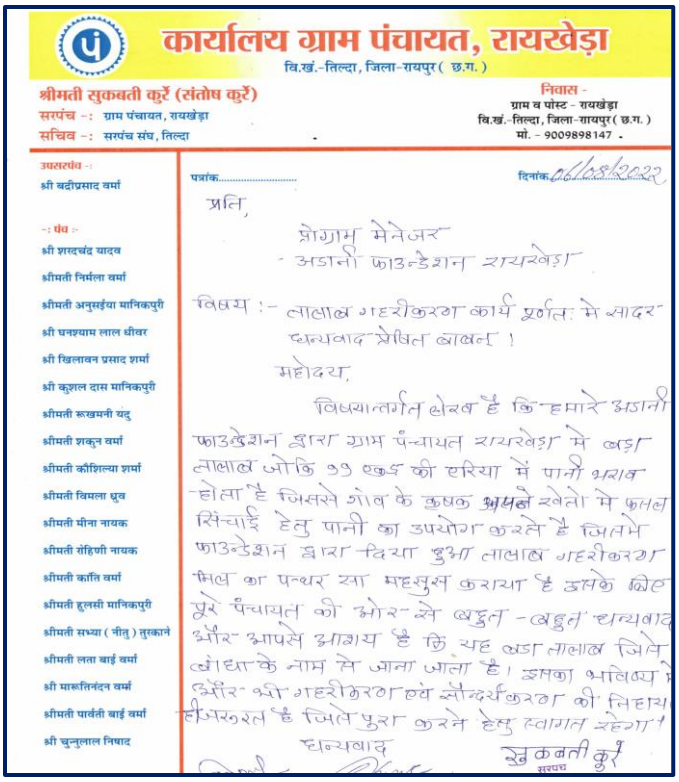
उक्त संबंध में स्वास्थ्य एवं परिवार कल्याण विभाग आपका सादर धन्यवाद करता है, एवं यह पत्र पावती के रूप में सादर प्रेषित है।

खण्ड चिकित्सा अधिकारी
विकासखण्ड–तिल्दा, जिला–रायपुर (छ.ग.)

पृ.क्रमांक/ सी.एच.सी./सत्रह/2023/92 तिल्दा–नेवरा, दिनांक:–22/02/2023

प्रतिलिपिः–
1. मुख्य चिकित्सा एवं स्वास्थ्य अधिकारी, जिला–रायपुर छ0ग0 की ओर सादर सूचनार्थ प्रेषित।
2. कार्यालय प्रति।

खण्ड चिकित्सा अधिकारी
विकासखण्ड–तिल्दा, जिला–रायपुर (छ.ग.)



कार्यालय ग्राम पंचायत, रायखेड़ा
वि.खं.-तिल्दा, जिला-रायपुर (छ.ग.)

श्रीमती सुकवती कुर्रे (संतोष कुर्रे)
सरपंच –: ग्राम पंचायत, रायखेड़ा
सचिव –: सरपंच संघ, तिल्दा

निवास -
ग्राम व पोस्ट - रायखेड़ा
वि.खं.-तिल्दा, जिला-रायपुर (छ.ग.)
मो. - 9009898147

उपसरपंच –:
श्री बदीप्रसाद वर्मा

–: पंच :–
श्री शरदचंद यादव
श्रीमती निर्मला वर्मा
श्रीमती अनुसईया मानिकपुरी
श्री घनश्याम लाल धीवर
श्री खिलावन प्रसाद शर्मा
श्री कुशल दास मानिकपुरी
श्रीमती रूखमनी यदु
श्रीमती शकुन वर्मा
श्रीमती कौशिल्या शर्मा
श्रीमती विमला ध्रुव
श्रीमती मीना नायक
श्रीमती रोहिणी नायक
श्रीमती कांति वर्मा
श्रीमती हूलसी मानिकपुरी
श्रीमती सभ्या (नीतू) तुरकाने
श्रीमती लता बाई वर्मा
श्री मारूतिनंदन वर्मा
श्रीमती पार्वती बाई वर्मा
श्री चुन्नुलाल निषाद

पत्रांक..... दिनांक 06/08/2022

प्रति,
प्रोग्राम मैनेजर
अडानी फाउंडेशन रायखेड़ा

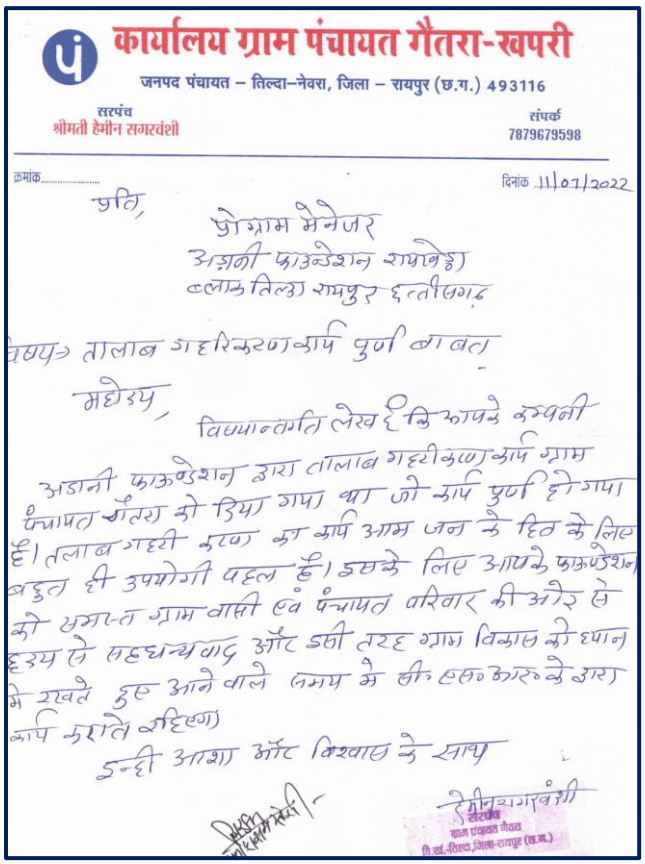
विषय :- तालाब गहरीकरण कार्य पूर्णता मे सादर धन्यवाद प्रेषित करना !

महोदय,

विषयान्तर्गत लेख है कि हमारे अडानी फाउंडेशन द्वारा ग्राम पंचायत रायखेड़ा मे बड़ा तालाब जोकि 33 एकड़ की एरिया में पानी भराव होता है जिससे गांव के कृषक अपने खेतो मे फसल सिंचाई हेतु पानी का उपयोग करते है जिसमे फाउंडेशन द्वारा किया हुआ तालाब गहरीकरण मिल का पत्थर का महसुस कराया है इसके लिए पूरे पंचायत की ओर से बहुत - बहुत धन्यवाद और आपसे आशाय है कि यह बड़ा तालाब जिसे बोधा के नाम से जाना जाता है। इसका भविष्य मे और भी गहरीकरण एवं सौन्दर्यकरण की निहाय आवश्यकता है जिसे पुरा करने हेतु स्वागत रहेगा।

धन्यवाद

सुकवती कुर्रे
सरपंच



कार्यालय ग्राम पंचायत गैतरा-खपरी
जनपद पंचायत – तिल्दा–नेवरा, जिला – रायपुर (छ.ग.) 493116

सरपंच
श्रीमती हेमीन सगरवंशी

संपर्क
7879679598

क्रमांक..... दिनांक 11/07/2022

प्रति,
प्रोग्राम मैनेजर
अडानी फाउंडेशन रायखेड़ा
ब्लाक तिल्दा रायपुर छत्तीसगढ़

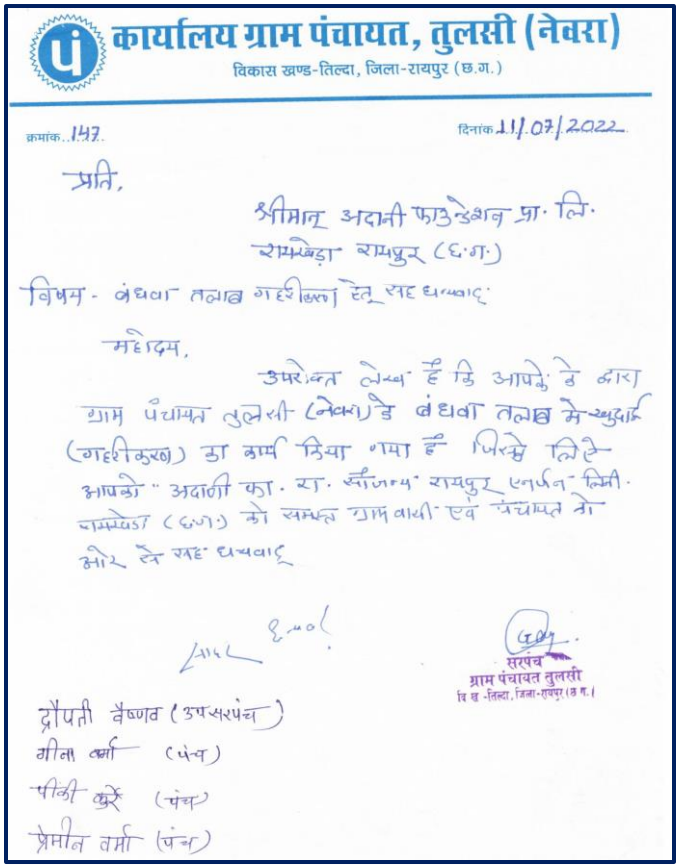
विषय- तालाब गहरिकरण कार्य पुर्ण बाबत

महोदय,

विषयान्तर्गत लेख है कि आपके कम्पनी अडानी फाउंडेशन द्वारा तालाब गहरीकरण कार्य ग्राम पंचायत गैतरा को दिया गया था जो कार्य पुर्ण हो गया है। तालाब गहरी करण का कार्य आम जन के हित के लिए बहुत ही उपयोगी पहल है। इसके लिए आपके फाउंडेशन को समस्त ग्राम वासी एवं पंचायत परिवार की ओर से हृदय से सहधन्यवाद और इसी तरह ग्राम विकास को ध्यान मे रखते हुए आने वाले समय मे सी.एस.आर. के द्वारा कार्य कराते रहेंगे।

इन्ही आशा और विश्वास के साथ

हेमीन सगरवंशी
सरपंच
ग्राम पंचायत गैतरा
वि.ख.-तिल्दा, जिला-रायपुर (छ.ग.)



कार्यालय ग्राम पंचायत, तुलसी (नेवरा)
विकास खण्ड-तिल्दा, जिला-रायपुर (छ.ग.)

क्रमांक..147. दिनांक 11/07/2022

प्रति,
श्रीमान् अदानी फाउंडेशन प्रा. लि.
रामखेड़ा रायपुर (छ.ग.)

विषय- बंधवा तलाब गहरीकरण हेतु सह धन्यवाद

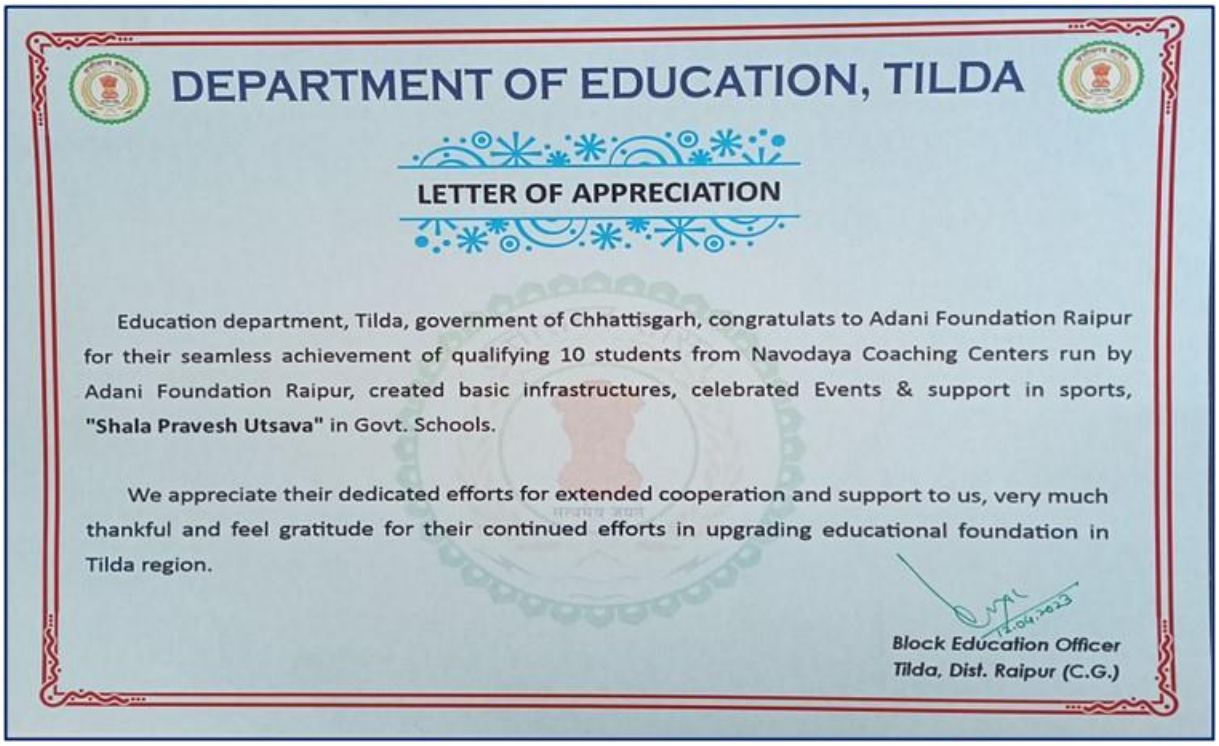
महोदय,

उपरोक्त लेख है कि आपके द्वारा ग्राम पंचायत तुलसी (नेवरा) के बंधवा तलाब मे खुदाई (गहरीकरण) का कार्य किया गया है जिसके लिये आपको "अदानी का. रा. सौजन्य रायपुर एनर्जन लिमी. रामखेड़ा (छ.ग.) को समस्त ग्रामवासी एवं पंचायत की ओर से सह धन्यवाद

सरपंच
ग्राम पंचायत तुलसी
वि.ख.-तिल्दा, जिला-रायपुर (छ.ग.)

द्रौपती वैष्णव (उपसरपंच)
गीता वर्मा (पंच)
पीली कुर्रे (पंच)
प्रेमीन वर्मा (पंच)

1.7 Award/ recognition



DEPARTMENT OF EDUCATION, TILDA

LETTER OF APPRECIATION

Education department, Tilda, government of Chhattisgarh, congratulats to Adani Foundation Raipur for their seamless achievement of qualifying 10 students from Navodaya Coaching Centers run by Adani Foundation Raipur, created basic infrastructures, celebrated Events & support in sports, **"Shala Pravesh Utsava"** in Govt. Schools.

We appreciate their dedicated efforts for extended cooperation and support to us, very much thankful and feel gratitude for their continued efforts in upgrading educational foundation in Tilda region.

11.04.2023

Block Education Officer
Tilda, Dist. Raipur (C.G.)

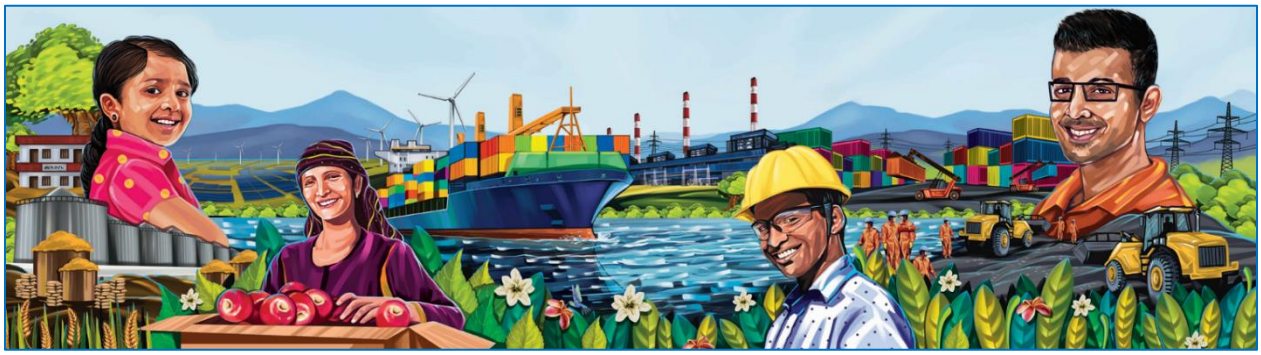
1.8 Beneficiaries Counts: -

S.No.	Activity Description	Direct	Indirect	Access
A.	**Education: -**			
1	Jawahar Navodaya Vidyalaya Coaching Center	120	500	
2	Bala Painting at Schools	1500		
3	School Bag Distribution "Shala Parvesh Utsav"	800	3200	
4	Creating joyful learning space: School repairing & Maintenance etc. (Gourkheda)	100		
5	Noni Laari- SWADAAN	60	250	
6	Sport training & sports item & competition	16	3000	
B.	**Community Health: -**			
1	Mobile Medical Health Care Unit	29,081		37000
2	Specialized Health Camps (Gyneac, Pediatric, EYE, Blood Donation)	2591		
S3	Health Awareness Sessions	200		
4	SuPoshan	2760	4348	
C.	**Sustainable Livelihood Development**			
1	Garment Production Center cum Training Center (Women)	50	200	
2	SRI & Backyard BADI Development Program (HH Family)	100	400	
3	Kamdhenu Program (AF-BAIF) (Livestock's)	2804		37000
4	Events/ Sports Celebration (Community)	3000		
D.	**Community Infrastructure Development**			
1	Pond Deepening (Raikheda)	3717		
2	Pond Deepening (Gaitra)	1012		
3	Pond Deepening (Chicholi)	1208		
4	Pond Deepening (Tulsi)	3801		

5	Pond Deepening (Murra)	2589		
6	Construction of Drainage (Bahesar)	737		
7	Construction of Gaushala Shed, (Khapri)	25		
8	Construction of Culvert & Road Repair (Bhatapara)	1700		

Adani Foundation team

S. No.	Name	Position
1.	Deepak Kumar Singh	Program Manager
2.	Preeti Prajapati	Senior Project Officer
3.	Khileshwar Mahmalla	Project Officer
4.	Deepali Das	Project Officer



Adani Foundation, Adani Power Limited, Village Raikheda, Block Tilda, District Raipur Chhattisgarh, 493225

भारत सरकार
परमाणु ऊर्जा विभाग
विकिरण एवं आइसोटोप प्रौद्योगिकी बोर्ड

Government of India
Department of Atomic Energy
Board of Radiation & Isotope Technology

Certificate Tracking ID / CTID : 2305467
Date of Issue / DOI : 05-Apr-2023
Certificate Serial No. / CSN : ULR-TC666523000003478F

TC-6665

RADIOACTIVITY TEST CERTIFICATE

Ref : BRIT/RAL/DOM/1222-1229/MISC/929-936/22-23

To :
M/S. RAIPUR ENERGEN LIMITED,
VILLAGE RAIKHEDA
BLOCK - TILDA
DISTRICT RAIPUR 493225
CHATTISGARH INDIA

This is regarding the samples of "COAL, FLY ASH, BOTTOM ASH AND POND ASH " sent for radioactivity analysis vide your letter REF NO. REL/ENV/22-23/231 dt. 13.02.2023 which as per above letter is drawn from consignment with the following markings, as shown in italics:

SAMPLE DESCRIPTION : COAL, FLY ASH, BOTTOM ASH AND POND ASH

Sr. No	SAMPLE NO	TYPE OF SAMPLE	PLACE	DATE OF SAMPLE	WEIGHT (IN KG)
1	SAMPLE #1	COAL SAMPLE	REL	13.02.2023	01
2	SAMPLE #2	FLY ASH SAMPLE	REL	13.02.2023	01
3	SAMPLE #3	BOTTOM ASH SAMPLE	REL	13.02.2023	01
4	SAMPLE #4	POND ASH SAMPLE	REL	13.02.2023	01

DATE OF RECEIPT OF SAMPLE: 23.02.2023 **DATE OF COMPLETION OF TEST: 24.03.2023**

The Samples provided were analysed for U-238 and Th-232 radioactivity content by HPGe gamma spectrometry and the values obtained are as follows :

Sr. No	TYPE OF SAMPLE	U-238 (Bq/Kg)	Th-232 (Bq/Kg)
1	COAL SAMPLE	31.3 ± 1.3	50.8 ± 5.3
2	FLY ASH SAMPLE	72.1 ± 2.5	95.2 ± 9.2
3	BOTTOM ASH SAMPLE	54 ± 2.1	91.9 ± 9.4
4	POND ASH	56.9 ± 1.9	86.2 ± 8.7

Opinion: The measurement values are below the clearance level for radionuclides of natural origin in bulk solid materials, as per AERB directive 01/2010 (table-3) dated 26/11/2010

Note: (i) The report pertains to the given sample only. (ii) The sample will be retained in this laboratory for a period of 3 months from certificate date and thereafter it will be disposed off. (iii) This report shall not be reproduced except in full, without written approval of the laboratory. (iv) The sampling is not done by this laboratory.

Checked by:
SHEEBA S.W.
Assistant

Authorized Signatory:
AJAY NANA THAMKE
OIC, RAL

********** End of Report **********

विआप्रौबो/ बीएआरसी परिसर, सेक्टर २०, वाशी, नवी मुंबई – ४०० ७०३ (महाराष्ट्र)
BRIT/ BARC Vashi Complex, Sector 20, Navi Mumbai – 400 703 (Maharashtra)
वेबसाइट/ Website: www.britatom.gov.in; दूरभाष/ 022 2788 7002/ 7006