



## Power

Ref: REL/TPP/EMD/MoEF/EC/302/11/21  
Date: 23.11.2021

**To,**  
**Dr. Bhardwaj Adiraju,**  
**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 half yearly Environment Clearance (EC) compliance status 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

Dear Sir,

With reference to the above, please find enclosed herewith Six Monthly Environment Clearance (EC) compliance status report along with environmental monitoring reports etc. for the period of **April'2021 to September'2021** of 2x685 MW Super Critical, Coal Based Thermal Power Plant at Village Raikheda, Gaitara and Chicholi in Tilda Block of Raipur District, Chhattisgarh in hard and soft copy (**e-mail**).

This is for your kind information and record please.

Thanking You,  
Yours faithfully,  
**for Raipur Energen Limited**

**(Santosh Kumar Singh)**  
**Head - Environment**

**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,  
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# SIX MONTHLY COMPLIANCE REPORT OF ENVIRONMENT CLEARANCE (EC)

for

**1370 MW (2x685MW) Thermal Power Plant**

At

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

*Submitted to:*

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



*Submitted by:*

**Environment Management Department  
Raipur Energen Limited  
Village Raikheda, Block Tilda,  
District Raipur, Chhattisgarh**

**Period: April'2021 – September'2021**

**Raipur Energen Limited**  
1370 MW (2x685 MW) Coal Based Thermal Power Plant

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**INTRODUCTION**

Raipur Energen Limited (formerly known as GMR Chhattisgarh Energy Generation 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 & name of the company has been changed from M/s GMR Chhattisgarh Energy Limited to M/s Raipur Energen Limited (REL) with effect from 20<sup>th</sup> August 2019 and it is to note that M/s Raipur Energen Limited is 100% subsidiary of M/s Adani Power Limited.

REL has also obtained transferred EC vide letter No. J-13012/62/2008-IA. II (T), dated 05.11.2019.

REL 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.

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

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**Compliance Status of Environmental Clearance**

vide letter No. J-13012/62/2008-IA. II (T), dated: 09<sup>th</sup> May 2011 and subsequent amendments dated: 13.06.2013, 18.11.2014, 04.02.2015 & 09.12.2015.

Sl. No.	Conditions of EC	Compliance Status
<b>A.</b>	<b>Specific Conditions</b>	
(i)	Vision document specifying prospective plan for the site shall be formulated and submitted to the Ministry within six months.	<p>Complied.</p> <ul style="list-style-type: none"> <li>- Name of the company has been changed to Raipur Energen Limited from 1<sup>st</sup> July 2019 and company is now a subsidiary of Adani Power Limited.</li> <li>- The Vision document of Adani Power Limited was already submitted to MoEF&amp;CC, Regional Office (WCZ), Nagpur vide our office letter Ref: REL / MoEF&amp;CC/EC/2020/ May/29, dated: 29<sup>th</sup> May 2020.</li> </ul>
(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).	<p>Being complied.</p> <ul style="list-style-type: none"> <li>- Use of 100% domestic coal sourced from tolling linkage and open market. Talabira-1 Mine is not under mining operation as Mining Plan was expired and the revised mining plan is due for approval.</li> <li>- Sulphur and Ash content of coal being used are within prescribed limits of MoEF&amp;CC and CECB.</li> </ul>
(iii)	Provision for installation of FGD shall be provided for future use.	<p>Complied.</p> <ul style="list-style-type: none"> <li>- Space provision for FGD have been provided as per the guidelines of CPCB vide letter No. B-33014/07/2017/IPC-II/TPP/15848, dated 11.12.2017.</li> <li>- However as per MoEF&amp;CC's Notification dated 31<sup>st</sup> March 2021, Raipur TPP is falling under Category "C" Non- retiring TPPs and the timelines for compliance of SO<sub>2</sub> emission is up to December 2024. Accordingly, the work is under progress for compliance as per CPCB direction.</li> </ul>
(iv)	Stack of 275 m height shall be installed and provided with continuous online monitoring equipment's for SO <sub>x</sub> , NO <sub>x</sub> , PM <sub>2.5</sub> & PM <sub>10</sub> . Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions from stack may also monitored on periodic basis.	<p>Complied.</p> <p>Stack Height is 275 meters. On-line continuous emission monitoring system (CEMS) has been installed for PM, SO<sub>2</sub> &amp; NO<sub>x</sub>. Monitoring of Hg in stack emission is also carried out by authorized laboratory by MoEF&amp;CC. The exit gas velocity is ensured @ 22m/sec.</p>

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Sl. No.	Conditions of EC	Compliance Status
		The Environment Monitoring report is enclosed herewith as <b>Annexure I</b> .
(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 <sup>3</sup> .	Complied. High efficiency Electrostatic Precipitators (ESP) has been considered to meet revised emission standard of <50 mg/ Nm <sup>3</sup> for PM. The monitoring report for stack emission is enclosed in <b>Annexure I</b> .
(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. <ul style="list-style-type: none"> <li>- Dust extraction system has been installed in coal crusher, AHP &amp; coal bunkers.</li> <li>- Dust suppression system through dry fog method has been installed at coal conveyor transfer points.</li> <li>- Water spray system has also been installed in coal yards for dust suppression.</li> </ul>
(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.  Sulphur and Ash content in coal being used in project as fired coal is ensured within prescribed standards of 0.7% Sulphur content and within 34%. Ash content
(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.	Complied. The transportation through rail has been 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 <a href="https://www.adanipower.com/Downloads">https://www.adanipower.com/Downloads</a>
(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. REL 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 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.	Complied.  Water allocation is from Mahanadi River and maintained by WRD, Chhattisgarh. REL has no role in regulating the water flow downstream & distribution

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(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 design is approved by CGWA. Copy of approval letter is submitted to MoEF&CC. Rainwater harvesting system has been implemented & further improvement is in process.
(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 annual review of hydrogeology study for FY 2019-20 has been carried out and report submitted with compliance report for the period of April-2020 to September-2020.
(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 adopt higher COC of at least not less than 5.0.	Complied. Water requirement is being restricted to 25 MCM. COC is being maintained more 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. REL 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 considering the minimum water flow requirement in the river.
(xvii)	Regular monitoring of ground water level shall be carried out by establishing a network of existing wells and constructing new	Complied. Six nos. piezometers constructed around periphery of the ash pond.

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	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	Seasonal monitoring of ground water level and quality is being done and monitoring data is being submitted to the MOEF, CPCB & CECB regularly. The ground water analysis data is attached in <b>Annexure I</b> .
(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, CPCB & CECB regularly. The surface water analysis data is attached in <b>Annexure I</b> .
(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. Completed during construction phase. No major construction is being executed in operation phase.
(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 restrict fugitive emission from fly ash.
(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 <b>Annexure II</b>
(xxii)	Fly ash shall be collected in dry form and storage facility (silos) shall be provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry form. Mercury and other 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.	Being Complied. <ul style="list-style-type: none"> <li>- Fly ash is being collected in dry form and unutilized fly ash is being disposed in dedicated ash storage ponds.</li> <li>- As per MoEF&amp;CC Office Memorandum dated 28<sup>th</sup> 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.</li> <li>- Mercury and heavy metals are being monitored in bottom ash. No effluent is emanated from ash pond.</li> </ul>
(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	Complied. Ash ponds is constructed in the way that no leachate takes place any point of time.



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	implemented to protect the ash dyke from getting breached.	
(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 <b>Annexure III</b>
(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 with expenditure within the framework of the 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 generation & community vocational training centre and community development.  Six-Monthly CSR Report (April 2021 - September 2021) enclosed as <b>Annexure IV</b>
(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	Being complied. CSR Plan for the villages is made as per local need and CSR activities are identified by Social

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	<p>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.</p>	<p>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 Panchayats statistics and special interventions have been planned for their up-liftment.</p> <p>Separate budget has been allocated for community development activities, income generation activities.</p> <p>Vocational training is being provided to youth for self-employment free of cost. We have started <b>Pratibha Centre</b> 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.</p> <p>Six-Monthly CSR Report (April 2021 - September 2021) enclosed as <b>Annexure IV</b></p>
(xxix)	<p>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.</p>	<p>Time bound implementation of CSR activities have been carried out &amp; CSR budget has earmarked for CSR activities being implemented in nearby project villages.</p> <p>Six-Monthly CSR Report (April 2021 - September 2021) enclosed as <b>Annexure IV</b></p>
(xxx)	<p>It shall be ensured that in-built monitoring mechanism for the schemes identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time</p>	<p>Complied.</p> <p>Annual review of Social Audit has been carried out in year 2020 by Indian Institute of Social Welfare and Business Management, Management House, College Square, West Kolkata. The report has already been submitted with compliance report for period of April'2020 to Spetember'2020</p>
.	<b>General Conditions;</b>	
(i)	<p>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.</p>	<p>Complied.</p> <p>The treated effluents conforming to the prescribed standards only are re-circulated and reused within the plant.</p> <p>Plant layout has been designed so that effluents and storm water do not get mixed.</p> <p>The ETP analysis report is attached as <b>Annexure I.</b></p>

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(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 to ensure quality of sewerage.
(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 MoEF&CC, Delhi as well as Regional Office of MoEF&CC.
(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 will not exceed 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.
(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 treatment for any hearing loss including shifting to non-noisy, less noisy areas.	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 attached in <b>Annexure I</b> .
(vii)	Regular monitoring of ambient air ground level concentration of SO <sub>2</sub> , NO <sub>x</sub> , PM <sub>2.5</sub> & PM <sub>10</sub> 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. REL has 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 MoEF&CC and is also made available at company's website. <a href="https://www.adanipower.com/Downloads">https://www.adanipower.com/Downloads</a>  The ambient air quality monitoring report is attached as <b>Annexure I</b> .

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(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.
(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 <a href="http://envfor.nic.in">http://envfor.nic.in</a>	Complied. Advertisement has been published in local daily News Papers & details submitted with previous compliance report.
(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. <a href="https://www.adanipower.com/Downloads">https://www.adanipower.com/Downloads</a>
(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 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.	Complied. REL has a well-established Environment Management Dept. headed by a competent experienced Manager with relevant academic qualification supported by Environmental Engineers, Chemist & Horticulturist.  Environmental laboratory has already been established & is operational to monitor Environmental Quality Parameters for Ambient Air, Water, Stack emission monitoring etc.
(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	Complied. Display board has been installed at main gate of TPP. Recent Environment compliance report will be uploaded in company website. <a href="http://www.adanipower.com/Downloads">www.adanipower.com/Downloads</a>

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Sl. No.	Conditions of EC	Compliance Status
	(ambient levels as well as stack emissions) shall display at a convenient location near the main gate of the company in the public domain.	
(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: 2020-21 in prescribed format (Form V) has been submitted to CECB, Raipur vide Letter No, REL/ENV/20-21/139 dated 14 <sup>th</sup> September 2021.
(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 compliance on the Environmental Clearance granted by MoEF is being submitted to MoEF, CPCB & CECB regularly. Compliance status updated on company's website. <a href="http://www.adanipower.com/Downloads">www.adanipower.com/Downloads</a> Compliance report for the period of October 2020 to March 2021 has been already submitted to your good office vide letter no.: REL/TPP/EMD/MoEF/EC/137/21 dated 20.05.2021
(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.	Being Complied. EIA & EMP report with all necessary document & information are already submitted to RO, MoEF&CC and CECB.

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

Sl. No.	Conditions of EC	Compliance Status
(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 10 <sup>th</sup> Dec'10. The Project development started after receiving Consent to establish dated 13 <sup>th</sup> 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.
<b>Conditions of Amended EC dated 13.06.2013</b>		
(v)	High Efficiency Electrostatic Precipitators (ESPs) shall be installed and it shall be ensured that particulate emission does not exceed 50 mg/Nm <sup>3</sup> "	Complied. High efficiency Electrostatic Precipitators (ESP) has been considered to meet revised emission standard of <50 mg/ Nm <sup>3</sup> for PM.  The monitoring report for stack emission is enclosed as <b>Annexure I</b> .
(xxxi)	The GCV of the imported coal from South Africa shall not be less than 4911 Kcal/kg and the ash and sulphur contents shall not exceed the limits stated under: Ash contents: 33.7% Sulphur contents: 0.7%	Being Complied.  Sulphur and Ash content in coal being used in project as fired coal is being ensured within prescribed standards <0.7% and Ash content is within 34%.
(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.	Radioactivity analysis in coal and ash has been carried out by Board of Radiation and Isotope Technology (BRIT) Government of India,
(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.	Being Complied.
<b>Conditions of Amended EC Extension dated 18.11.2014</b>		
(i)	The coal transportation by road shall be through mechanically covered trucks to the	Complied. The transportation through rail is being done.

**Raipur Energen Limited**  
1370 MW (2x685 MW) Coal Based Thermal Power Plant

Sl. No.	Conditions of EC	Compliance Status
	extent feasible, else, shall be through tarpaulin covered trucks.	
(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 after amendment. 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 <a href="https://www.adanipower.com/Downloads">https://www.adanipower.com/Downloads</a>
(xxxiv)	Harnessing solar power within the premises of the plant particularly at available rooftops shall be undertaken and status of implementation shall be submitted periodically to the Regional Office of the Ministry.	Complied. 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 attached as <b>Annexure III.</b>
(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. REL 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.  REL has well established Environment Management Dept. which is headed by experience Manager & supported by Env. Engineer & Lab Chemist. Environmental laboratory has been established to monitor Environmental Quality Parameters for Ambient Air, Water, Stack emission monitoring etc. Environmental Management System as per EMS ISO 14001:2015 implemented under Integrated Management System.

**Raipur Energen Limited**  
1370 MW (2x685 MW) Coal Based Thermal Power Plant

Sl. No.	Conditions of EC	Compliance Status
<b>Conditions of Amended EC Extension dated 04.02.2015</b>		
(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.  Sulphur and Ash content in coal being used in project as fired coal is being ensured within prescribed standards of 0.7% and Ash content is within 34%.
(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.
<b>Conditions of Amended EC Extension dated 09.12.2015</b>		
(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.  Sulphur and Ash content in coal being used in project as fired coal is being ensured within prescribed standards of 0.7% and Ash content is within 34%.
(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.  Advertisement has been published in local daily News Papers. & details submitted with previous compliance report.

<b>EC amendment - MoEF&amp;CC notification vide letter number S.O. 1561 (E) dated 21<sup>st</sup> May, 2020</b>		
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 extant 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. i) Technology solutions are being implemented for mitigating fugitive emissions of Particulate Matter.  ii) Washeries, middling and rejects are not applicable for this 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.	i) Noted & being complied. Fly ash is being supplied to nearest cement industries and brick manufacture. Fly Ash generation and utilization is regularly submitted to MoEF&CC, CPCB, CEA & CECB. Please refer <b>Annexure II</b> .



## Raipur Energen Limited

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

	<p>ii) Appropriate Technology solutions shall be applied to optimise water consumption for Ash management.</p> <p>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</p> <p>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.</p>	<p>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</p> <p>iii) Noted &amp; being complied</p> <p>iv) Noted &amp; will be complied as &amp; when fly ash is disposed in abandoned or working mines</p>
<p>3)</p>	<p>Transportation</p> <p>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.</p> <p>ii) It shall be ensured by the thermal power plant that</p> <p>a) Rail siding facility or conveyer facility is set up at or near the power plant, for transportation by rail or conveyor; and</p> <p>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.</p>	<p>i) Noted &amp; being complied. Rail siding facility has been made operational &amp; coal is being transported through covered rail wagons</p> <p>ii)</p> <p>a) Rail siding facility has been made operational &amp; coal is being transported through covered rail wagons</p> <p>b) Not applicable as Rail siding facility has been made operational &amp; coal is being transported through covered rail wagons</p>

# 1st Quarterly Environmental Monitoring Report



## **Submitted To:**

**M/s Raipur Energen Limited**

***Formerly GMR Chhattisgarh Energy Ltd.***

**Village: Raikheda, Block-Tilda, Dist.-Raipur (Chhattisgarh)**

## **Conducted by:**

**M/s Vardan EnviroLab**

**Plot no. 82A, Sector-5, IMT Manesar, Gurugram (Haryana)**

**(Recognized by MoEF & CC, NABL 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, Dist.-Raipur (Chhattisgarh), India, has engaged M/S Vardan EnviroLab, Gurugram, (HR) to provide Environmental Services in respect of ambient air quality monitoring, stack emission, noise level monitoring & Sampling and Analysis of ground water quality, surface water quality, treated effluent sewage, effluent water from ETP, and soil for Raipur Energen Limited, Raipur district of Chhattisgarh, as per guidelines of MoEF & CC and CPCB Gazette notification.**

**M/S Vardan EnviroLab, Gurugram, (HR) has deployed entirely its own personnel, facilities and expertise for doing this service. Sampling / Monitoring Stations were identified by the Environmental Officer of Raipur Energen Limited, Raipur, The samples were analyzed partly at site and partly at our MoEF Recognized laboratory situated at Gurugram (HR).**

This report presents the data generated for the period from 15th June 2021 to 20th June 2021, i.e. for First quarter which includes sampling locations, Methodology, testing procedure and compilation for the Environmental parameters i.e. Air, Water, Soil & Noise 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 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 : 5/7/2021

Authorized Signatory  


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## **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. Raipur Energen Limited., has commissioned its Thermal Power Plant 1370MW (2x685 MW) Unit at Village Raikheda, Block -Tilda, Dist- Raipur, Chhattisgarh (India).

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. 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 Bangoli dam approximately 2 km. away from plant in SW direction. Mura Talab approximately 5 km. away from plant in South direction. Chhicholi Talab approximately 2 km. away from plant in East direction.

#### **2.2 Location**

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

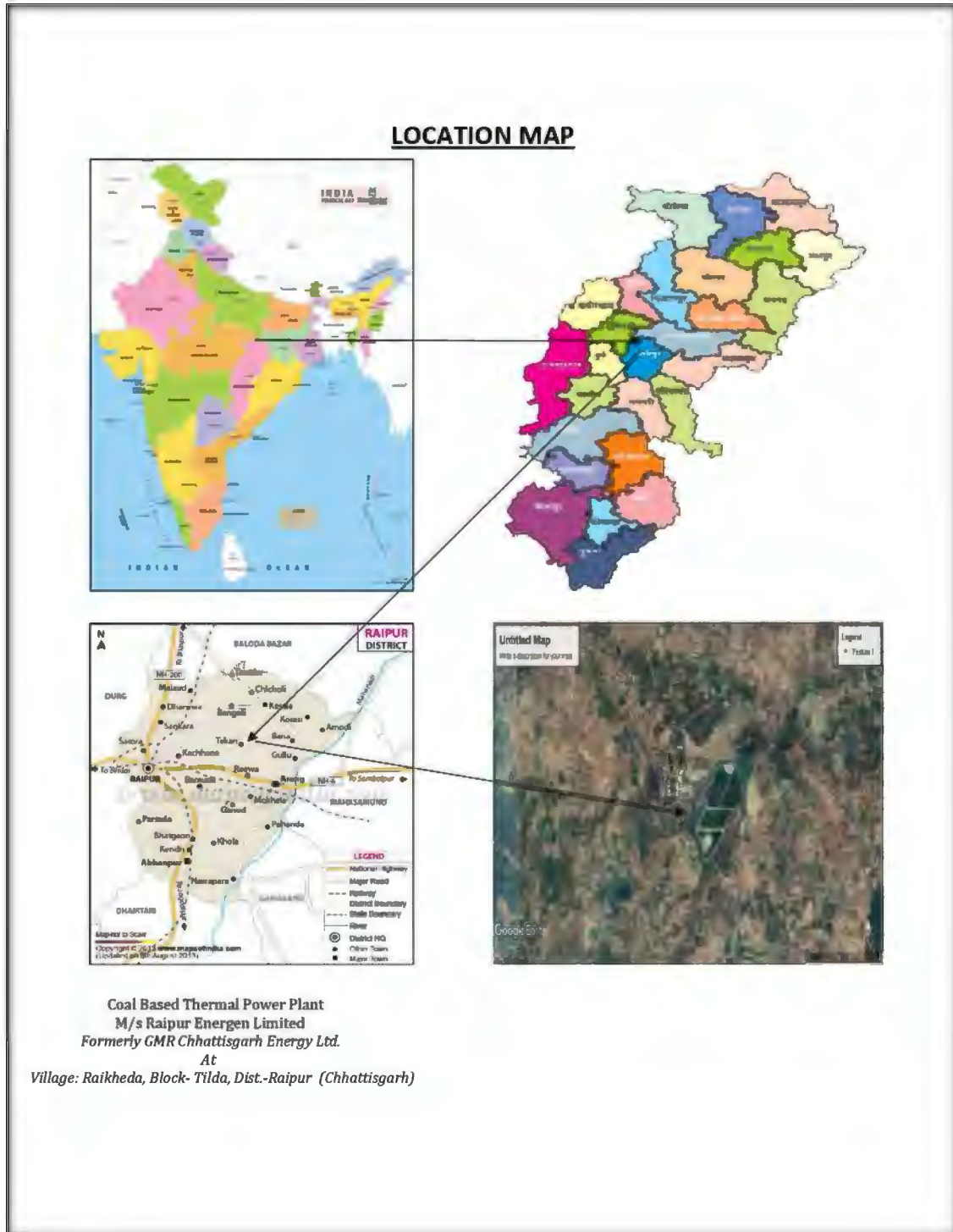
#### **2.3 Climate**

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 29.5°C - 49 °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, noise level monitoring & Sampling and Analysis of ground water quality, surface water quality, treated effluent sewage, effluent water from ETP and soil.

#### **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 assess the existing air quality of the area.

The ambient air quality monitoring was carried out for 24 hours at each station. At all stations SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, CO and Mercury were monitored. All the samples collected were analyzed for quantitative analysis of various pollutants.

The ambient air quality sampling locations were identified by the Environmental Officer of Raipur Energen Limited.

##### **3.2.2 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.



### **3.2.3 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 which is expressed in dB(A).

### **3.2.4 Soil**

The Soil samples were collected from selected locations. These samples were analyzed for Physico-Chemical parameters including heavy metals.

## 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**

Location Code: -

- A1- Raikheda Village
- A2- Mura Village
- A3- Doosan Village
- A4- Chicholi Village
- A5- Near STP



## Test Report

Sample Number : VEL/AA/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/A/2106250017/A

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 05/07/2021

Period of Analysis : 25/06/2021-05/07/2021

Receipt Date : 25/06/2021

Sample Description : AMBIENT AIR

### General Information

Sampling Location : Village - Raikheda (Near Ramesh House)  
Sample Collected by : VEL Team  
Sampling Equipment used : RDS/FPS  
Instrument Code : VEL/RDS/FPS/01  
Instrument Calibration Status : Calibrated  
Latitude : 26°48'43"  
Longitude : 75°36'41"  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 15/06/2021 To 16/06/2021  
Time of Monitoring : 10.00 to 10.00 Hrs.  
Ambient Temperature (°C) : Min. 24° Max 38°  
Surrounding Activity : Human, Vehicular & Other Activity  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS :5182  
Sampling Duration : 24 hrs.  
Parameter Required : As Per Work Order

S.No.	Parameters	Test Method	Results	Units	Limit as per CPCB
1	Particulate Matter (as PM -10)	IS:5182 (P- 23)-2006,RA. 2017	77.41	µg/m <sup>3</sup>	100
2	Particulate Matter (as PM - 2.5)	IS:5182 (P- 24)-2019	33.18	µg/m <sup>3</sup>	60
3	Nitrogen Dioxides (as NO <sub>2</sub> )	IS:5182 (P- 6)-2006 RA.2017	25.45	µg/m <sup>3</sup>	80
4	Sulphur Dioxide (as SO <sub>2</sub> )	IS:5182 (P- 2)-2001, RA. 2017	9.87	µg/m <sup>3</sup>	80
5	Ozone (as O <sub>3</sub> )	IS 5182 (P-9):1974 RA.2014	9.08	µg/m <sup>3</sup>	180.0

BDL\*(Below Detection Limit)\*\* DL Detection Limit

\*\*\*End of Report\*\*\*

VI'ENDRA KUMAR

TE (Checked By) MANAGER

RAJ KUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION



## Test Report

Sample Number : VEL/AA/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/A/2106250017/B

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 05/07/2021

Period of Analysis : 25/06/2021-05/07/2021

Receipt Date : 25/06/2021

Sample Description : AMBIENT AIR

### General Information

Sampling Location : Village - Raikheda (Near Ramesh House)  
Sample Collected by : VEL Team  
Sampling Equipment used : RDS/FPS  
Instrument Code : VEL/RDS/FPS/01  
Instrument Calibration Status : Calibrated  
Latitude : 26°48'43"  
Longitude : 75°36'41"  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 15/06/2021 To 16/06/2021  
Time of Monitoring : 10.00 to 10.00 Hrs  
Ambient Temperature (°C) : Min 24° Max 36°  
Surrounding Activity : Human, Vehicular & Other Activity  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS 5182  
Sampling Duration : 24 hrs  
Parameter Required : As Per Work Order

S.No.	Parameters	Test Method	Results	Units	Limit as per CPCB
1	Suspended Particulate Matter	IS:5182 (P- 4) :1999 RA.2014	196.29	µg/m <sup>3</sup>	600
2	Mercury (Hg)	Methods of air sampling and analysis,3rd ed.,1988, Method No.317	*BDL(DL-0.001)	µg/m <sup>3</sup>	--

BDL\*(Below Detection Limit)\*\* DL Detection Limit

\*\*\*End of Report\*\*\*

VIJENDRA KUMAR

(Checked By)  
TECHNICAL MANAGER

RAJ KUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION



## Test Report

Sample Number : VEL/AA/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/A/2106250018/A

Format No : 7 &amp; F-01

Party Reference No : NIL

Report Date : 05/07/2021

Period of Analysis : 25/06/2021-05/07/2021

Receipt Date : 25/06/2021

Sample Description : AMBIENT AIR

### General Information

Sampling Location : Near STP  
 Sample Collected by : VEL Team  
 Sampling Equipment used : RDS/FPS  
 Instrument Code : VEL/RDS/FPS/01  
 Instrument Calibration Status : Calibrated  
 Latitude : 26°48'43"  
 Longitude : 75°36'41"  
 Meteorological condition during monitoring : clear Sky  
 Date of Monitoring : 16/06/2021 To 17/06/2021  
 Time of Monitoring : 11.00 to 11.00 Hrs.  
 Ambient Temperature (°C) : Min 23° Max 38°  
 Surrounding Activity : Human, Vehicular & Other Activity  
 Scope of Monitoring : Regulatory Requirement  
 Sampling & Analysis Protocol : IS 5182  
 Sampling Duration : 24 hrs.  
 Parameter Required : As Per Work Order

S.No.	Parameters	Test Method	Results	Units	Limit as per CPCB
1	Particulate Matter (as PM -10)	IS:5182 (P- 23)-2006,RA. 2017	73.36	µg/m <sup>3</sup>	100
2	Particulate Matter (as PM - 2.5)	IS:5182 (P- 24)-2019	32.26	µg/m <sup>3</sup>	60
3	Nitrogen Dioxides (as NO2)	IS:5182 (P- 6)-2006 RA.2017	19.19	µg/m <sup>3</sup>	80
4	Sulphur Dioxide (as SO2)	IS:5182 (P- 2)-2001, RA. 2017	8.99	µg/m <sup>3</sup>	80
5	Ozone (as O3)	IS 5182 (P-9):1974 RA.2014	8.18	µg/m <sup>3</sup>	180.0

BDL\*(Below Detection Limit)\*\*DL Detection Limit

DINESH PALSANIYA

\*\*\*End of Report\*\*\*

*(Checked By)*  
 TECHNICAL MANAGER

RAJ KUNAR YADAV  
 (Authorized Signatory)  
 G M LAB OPERATION



## Test Report

Sample Number : VEL/AA/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/A/2106250018/B

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 05/07/2021

Period of Analysis : 25/06/2021-05/07/2021

Receipt Date : 25/06/2021

Sample Description : AMBIENT AIR

### General Information

Sampling Location : Near STP  
Sample Collected by : VEL Team  
Sampling Equipment used : RDS/FPS  
Instrument Code : VEL/RDS/FPS/01  
Instrument Calibration Status : Calibrated  
Latitude : 26°48'43"  
Longitude : 75°36'41"  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 16/06/2021 To 17/06/2021  
Time of Monitoring : 11:00 to 11:00 Hrs  
Ambient Temperature (°C) : Min 23° Max 38°  
Surrounding Activity : Human, Vehicular & Other Activity  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS 5182  
Sampling Duration : 24 hrs  
Parameter Required : As Per Work Order

S.No.	Parameters	Test Method	Results	Units	Limit as per CPCB
1	Suspended Particulate Matter	IS:5182 (P- 4) :1999 RA.2014	225.27	µg/m <sup>3</sup>	600
2	Mercury (Hg)	Methods of air sampling and analysis,3rd ed.,1988, Method No.317	*BDL(DL-0.001)	µg/m <sup>3</sup>	--

BDL\*(Below Detection Limit)\*\*DL Detection Limit

\*\*\*End of Report\*\*\*

DINESH PALSANIYA

(Checked By)  
DY. TECHNICAL MANAGER

RAJ KUMAR YADAV  
(Authorized Signatory)  
G M LAB OPERATION



## Test Report

Sample Number : VEL/AA/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/A/2106250019/A  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 05/07/2021  
Period of Analysis : 25/06/2021-05/07/2021  
Receipt Date : 25/06/2021

Sample Description : AMBIENT AIR

General Information  
Sampling Location : Village- Mura (Near Petrol Pump)  
Sample Collected by : VEL Team  
Sampling Equipment used : RDS/FPS  
Instrument Code : VEL/RDS/FPS/02  
Instrument Calibration Status : Calibrated  
Latitude : 21°26'23"  
Longitude : 81°52'10"  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 17/06/2021 To 18/06/2021  
Time of Monitoring : 09.10 to 09.10 Hrs  
Ambient Temperature (°C) : Min 24° Max 40°  
Surrounding Activity : Human, Vehicular & Other Activity  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS 5182  
Sampling Duration : 24 hrs  
Parameter Required : As Per Work Order

S.No.	Parameters	Test Method	Results	Units	Limit as per CPCB
1	Particulate Matter (as PM -10)	IS:5182 (P- 23)-2006,RA. 2017	68.39	µg/m <sup>3</sup>	100
2	Particulate Matter (as PM - 2.5)	IS:5182 (P- 24)-2019	31.46	µg/m <sup>3</sup>	60
3	Nitrogen Dioxides (as NO2)	IS:5182 (P- 6)-2006 RA.2017	16.35	µg/m <sup>3</sup>	80
4	Sulphur Dioxide (as SO2)	IS:5182 (P- 2)-2001, RA. 2017	8.68	µg/m <sup>3</sup>	80
5	Ozone (as O3)	IS 5182 (P-9):1974 RA.2014	6.36	µg/m <sup>3</sup>	180.0

BDL\*(Below Detction Limit)\*\*DL Detection Limit

\*\*\*End of Report\*\*\*

DINESH PALSANIYA

(Checked By)  
DY TECHNICAL MANAGER

RAJ KUMAR YADAV  
(Authorized Signatory)

G M LAB OPERATION



## Test Report

Sample Number : VEL/AA/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/A/2106250019/B

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 05/07/2021

Period of Analysis : 25/06/2021-05/07/2021

Receipt Date : 25/06/2021

Sample Description : AMBIENT AIR

### General Information

Sampling Location : Village- Mura (Near Petrol Pump)  
Sample Collected by : VEL Team  
Sampling Equipment used : RDS/FPS  
Instrument Code : VEL/RDS/FPS/02  
Instrument Calibration Status : Calibrated  
Latitude : 21°26'23"  
Longitude : 81°52'10"  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 17/06/2021 To 18/06/2021  
Time of Monitoring : 09.10 to 09.10 Hrs  
Ambient Temperature (°C) : Min 24° Max 40°  
Surrounding Activity : Human, Vehicular & Other Activity  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS 5182  
Sampling Duration : 24 hrs  
Parameter Required : As Per Work Order

S.No.	Parameters	Test Method	Results	Units	Limit as per CPCB
1	Suspended Particulate Matter	IS:5182 (P- 4) :1999 RA.2014	193.64	µg/m <sup>3</sup>	600
2	Mercury (Hg)	Methods of air sampling and analysis,3rd ed.,1988, Method No.317	*BDL(DL-0.001)	µg/m <sup>3</sup>	--

BDL\*(Below Detection Limit)\*\*DL Detection Limit

DINESH PALSANIYA

\*\*\*End of Report\*\*\*

TECHNICAL MANAGER  
(Checked By)

RAJ KUMAR YADAV  
  
(Authorized Signatory)  
G M LAB OPERATION





## Test Report

Sample Number : VEL/AA/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/A/2106250020/A

Format No : 7 8 F-01

Party Reference No : NIL

Report Date : 05/07/2021

Period of Analysis : 25/06/2021-05/07/2021

Receipt Date : 25/06/2021

Sample Description : AMBIENT AIR

### General Information

Sampling Location : Village - Chicholi Chatamura Chock  
Sample Collected by : VEL Team  
Sampling Equipment used : RDS/FPS  
Instrument Code : VEL/RDS/FPS/02  
Instrument Calibration Status : Calibrated  
Latitude : 21°27'14"  
Longitude : 81°50'57"  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 18/06/2021 To 19/06/2021  
Time of Monitoring : 09:15 to 09:15 Hrs.  
Ambient Temperature (°C) : Min. 23° Max 37°  
Surrounding Activity : Human, Vehicular & Other Activity  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS:5182  
Sampling Duration : 24 hrs  
Parameter Required : As Per Work Order

S.No.	Parameters	Test Method	Results	Units	Limit as per CPCB
1	Particulate Matter (as PM -10)	IS:5182 (P- 23)-2006,RA. 2017	81.47	µg/m <sup>3</sup>	100
2	Particulate Matter (as PM - 2.5)	IS:5182 (P- 24)-2019	36.63	µg/m <sup>3</sup>	60
3	Nitrogen Dioxides (as NO2)	IS:5182 (P- 6)-2006 RA.2017	23.62	µg/m <sup>3</sup>	80
4	Sulphur Dioxide (as SO2)	IS:5182 (P- 2)-2001, RA. 2017	11.99	µg/m <sup>3</sup>	80
5	Ozone (as O3)	IS 5182 (P-9):1974 RA.2014	8.18	µg/m <sup>3</sup>	180.0

BDL\*(Below Detection Limit)\*\*DL Detection Limit

\*\*\*End of Report\*\*\*

DINESH PALSANIYA

(Checked By)

BY TECHNICAL MANAGER

RAJ KUNAR YADAV

(Authorized Signatory)

G M LAB OPERATION



## Test Report

Sample Number : VEL/AA/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/A/2106250020/B

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 05/07/2021

Period of Analysis : 25/06/2021-05/07/2021

Receipt Date : 25/06/2021

Sample Description : AMBIENT AIR

### General Information

Sampling Location : Village - Chicholi Chatamura Chock  
Sample Collected by : VEL Team  
Sampling Equipment used : RDS/FPS  
Instrument Code : VEL/RDS/FPS/02  
Instrument Calibration Status : Calibrated  
Latitude : 21°27'14"  
Longitude : 81°50'57"  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 18/06/2021 To 19/06/2021  
Time of Monitoring : 09.15 to 09.15 Hrs.  
Ambient Temperature (°C) : Min. 23° Max 37°  
Surrounding Activity : Human, Vehicular & Other Activity  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS :5182  
Sampling Duration : 24 hrs  
Parameter Required : As Per Work Order

S.No.	Parameters	Test Method	Results	Units	Limit as per CPCB
1	Suspended Particulate Matter	IS:5182 (P- 4) :1999 RA.2014	233.01	µg/m <sup>3</sup>	600
2	Mercury (Hg)	Methods of air sampling and analysis,3rd ed.,1988, Method No.317	*BDL(DL-0.001)	µg/m <sup>3</sup>	--

BDL\*(Below Detection Limit)\*\*DL Detection Limit

\*\*\*End of Report\*\*\*

DINESH PALSANIYA

*Mud*  
(Checked By)  
DY TECHNICAL MANAGER

RAJ KUNAR YADAV  
(Authorized Signatory)

G M LAB OPERATION



## Test Report

Sample Number : VEL/AA/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/A/2106250021/A

Format No : 7 8 F-01

Party Reference No : NIL

Report Date : 05/07/2021

Period of Analysis : 25/06/2021-05/07/2021

Receipt Date : 25/06/2021

Sample Description : AMBIENT AIR

### General Information

Sampling Location : Near Doosan (Old Project)  
Sample Collected by : VEL Team  
Sampling Equipment used : RDS/FPS  
Instrument Code : VEL/RDS/FPS/03  
Instrument Calibration Status : Calibrated  
Latitude : 21°27'14"  
Longitude : 81°50'57"  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 19/06/2021 To 20/06/2021  
Time of Monitoring : 09:50 to 09:50 Hrs.  
Ambient Temperature (°C) : Min 23° Max 39°  
Surrounding Activity : Human, Vehicular & Other Activity  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS :5182  
Sampling Duration : 24 hrs  
Parameter Required : As Per Work Order

S.No.	Parameters	Test Method	Results	Units	Limit as per CPCB
1	Particulate Matter (as PM -10)	IS:5182 (P- 23)-2006,RA. 2017	83.98	µg/m <sup>3</sup>	100
2	Particulate Matter (as PM - 2.5)	IS:5182 (P- 24)-2019	41.26	µg/m <sup>3</sup>	60
3	Nitrogen Dioxides (as NO2)	IS:5182 (P- 6)-2006 RA.2017	24.28	µg/m <sup>3</sup>	80
4	Sulphur Dioxide (as SO2)	IS:5182 (P- 2)-2001, RA. 2017	13.20	µg/m <sup>3</sup>	80
5	Ozone (as O3)	IS 5182 (P-9):1974 RA.2014	9.08	µg/m <sup>3</sup>	180.0

BDL\*(Below Detection Limit)\*\*DL Detection Limit

\*\*\*End of Report\*\*\*

DINESH PALSANIYA

*Mishra*  
(Checked By)  
REGIONAL MANAGER

RAJ KUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION



## Test Report

Sample Number : VEL/AA/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/A/2106250021/B

Format No : 7 8 F-01

Party Reference No : NIL

Report Date : 05/07/2021

Period of Analysis : 25/06/2021-05/07/2021

Receipt Date : 25/06/2021

Sample Description : AMBIENT AIR

### General Information

Sampling Location : Near Doosan (Old Project)  
Sample Collected by : VEL Team  
Sampling Equipment used : RDS/FPS  
Instrument Code : VEL/RDS/FPS/03  
Instrument Calibration Status : Calibrated  
Latitude : 21°27'14"  
Longitude : 81°50'57"  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 19/06/2021 To 20/06/2021  
Time of Monitoring : 09.50 to 09.50 Hrs.  
Ambient Temperature (°C) : Min. 23° Max 39°  
Surrounding Activity : Human, Vehicular & Other Activity  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS 5182  
Sampling Duration : 24 hrs  
Parameter Required : As Per Work Order

S.No.	Parameters	Test Method	Results	Units	Limit as per CPCB
1	Suspended Particulate Matter	IS:5182 (P- 4) :1999 RA.2014	214.68	µg/m <sup>3</sup>	600
2	Mercury (Hg)	Methods of air sampling and analysis,3rd ed.,1988, Method No.317	*BDL(DL-0.001)	µg/m <sup>3</sup>	--

BDL\*(Below Detection Limit)\*\*DL Detection Limit

\*\*\*End of Report\*\*\*

DINESH PALSANIYA

(Checked By)  
QUALITY CONTROL MANAGER

RAJ KUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION

### 4.2 Noise Level Monitoring



**Figure No.4. Plan Showing Noise Level Monitoring Location Map**

#### **Ambient Noise Level Monitoring Locations**

- Location Code: -
- N1- Admin Building
  - N2- Field Hostel
  - N3- Gate-1 Main gate
  - N4- Gate-2 Gaitara Gate
  - N5- Gate-3 Bhatapara
  - N6- Gate-4 Mura Colony
  - N7- Near Weigh Bridge
  - N8- Near OHC



## Test Report

Sample Number : VEL/AN/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  
 Scope of Monitoring : Regulatory Requirement  
 Protocol Used : IS 9989, IS 9876  
 Instrument Used : SLM

Report No. : VEL/N/2106250014/A  
 Format No : 7.8 F-01  
 Party Reference No : NIL  
 Report Date : 05/07/2021  
 Receipt Date : 25/06/2021  
 Sampling Duration : 24 hrs  
 Sample Collected by : VEL Team  
 Instrument : Calibrated  
 Calibration Status

### General Information

Sampling Location : Near Gate No. 1  
 Instrument Code : VEL/JAI/SLM/05  
 Meteorological condition during monitoring : clear Sky  
 Date of Monitoring : 15/06/2021 To 15/06/2021  
 Time of Monitoring : 06.00 to 06.00 Hrs.  
 Ambient Temperature (°C) : Min 23° Max 38°  
 Surrounding Activity : Human, Vehicular & Other Activity  
 Parameter Required : As Per Work Order

S.No.	Test Parameters	Protocol	Test Result dB (A)	
			Day Time	Night Time
1	L max	IS: 9989-1981, IS 9876: 1981	71.5	56.8
2	L min	IS: 9989-1981, IS 9876: 1981	41.2	39.5
3	Leq	IS: 9989-1981, IS 9876: 1981	55.63	45.62

Category of Zones	Leq in dB(A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

- Day Time is from 6.00 AM to 10.00 PM.
  - Night Time is reckoned between 10.00 PM to 6.00 AM
  - Silence Zone is defined as an area up to 100m around premises of Hospitals, Educational Institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones.
- Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

\*\*\*End of Report\*\*\*

**DINAKAR DALSANIYA**  
 (Checked By)  
 DY TECHNICAL MANAGER

**RAJESH KUMAR YADAV**  
 (Authorized Signatory)  
 G M LAB OPERATION



## Test Report

Sample Number : VEL/AN/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  
Scope of Monitoring : Regulatory Requirement  
Protocol Used : IS 9989, IS 9876  
Instrument Used : SLM

Report No. : VEL/N/2106250015/A  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 05/07/2021  
Receipt Date : 25/06/2021  
Sampling Duration : 24 hrs  
Sample Collected by : VEL Team  
Instrument : Calibrated  
Calibration Status

### General Information

Sampling Location : Field Hostel  
Instrument Code : VEL/JAI/SLM/08  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 15/06/2021 To 16/06/2021  
Time of Monitoring : 06:00 to 06:00 Hrs  
Ambient Temperature (°C) : Min 24° Max 39°  
Surrounding Activity : Human, Vehicular & Other Activity  
Parameter Required : As Per Work Order

S.No.	Test Parameters	Protocol	Test Result dB (A)	
			Day Time	Night Time
1	L max	IS: 9989-1981, IS 9876: 1981	67.2	54.3
2	L min	IS: 9989-1981, IS 9876: 1981	40.5	37.7
3	Leq	IS: 9989-1981, IS 9876: 1981	52.32	42.31

Category of Zones	Leq in dB(A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

- Day Time is from 6.00 AM to 10.00 PM.
  - Night Time is reckoned between 10.00 PM to 6.00 AM
  - Silence Zone is defined as an area up to 100m around premises of Hospitals, Educational Institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones
- Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

\*\*\*End of Report\*\*\*

DINESH BALSANIYA  
(Checked By)  
TECHNICAL MANAGER

RAJ KUMAR YADAV  
(Authorized Signatory)  
G M LAB OPERATION



## Test Report

Sample Number : VEL/AN/03

Name & Address of the Party : M/s Raipur Energen Limited  
Formerly GMR Chhattisgarh Energy Ltd. Village:  
Raikheda, Block - Tilda, Dist. Raipur ChhattisgarhSample Description : Ambient Noise  
Scope of Monitoring : Regulatory Requirement  
Protocol Used : IS 9989, IS 9876  
Instrument Used : SLMReport No. : VEL/N/2106250016/A  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 05/07/2021  
Receipt Date : 25/06/2021  
Sampling Duration : 24 hrs  
Sample Collected by : VEL Team  
Instrument : Calibrated  
Calibration Status

### General Information

Sampling Location : Gate No. 2 (Gaitara Gate)  
Instrument Code : VEL/JAI/SLM/07  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 16/06/2021 To 17/06/2021  
Time of Monitoring : 06:00 to 06:00 Hrs.  
Ambient Temperature (°C) : Min 23° Max 40°  
Surrounding Activity : Human, Vehicular & Other Activity  
Parameter Required : As Per Work Order

S.No.	Test Parameters	Protocol	Test Result dB (A)	
			Day Time	Night Time
1	L max	IS: 9989-1981, IS 9876: 1981	71.5	57.8
2	L min	IS: 9989-1981, IS 9876: 1981	43.2	39.1
3	Leq	IS: 9989-1981, IS 9876: 1981	56.84	46.32

Category of Zones	Leq in dB(A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

- Day Time is from 6:00 AM to 10:00 PM.
  - Night Time is reckoned between 10:00 PM to 6:00 AM
  - Silence Zone is defined as an area up to 100m around premises of Hospitals, Educational Institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones.
- Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

\*\*\*End of Report\*\*\*

*Mu*  
(Checked By)  
DINESH PALSANIYA  
TECHNICAL MANAGER

RAJ KUMAR YADAV  
(Authorized Signatory)  
G M LAB OPERATION





## Test Report

Sample Number : VEL/AN/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  
 Scope of Monitoring : Regulatory Requirement  
 Protocol Used : IS 9989| IS 9876  
 Instrument Used : SLM

Report No. : VEL/N/2106250017/A  
 Format No : 7.8 F-01  
 Party Reference No : NIL  
 Report Date : 05/07/2021  
 Receipt Date : 25/06/2021  
 Sampling Duration : 24 hrs  
 Sample Collected by : VEL Team  
 Instrument : Calibrated  
 Calibration Status

**General Information**  
 Sampling Location : Near Weigh Bridge  
 Instrument Code : VEL/JAI/SLM/08  
 Meteorological condition during monitoring : clear Sky  
 Date of Monitoring : 16/06/2021 To 17/06/2021  
 Time of Monitoring : 06.00 to 06.00 Hrs.  
 Ambient Temperature (°C) : Min 23° Max 39°  
 Surrounding Activity : Human, Vehicular & Other Activity  
 Parameter Required : As Per Work Order

S.No.	Test Parameters	Protocol	Test Result dB (A)	
			Day Time	Night Time
1	L max	IS: 9989-1981, IS 9876: 1981	73.6	58.6
2	L min	IS: 9989-1981, IS 9876: 1981	44.2	39.1
3	Leq	IS: 9989-1981, IS 9876: 1981	57.39	43.25

Category of Zones	Leq in dB(A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM  
 2. Night Time is reckoned between 10.00 PM to 6.00 AM  
 3. Silence Zone is defined as an area up to 100m around premises of Hospitals, Educational Institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones.  
 Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

\*\*\*End of Report\*\*\*

DINESH PALSANIYA  
 (Checked By)  
 BY TECHNICAL MANAGER

RAJ KUMAR YADAV  
 (Authorized Signatory)  
 Q M LAB OPERATION



## Test Report

Sample Number : VEL/AN/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  
Scope of Monitoring : Regulatory Requirement  
Protocol Used : IS 9989, IS 9876  
Instrument Used : SLM

Report No. : VEL/N/2106250018/A  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 05/07/2021  
Receipt Date : 25/06/2021  
Sampling Duration : 24 hrs  
Sample Collected by : VEL Team  
Instrument : Calibrated  
Calibration Status

### General Information

Sampling Location : Near Admin Building  
Instrument Code : VEL/JAI/SLM/05  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 17/06/2021 To 18/06/2021  
Time of Monitoring : 06.00 to 06.00 Hrs  
Ambient Temperature (°C) : Min 24° Max 40°  
Surrounding Activity : Human, Vehicular & Other Activity  
Parameter Required : As Per Work Order

S.No.	Test Parameters	Protocol	Test Result dB (A)	
			Day Time	Night Time
1	L max	IS: 9989-1981, IS 9876: 1981	75.3	60.5
2	L min	IS: 9989-1981, IS 9876: 1981	47.6	42.3
3	Leq	IS: 9989-1981, IS 9876: 1981	60.25	48.67

Category of Zones	Leq in dB(A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.  
2. Night Time is reckoned between 10.00 PM to 6.00 AM  
3. SilenceZone is defined as an area up to 100m around premises of Hospitals, Educational Institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones.  
Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

\*\*\*End of Report\*\*\*

DINESH PALSANIYA

(Checked By)

TECHNICAL MANAGER

RAJ KUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION



## Test Report

Sample Number : VEL/AN/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/N/2106250019/A  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 05/07/2021  
Receipt Date : 25/06/2021  
Sampling Duration : 24 hrs  
Sample Collected by : VEL Team  
Instrument : Calibrated  
Calibration Status

Sample Description : Ambient Noise  
Scope of Monitoring : Regulatory Requirement  
Protocol Used : IS 9989, IS 9876  
Instrument Used : SLM

### General Information

Sampling Location : Near Mura Village Gate  
Instrument Code : VEL/JAI/SLM/06  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 17/06/2021 To 18/06/2021  
Time of Monitoring : 06:00 to 06:00 Hrs  
Ambient Temperature (°C) : Min 24° Max 39°  
Surrounding Activity : Human, Vehicular & Other Activity  
Parameter Required : As Per Work Order

S.No.	Test Parameters	Protocol	Test Result dB (A)	
			Day Time	Night Time
1	L max	IS: 9989-1981, IS 9876: 1981	69.5	59.6
2	L min	IS: 9989-1981, IS 9876: 1981	42.1	38.7
3	Leq	IS: 9989-1981, IS 9876: 1981	55.32	45.37

Category of Zones	Leq in dB(A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.  
2. Night Time is reckoned between 10.00 PM to 6.00 AM  
3. Silence Zone is defined as an area up to 100m around premises of Hospitals, Educational Institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones.  
Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

\*\*\*End of Report\*\*\*

DINESH KALSANITA  
Mw  
Checked By MANAGER

RAJ KUMAR YADAV  
(Authorized Signatory)

G M LAB OPERATION



## Test Report

Sample Number : VEL/AN/06

Report No. : VEL/N/2106250020/A

Name &amp; Address of the Party : M/s Raipur Energen Limited

Format No : 7.8 F-01

Village: Raikheda, Block-Tilda Dist: Raipur -493225  
(CG)Talabira Mines

Party Reference No : NIL

Report Date : 05/07/2021

Receipt Date : 25/06/2021

Sample Description : Ambient Noise

Sampling Duration : 24 hrs

Scope of Monitoring : Regulatory Requirement

Sample Collected by : VEL Team

Protocol Used : IS 9989, IS 9876

Instrument : Calibrated

Instrument Used : SLM

Calibration Status

### General Information

Sampling Location : Near OHC  
 Instrument Code : VEL/JAI/SLM/07  
 Meteorological condition during monitoring : clear Sky  
 Date of Monitoring : 18/06/2021 To 19/06/2021  
 Time of Monitoring : 06.00 to 06.00 Hrs.  
 Ambient Temperature (°C) : Min. 22° Max 35°  
 Surrounding Activity : Human, Vehicular & Other Activity  
 Parameter Required : As Per Work Order

S.No.	Test Parameters	Protocol	Test Result dB (A)	
			Day Time	Night Time
1	L max	IS: 9989-1981, IS 9876: 1981	71.3	54.8
2	L min	IS: 9989-1981, IS 9876: 1981	42.6	36.4
3	Leq	IS: 9989-1981, IS 9876: 1981	55.87	44.74

Category of Zones	Leq in dB(A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

- Day Time is from 6.00 AM to 10.00 PM.
  - Night Time is reckoned between 10.00 PM to 6.00 AM
  - SilenceZone is defined as an area up to 100m around premises of Hospitals, Educational institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones.
- Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

\*\*\*End of Report\*\*\*

DINESH PALSANIYA

(Checked By)

DY TECHNICAL MANAGER

RAJ KUMAR SHARMA

(Authorized Signatory)

G M LAB OPERATION



## Test Report

Sample Number : VEL/AN/07

Name & Address of the Party : M/s Raipur Energen Limited  
Formerly GMR Chhattisgarh Energy Ltd. Village  
Raikheda. Block - Tilda, Dist. Raipur ChhattisgarhSample Description : Ambient Noise  
Scope of Monitoring : Regulatory Requirement  
Protocol Used : IS 9989 IS 9876  
Instrument Used : SLM

Report No. : VEL/N/2106250021/A

Format No : 7 B F-01  
Party Reference No : NIL  
Report Date : 05/07/2021  
Receipt Date : 25/06/2021  
Sampling Duration : 24 hrs  
Sample Collected by : VEL Team  
Instrument : Calibrated  
Calibration Status

### General Information

Sampling Location : Gate No. 3 (Bhatapora)  
Instrument Code : VEL/JAI/SLM/08  
Meteorological condition during monitoring : clear Sky  
Date of Monitoring : 18/06/2021 To 19/06/2021  
Time of Monitoring : 06.00 to 06.00 Hrs.  
Ambient Temperature (°C) : Min. 24° Max 40°  
Surrounding Activity : Human, Vehicular & Other Activity  
Parameter Required : As Per Work Order

S.No.	Test Parameters	Protocol	Test Result dB (A)	
			Day Time	Night Time
1	L max	IS: 9989-1981, IS 9876: 1981	66.5	54.6
2	L min	IS: 9989-1981, IS 9876: 1981	40.2	37.1
3	Leq	IS: 9989-1981, IS 9876: 1981	62.74	44.62

Category of Zones	Leq in dB(A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.
  2. Night Time is reckoned between 10.00 PM to 6.00 AM
  3. Silence Zone is defined as an area up to 100m around premises of Hospitals, Educational Institutions and Courts. Use of vehicle horn, loudspeaker and bursting of crackers is banned in these zones
- Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

\*\*\*End of Report\*\*\*

DINESH PALSANIYA

(Checked By)

BY TECHNICAL MANAGER

RAJ KUMAR YADAV  
(Authorized Signatory)

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### 4.3 Ground water Quality Analysis



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

Location Code: -

GW1- Raikheda Village

GW2- Mura Village

GW3- Gaitara Village

GW4- Chicholi Village

GW5- Nr. Field Hostel



## 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 : GROUND WATER  
Location : Village- Craitara Hand Pump Water  
Sample Collected by : VEL Team  
Preservation : Suitable Preservation  
Sampling and Analysis Protocol : IS 10500 -2012

Report No. : VEL/W/2106250028/A  
Format No : 7 8 F-01  
Party Reference No : NIL  
Report Date : 29/06/2021  
Period of Analysis : 25/06/2021-29/06/2021  
Receipt Date : 25/06/2021  
Sampling Date : 15/06/2021  
Sampling Quantity : 2 ltr  
Sampling Type : Grab  
Longitude :  
Latitude :

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	pH	IS 3025 (P-11): 1983 Reaff. 2017	7.46	--	6.5 to 8.5	No Relaxation
2	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	340.00	mg/l	500	2000
3	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	178.48	mg/l	200	600
4	Total Hardness (as CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	216.96	mg/l	200	600
5	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019	3.12	mg/l	45	No Relaxation
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	65.51	mg/l	250	1000
7	Sulphate (as SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	19.42	mg/l	200	400
8	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019	81.52	mg/l	75	200
9	Magnesium (as Mg)	IS: 3025 (Part 46): 1994, Reaff. 2009 (EDTA method)	3.30	mg/l	30	100
10	Fluorides (as F)	APHA 23rd Edition 2017, 4500 FD	0.37	mg/l	1.0	1.5
11	Total Iron (as Fe)	IS 3025(P-53): 2003 Reaffirm 2019	0.20	mg/l	1.0	No Relaxation
12	Arsenic (as As)	APHA (23rd edition-2017), 3114 C	*BDL(**DL-0.005 mg/l)	mg/l	0.01	No Relaxation
13	Copper (as Cu)	APHA 23rd Edition Year 2017 Method No. 3111B	*BDL(**DL-0.02 mg/l)	mg/l	0.05	1.5
14	Zinc (as Zn)	APHA (23rd edition-2017), 3030D, 3113 B	*BDL(**DL-0.20 mg/l)	mg/l	5.0	15
15	Selenium (as Se)	APHA (23rd edition-2017), 3114C	*BDL(**DL-0.005 mg/l)	mg/l	0.01	No Relaxation
16	Turbidity	IS 3025 (Part 10): 1984, Ref: 2017, (Nephelometric Method)	*BDL(**DL 1.0 NTU)	NTU	1	5
17	Aluminium	IS 3025 (Part-55): 2003, Reaff. 2019	*BDL(**DL-0.03 mg/l)	mg/l	0.03	0.2
18	Manganese (as Mn)	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	*BDL(**DL-0.05 mg/l)	mg/l	0.1	0.3
19	Ammonia (as NH <sub>3</sub> )	IS-3025 (Part-34)- 1988, RA. 2019	*BDL(**DL-0.3 mg/l)	mg/l	0.5	No Relaxation

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Note: Terms & conditions refer on backside of test report.

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## Test Report

Sample Number : VEL/W/05

Report No. : VEL/W/2106250028/A

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
20	Boron (as B)	APHA 23rd Edition Year 2017 Method No. 4500B	*BDL(**DL-0.2 mg/l)	mg/l	0.5	1.0
21	Sulphide	IS: 3025 (Part 29): 1986, RA. 2009 Turbidity Method	*BDL(**DL-0.05 mg/l)	mg/l	200	400
22	Phenolic Compound	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.001 mg/l)	mg/l	0.001	0.002
23	Free Residual Chlorine	IS: 3025 (Part 26): 1986 RA 2019	*BDL(**DL-0.2 mg/l)	mg/l	0.2	1

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

VIENDRA KUMAR

\*\*\*End of Report\*\*\*

RAJ KUMAR YADAV

TE (Checked By) Mr NADER

(Authorized Signatory)

G M LAB OPERATION





## 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 : GROUND WATER  
 Location : Village- Craitara Hand Pump Water  
 Sample Collected by : VEL Team  
 Preservation : Suitable Preservation  
 Sampling and Analysis Protocol : IS 10500 -2012

Report No. : VEL/W/2106250028/B  
 Format No : 7.8 F-01  
 Party Reference No : NIL  
 Report Date : 29/06/2021  
 Period of Analysis : 25/06/2021-29/06/2021  
 Receipt Date : 25/06/2021  
 Sampling Date : 15/06/2021  
 Sampling Quantity : 2 ltr  
 Sampling Type : Grab  
 Longitude :  
 Latitude :

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	Total Coliform (By MPN Method)	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	NA
2	E-Coli	IS:1622	Absent	per 100 ml	Absent/100 ml	Absent/100 ml
3	Cyanide (as CN)	APHA 23rd Edition 2017, 4500CN D	*BDL(**DL-0.05 mg/l)	mg/l	0.05	No Relaxation
4	Colour	IS 3025: 1983 (P-4) RA.. 2017	*BDL(**DL 1.0 Hazen)	Hazen Unit	5	15
5	Odour	IS 3025 (P-5): RA. 2018	Agreeable	Qualitative	Agreeable	Agreeable
6	Taste	IS 3025(P-8):1984 RA. 2017	Agreeable	Qualitative	Agreeable	Agreeable
7	Anionic Surface Active Agent	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05 mg/l)	mg/l	0.2	1.0
8	Mineral Oil	IS 3025(P-39)	*BDL(**DL-0.05 mg/l)	mg/l	0.5	No Relaxation
9	Barium as (Ba)	APHA3111B	*BDL(**DL-0.02 mg/l)	mg/l	0.7	No Relaxation
10	Faecal Caliform	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	

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TECHNICAL MANAGER

RAJKUMAR YADAV

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## Test Report

Sample Number VFL/W/01

Report No

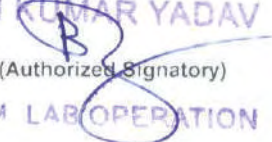
VLL/W/1106250078/B

\*BDL-Below Detection Limit, \*DL-Detection Limit

VIHENDRA KUMAR

Client Name

  
(Checked By)  
TECHNICAL MANAGER

RAJ KUMAR YADAV  
  
(Authorized Signatory)  
C.M. LAB OPERATION



## 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 : GROUND WATER  
Location : Village- Raikheda Tap Water  
Sample Collected by : VEL Team  
Preservation : Suitable Preservation  
Sampling and Analysis Protocol : IS 10500 -2012

Report No. : VEL/W/2106250029/A  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 29/06/2021  
Period of Analysis : 25/06/2021-29/06/2021  
Receipt Date : 25/06/2021  
Sampling Date : 18/06/2021  
Sampling Quantity : 2 ltr.  
Sampling Type : Grab  
Longitude :  
Latitude :

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	pH	IS 3025 (P-11): 1983 Reaff. 2017	7.41	--	6.5 to 8.5	No Relaxation
2	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	321.00	mg/l	500	2000
3	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	201.76	mg/l	200	600
4	Total Hardness (as CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	239.56	mg/l	200	600
5	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019	3.24	mg/l	45	No Relaxation
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	59.60	mg/l	250	1000
7	Sulphate (as SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	16.35	mg/l	200	400
8	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019	83.33	mg/l	75	200
9	Magnesium (as Mg)	IS: 3025 (Part 46): 1994, Reaff. 2009 (EDTA method)	7.70	mg/l	30	100
10	Fluorides (as F)	APHA 23rd Edition 2017, 4500 FD	0.32	mg/l	1.0	1.5
11	Total Iron (as Fe)	IS 3025(P-53): 2003 Reaffirm 2019	0.14	mg/l	1.0	No Relaxation
12	Arsenic (as As)	APHA (23rd edition-2017), 3114 C	*BDL(**DL-0.005 mg/l)	mg/l	0.01	No Relaxation
13	Copper (as Cu)	APHA 23rd Edition Year 2017 Method No. 3111B	*BDL(**DL-0.02 mg/l)	mg/l	0.05	1.5
14	Zinc (as Zn)	APHA (23rd edition-2017), 3030D, 3113 B	*BDL(**DL-0.20 mg/l)	mg/l	5.0	15
15	Selenium (as Se)	APHA (23rd edition-2017), 3114C	*BDL(**DL-0.005 mg/l)	mg/l	0.01	No Relaxation
16	Turbidity	IS 3025 (Part 10): 1984, Ref: 2017, (Nephelometric Method)	*BDL(**DL 1.0 NTU)	NTU	1	5
17	Aluminium	IS 3025 (Part-55): 2003, Reaff. 2019	*BDL(**DL-0.03 mg/l)	mg/l	0.03	0.2
18	Manganese (as Mn)	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	*BDL(**DL-0.05 mg/l)	mg/l	0.1	0.3
19	Ammonia (as NH <sub>3</sub> )	IS-3025 (Part-34)- 1988, RA. 2019	*BDL(**DL-0.3 mg/l)	mg/l	0.5	No Relaxation



## Test Report

Sample Number : VEL/W/06

Report No. : VEL/W/2106250029/A

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
20	Boron (as B)	APHA 23rd Edition Year 2017 Method No. 4500B	*BDL(**DL-0.2 mg/l)	mg/l	0.5	1.0
21	Sulphide	IS: 3025 (Part 29): 1986, RA. 2009 Turbidity Method	*BDL(**DL-0.05 mg/l)	mg/l	200	400
22	Phenolic Compound	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.001 mg/l)	mg/l	0.001	0.002
23	Free Residual Chlorine	IS: 3025 (Part 26): 1986 RA 2019	*BDL(**DL-0.2 mg/l)	mg/l	0.2	1

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

\*\*\*End of Report\*\*\*

VIENDRA KUMAR

(Checked By)

TECHNICAL MANAGER

RAJ KUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION



## 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 : GROUND WATER  
 Location : Village- Raikheda Tap Water  
 Sample Collected by : VEL Team  
 Preservation : Suitable Preservation  
 Sampling and Analysis Protocol : IS 10500 -2012

Report No. : VEL/W/2106250029/B  
 Format No : 7.8 F-01  
 Party Reference No : NIL  
 Report Date : 29/06/2021  
 Period of Analysis : 25/06/2021-29/06/2021  
 Receipt Date : 25/06/2021  
 Sampling Date : 18/06/2021  
 Sampling Quantity : 2 ltr  
 Sampling Type : Grab  
 Longitude :  
 Latitude :

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	Total Coliform (By MPN Method)	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	NA
2	E-Coli	IS:1622	Absent	per 100 ml	Absent/100 ml	Absent/100 ml
3	Cyanide (as CN)	APHA 23rd Edition 2017, 4500CN D	*BDL(**DL-0.05 mg/l)	mg/l	0.05	No Relaxation
4	Colour	IS 3025: 1983 (P-4) RA., 2017	*BDL(**DL 1.0 Hazen)	Hazen Unit	5	15
5	Odour	IS 3025 (P-5): RA, 2018	Agreeable	Qualitative	Agreeable	Agreeable
6	Taste	IS 3025(P-8):1984 RA, 2017	Agreeable	Qualitative	Agreeable	Agreeable
7	Anionic Surface Active Agent	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05 mg/l)	mg/l	0.2	1.0
8	Mineral Oil	IS 3025(P-39)	*BDL(**DL-0.05 mg/l)	mg/l	0.5	No Relaxation
9	Barium as (Ba)	APHA3111B	*BDL(**DL-0.02 mg/l)	mg/l	0.7	No Relaxation
10	Faecal Caliform	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	

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TECHNICAL MANAGER

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G M LAB OPERATION

Page No. 1/2



## Test Report

Sample Number VEL/W/20

Report No

VEL/W/210675002018

\*BDL-Below Detection Limit, \*\*DL-Detectable Limit

VIHENDRA KUMAR

Technical Manager

TECHNICAL MANAGER

RAJKUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION



## 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 : GROUND WATER  
 Location : Village- Chicholi Hand Pump Water  
 Sample Collected by : VEL Team  
 Preservation : Suitable Preservation  
 Sampling and Analysis Protocol : IS 10500 -2012

Report No. : VEL/W/2106250030/A  
 Format No : 7.8 F-01  
 Party Reference No : NIL  
 Report Date : 29/06/2021  
 Period of Analysis : 25/06/2021-29/06/2021  
 Receipt Date : 25/06/2021  
 Sampling Date : 18/06/2021  
 Sampling Quantity : 2 ltr  
 Sampling Type : Grab  
 Longitude :  
 Latitude :

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	pH	IS 3025 (P-11): 1983 Reaff. 2017	7.49	--	6.5 to 8.5	No Relaxation
2	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	314.00	mg/l	500	2000
3	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	190.12	mg/l	200	600
4	Total Hardness (as CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	198.88	mg/l	200	600
5	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019	2.30	mg/l	45	No Relaxation
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	57.57	mg/l	250	1000
7	Sulphate (as SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	17.31	mg/l	200	400
8	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019	68.84	mg/l	75	200
9	Magnesium (as Mg)	IS: 3025 (Part 46): 1994, Reaff. 2009 (EDTA method)	6.59	mg/l	30	100
10	Fluorides (as F)	APHA 23rd Edition 2017, 4500 FD	0.32	mg/l	1.0	1.5
11	Total Iron (as Fe)	IS 3025(P-53): 2003 Reaffirm 2019	0.14	mg/l	1.0	No Relaxation
12	Arsenic (as As)	APHA (23rd edition-2017), 3114 C	*BDL(**DL-0.005 mg/l)	mg/l	0.01	No Relaxation
13	Copper (as Cu)	APHA 23rd Edition Year 2017 Method No. 3111B	*BDL(**DL-0.02 mg/l)	mg/l	0.05	1.5
14	Zinc (as Zn)	APHA (23rd edition-2017), 3030D, 3113 B	*BDL(**DL-0.20 mg/l)	mg/l	5.0	15
15	Selenium (as Se)	APHA (23rd edition-2017), 3114C	*BDL(**DL-0.005 mg/l)	mg/l	0.01	No Relaxation
16	Turbidity	IS 3025 (Part 10): 1984, Ref: 2017, (Nephelometric Method)	*BDL(**DL 1.0 NTU)	NTU	1	5
17	Aluminium	IS 3025 (Part-55): 2003, Reaff. 2019	*BDL(**DL-0.03 mg/l)	mg/l	0.03	0.2
18	Manganese (as Mn)	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	*BDL(**DL-0.05 mg/l)	mg/l	0.1	0.3
19	Ammonia (as NH <sub>3</sub> )	IS: 3025 (Part-34)- 1988, RA. 2019	*BDL(**DL-0.3 mg/l)	mg/l	0.5	No Relaxation



## Test Report

Sample Number : VEL/W/07

Report No. : VEL/W/2106250030/A

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
20	Boron (as B)	APHA 23rd Edition Year 2017 Method No. 4500B	*BDL(**DL-0.2 mg/l)	mg/l	0.5	1.0
21	Sulphide	IS: 3025 (Part 29): 1986, RA. 2009 Turbidity Method	*BDL(**DL-0.05 mg/l)	mg/l	200	400
22	Phenolic Compound	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.001 mg/l)	mg/l	0.001	0.002
23	Free Residual Chlorine	IS: 3025 (Part 26): 1986 RA 2019	*BDL(**DL-0.2 mg/l)	mg/l	0.2	1

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

\*\*\*End of Report\*\*\*

VIJENDRA KUMAR

(Checked By)

TECHNICAL MANAGER

RAJ KUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION





## Test Report

Sample Number : VELW/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 : GROUND WATER  
 Location : Village- Chicholi Hand Pump Water  
 Sample Collected by : VEL Team  
 Preservation : Suitable Preservation  
 Sampling and Analysis Protocol : IS 10500 -2012

Report No. : VEL/W/2106250030/B  
 Format No : 7 8 F-01  
 Party Reference No : NIL  
 Report Date : 29/06/2021  
 Period of Analysis : 25/06/2021-29/06/2021  
 Receipt Date : 25/06/2021  
 Sampling Date : 18/06/2021  
 Sampling Quantity : 2 ltr.  
 Sampling Type : Grab  
 Longitude :  
 Latitude :

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	Total Coliform (By MPN Method)	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	NA
2	E-Coli	IS:1622	Absent	per 100 ml	Absent/100 ml	Absent/100 ml
3	Cyanide (as CN)	APHA 23rd Edition 2017, 4500CN D	*BDL(**DL-0.05 mg/l)	mg/l	0.05	No Relaxation
4	Colour	IS 3025: 1983 (P-4) RA.. 2017	*BDL(**DL 1.0 Hazen)	Hazen Unit	5	15
5	Qdour	IS 3025 (P-5): RA. 2018	Agreeable	Qualitative	Agreeable	Agreeable
6	Taste	IS 3025(P-8):1984 RA. 2017	Agreeable	Qualitative	Agreeable	Agreeable
7	Anionic Surface Active Agent	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05 mg/l)	mg/l	0.2	1.0
8	Mineral Oil	IS 3025(P-39)	*BDL(**DL-0.05 mg/l)	mg/l	0.5	No Relaxation
9	Barium as (Ba)	APHA3111B	*BDL(**DL-0.02 mg/l)	mg/l	0.7	No Relaxation
10	Faecal Caliform	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	

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RAJ KUMAR YADAV  
  
 G M LAB OPERATOR  
 Page No. 1/2



## Test Report

Sample Number : VEL/W/17

Report No

VEL/W/210625/11008

\*BDL-Below Detection Limit\* ND, Detection Limit

\*\*\*End of Report\*\*\*

**VIJENDRA KUMAR**

(Checked By)

**TECHNICAL MANAGER**

**RAJ KUMAR YADAV**

(Authorized Signatory)

**G M LAB OPERATION**



## 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

Report No. : VEL/W/2106250031/A  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 29/06/2021  
Period of Analysis : 25/06/2021-29/06/2021  
Receipt Date : 25/06/2021  
Sampling Date : 18/06/2021  
Sampling Quantity : 2 ltr  
Sampling Type : Grab  
Longitude :  
Latitude :

Sample Description : GROUND WATER  
Location : Near Field Hostel  
Sample Collected by : VEL Team  
Preservation : Suitable Preservation  
Sampling and Analysis Protocol : IS 10500 -2012

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	pH	IS 3025 (P-11): 1983 Reaff. 2017	7.43	--	6.5 to 8.5	No Relaxation
2	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	291.00	mg/l	500	2000
3	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	170.72	mg/l	200	600
4	Total Hardness (as CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	171.76	mg/l	200	600
5	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019	2.22	mg/l	45	No Relaxation
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	69.48	mg/l	250	1000
7	Sulphate (as SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	17.12	mg/l	200	400
8	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019	54.35	mg/l	75	200
9	Magnesium (as Mg)	IS: 3025 (Part 46): 1994, Reaff. 2009 (EDTA method)	8.79	mg/l	30	100
10	Fluorides (as F)	APHA 23rd Edition 2017, 4500 FD	0.28	mg/l	1.0	1.5
11	Total Iron (as Fe)	IS 3025(P-53): 2003 Reaffirm 2019	0.16	mg/l	1.0	No Relaxation
12	Arsenic (as As)	APHA (23rd edition-2017), 3114 C	*BDL(**DL-0.005 mg/l)	mg/l	0.01	No Relaxation
13	Copper (as Cu)	APHA 23rd Edition Year 2017 Method No. 3111B	*BDL(**DL-0.02 mg/l)	mg/l	0.05	1.5
14	Zinc (as Zn)	APHA (23rd edition-2017), 3030D, 3113 B	*BDL(**DL-0.20 mg/l)	mg/l	5.0	15
15	Selenium (as Se)	APHA (23rd edition-2017), 3114C	*BDL(**DL-0.005 mg/l)	mg/l	0.01	No Relaxation
16	Turbidity	IS 3025 (Part 10): 1984, Ref: 2017, (Nephelometric Method)	*BDL(**DL 1.0 NTU)	NTU	1	5
17	Aluminium	IS 3025 (Part-55): 2003, Reaff. 2019	*BDL(**DL-0.03 mg/l)	mg/l	0.03	0.2
18	Manganese (as Mn)	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	*BDL(**DL-0.05 mg/l)	mg/l	0.1	0.3
19	Ammonia (as NH <sub>3</sub> )	IS-3025 (Part-34)- 1988, RA. 2019	*BDL(**DL-0.3 mg/l)	mg/l	0.5	No Relaxation

VIJENDRA KUMAR



## Test Report

Sample Number : VELW/08

Report No. : VEL/W/2108250031/A

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
20	Boron (as B)	APHA 23rd Edition Year 2017 Method No. 4500B	*BDL(**DL-0.2 mg/l)	mg/l	0.5	1.0
21	Sulphide	IS: 3025 (Part 29): 1986, RA. 2009 Turbidity Method	*BDL(**DL-0.05 mg/l)	mg/l	200	400
22	Phenolic Compound	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.001 mg/l)	mg/l	0.001	0.002
23	Free Residual Chlorine	IS: 3025 (Part 26): 1986 RA 2019	*BDL(**DL-0.2 mg/l)	mg/l	0.2	1

\*BDL-Below Detection Limit, \*\*DL-Detection Limit.

\*\*\*End of Report\*\*\*

VIHENDRA KUMAR

(Checked By)

TECHNICAL MANAGER

RAJ KUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION



## 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

Report No. : VEL/W/2106250031/B  
Format No : 7 8 F-01  
Party Reference No : NIL  
Report Date : 29/06/2021  
Period of Analysis : 25/06/2021-29/06/2021  
Receipt Date : 25/06/2021  
Sampling Date : 18/06/2021  
Sampling Quantity : 2 ltr.  
Sampling Type : Grab  
Longitude :  
Latitude :

Sample Description : GROUND WATER  
Location : Near Field Hostal  
Sample Collected by : VEL Team  
Preservation : Suitable Preservation  
Sampling and Analysis Protocol : IS 10500 -2012

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	Total Coliform (By MPN Method)	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	NA
2	E-Coli	IS:1622	Absent	per 100 ml	Absent/100 ml	Absent/100 ml
3	Cyanide (as CN)	APHA 23rd Edition 2017, 4500CN D	*DDL(**DL-0.05 mg/l)	mg/l	0.05	No Relaxation
4	Colour	IS 3025: 1983 (P-4) RA. 2017	*BDL(**DL 1.0 Hazen)	Hazen Unit	5	15
5	Odour	IS 3025 (P-5); RA. 2018	Agreeable	Qualitative	Agreeable	Agreeable
6	Taste	IS 3025(P-8);1984 RA. 2017	Agreeable	Qualitative	Agreeable	Agreeable
7	Anionic Surface Active Agent	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05 mg/l)	mg/l	0.2	1.0
8	Mineral Oil	IS 3025(P-39)	*BDL(**DL-0.05 mg/l)	mg/l	0.5	No Relaxation
9	Barium as (Ba)	APHA3111B	*BDL(**DL-0.02 mg/l)	mg/l	0.7	No Relaxation
10	Faecal Coliform	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	

VIKENDRA KUMAR

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RAJKUMAR YADAV  
G M LAB OPERATION  
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## Test Report

Sample Number : VLEW006

Report No. : VFI-WP1062500311B

\*BDL-below Detection Limit \*\*DL-Detection Limit

Method used:ppm

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RAJ KUMAR YADAV

(Authorized Signatory)

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## 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/2106250032/A  
Format No : 7 8 F-01  
Party Reference No : NIL  
Report Date : 29/06/2021  
Period of Analysis : 25/06/2021-29/06/2021  
Receipt Date : 25/06/2021  
Sampling Date : 18/06/2021  
Sampling Quantity : 2 ltr.  
Sampling Type : Grab  
Longitude :  
Latitude :

Sample Description : GROUND WATER  
Location : Village - Mura Hand Pump Water  
Sample Collected by : VEL Team  
Preservation : Suitable Preservation  
Sampling and Analysis Protocol : IS 10500 -2012

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	pH	IS 3025 (P-11): 1983 Reaff. 2017	7.52	--	6.5 to 8.5	No Relaxation
2	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	310.00	mg/l	500	2000
3	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	166.84	mg/l	200	600
4	Total Hardness (as CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	185.32	mg/l	200	600
5	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019	2.20	mg/l	45	No Relaxation
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	79.41	mg/l	250	1000
7	Sulphate (as SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	19.81	mg/l	200	400
8	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019	56.16	mg/l	75	200
9	Magnesium (as Mg)	IS: 3025 (Part 46): 1994, Reaff. 2009 (EDTA method)	10.91	mg/l	30	100
10	Fluorides (as F)	APHA 23rd Edition 2017, 4500 FD	0.27	mg/l	1.0	1.5
11	Total Iron (as Fe)	IS 3025(P-53): 2003 Reaffirm 2019	0.16	mg/l	1.0	No Relaxation
12	Arsenic (as As)	APHA (23rd edition-2017), 3114 C	*BDL(**DL-0.005 mg/l)	mg/l	0.01	No Relaxation
13	Copper (as Cu)	APHA 23rd Edition Year 2017 Method No. 3111B	*BDL(**DL-0.02 mg/l)	mg/l	0.05	1.5
14	Zinc (as Zn)	APHA (23rd edition-2017), 3030D, 3113 B	*BDL(**DL-0.20 mg/l)	mg/l	5.0	15
15	Selenium (as Se)	APHA (23rd edition-2017), 3114C	*BDL(**DL-0.005 mg/l)	mg/l	0.01	No Relaxation
16	Turbidity	IS 3025 (Part 10): 1984, Ref: 2017, (Nephelometric Method)	*BDL(**DL 1.0 NTU)	NTU	1	5
17	Aluminium	IS 3025 (Part-55): 2003, Reaff. 2019	*BDL(**DL-0.03 mg/l)	mg/l	0.03	0.2
18	Manganese (as Mn)	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	*BDL(**DL-0.05 mg/l)	mg/l	0.1	0.3
19	Ammonia (as NH <sub>3</sub> )	IS-3025 (Part-34)- 1988, RA. 2019	*BDL(**DL-0.3 mg/l)	mg/l	0.5	No Relaxation



## Test Report

Sample Number : VELW/09

Report No. : VELW/2106250032/A

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
20	Boron (as B)	APHA 23rd Edition Year 2017 Method No. 4500B	*BDL(**DL-0.2 mg/l)	mg/l	0.5	1.0
21	Sulphide	IS: 3025 (Part 29): 1986, RA. 2009 Turbidity Method	*BDL(**DL-0.05 mg/l)	mg/l	200	400
22	Phenolic Compound	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.001 mg/l)	mg/l	0.001	0.002
23	Free Residual Chlorine	IS: 3025 (Part 26): 1986 RA 2019	*BDL(**DL-0.2 mg/l)	mg/l	0.2	1

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

\*\*\*End of Report\*\*\*

**VIENDRA KUMAR**  
(Checked By)  
TECHNICAL MANAGER

**RAJ KUMAR YADAV**  
(Authorized Signatory)  
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## 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/2106250032/B  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 29/06/2021  
Period of Analysis : 25/06/2021-29/06/2021  
Receipt Date : 25/06/2021  
Sampling Date : 18/06/2021  
Sampling Quantity : 2 ltr  
Sampling Type : Grab  
Longitude :  
Latitude :

Sample Description : GROUND WATER  
Location : Village - Mura Hand Pump Water  
Sample Collected by : VEL Team  
Preservation : Suitable Preservation  
Sampling and Analysis Protocol : IS 10500 -2012

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	Total Coliform (By MPN Method)	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	NA
2	E-Coli	IS:1622	Absent	per 100 ml	Absent/100 ml	Absent/100 ml
3	Cyanide (as CN)	APHA 23rd Edition 2017, 4500CN D	*BDL(**DL-0.05 mg/l)	mg/l	0.05	No Relaxation
4	Colour	IS 3025: 1983 (P-4) RA. 2017	*BDL(**DL 1.0 Hazen)	Hazen Unit	5	15
5	Odour	IS 3025 (P-5): RA. 2018	Agreeable	Qualitative	Agreeable	Agreeable
6	Taste	IS 3025(P-8):1984 RA. 2017	Agreeable	Qualitative	Agreeable	Agreeable
7	Anionic Surface Active Agent	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05 mg/l)	mg/l	0.2	1.0
8	Mineral Oil	IS 3025(P-39)	*BDL(**DL-0.05 mg/l)	mg/l	0.5	No Relaxation
9	Barium as (Ba)	APHA3111B	*BDL(**DL-0.02 mg/l)	mg/l	0.7	No Relaxation
10	Faecal Caliform	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	

VIHENDRA KUMAR

  
TECHNICAL MANAGER

RAJ KUMAR YADAV

  
G.M. LAB OPERATOR



## Test Report

Sample Number : VLL/W/19

Report No. : VLL/W/21062500321B

\*BDL Below Detection Limit \*NDL Not Determined

VIHENDRA KUMAR

(Checked By)

TECHNICAL MANAGER

1. Field Analyst

RAJ KUMAR YADAV

(Authorized Signatory)

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#### 4.4 Surface water Quality Analysis



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

Location Code: - SW1. Raikheda Talab

SW2. Bangoli Dam

SW3. Mura Talab

SW4. Chhicholi Talab



## 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  
 Name of the Project :  
 Sample Description : SURFACE WATER  
 Location : Village - Raikheda (Pond Water)  
 Sample Collected by : VEL Team  
 Parameter Required : As Per Work Order  
 Sampling and Analysis Protocol : IS 2296

Report No. : VEL/W/2106250024/A  
 Format No : 7.B F-01  
 Party Reference No : NIL  
 Report Date : 29/06/2021  
 Period of Analysis : 25/06/2021-29/06/2021  
 Receipt Date : 25/06/2021  
 Sampling Date : 15/06/2021  
 Sampling Quantity : 2 ltr  
 Sampling Type : Grab  
 Preservation : Suitable Preservation

Dispatched Quantity : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	pH value	IS 3025 (P-11): 1983 Reaff. 2017	7.19	--
2	Turbidity	IS 3025 (Part 10): 1984, Reaff. 2017, (Nephelometric Method)	3.00	NTU
3	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	177.00	mg/l
4	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	49.63	mg/l
5	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	89.24	mg/l
6	Total Hardness (CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	85.88	mg/l
7	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019 (EDTA method)	30.80	mg/l
8	Magnesium	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	2.20	mg/l
9	Fluoride ( as F)	APHA 23rd Edition 2017, 4500FD	0.27	mg/l
10	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019 (Chromotropic Method)	1.51	mg/l
11	Phenolic compounds	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.1 mg/l)	mg/l
12	Dissolved oxygen	IS : 3025 (Part-38) : 1989, Ref: 2019	5.4	mg/l
13	Biochemical Oxygen Demand (BOD) ( 3 days at 27°C)	IS: 3025 (Part-44): 1993, Ref: 2019	3.00	mg/l
14	Chemical Oxygen Demand (COD)	IS : 3025 (Part 58) : 2006ref: 2017	16.68	mg/l
15	Zinc as (Zn)	APHA (23rd edition), 3030D,3113B	*BDL(**DL-0.20 mg/l)	mg/l
16	Copper (Cu)	APHA (23rd edition), 3111B	*BDL(**DL-0.02 mg/l)	mg/l
17	Lead as Pb	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.005 mg/l)	mg/l

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Note: Terms & conditions refer on backside of test report.

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## Test Report

Sample Number : VEL/W/01

Report No. : VEL/W/2106250024/A

S.No.	Test Parameters	Test Method	Results	Units
18	Arsenic as As	APHA (23rd edition), 3030D,3114C, 2017	*BDL(**DL-0.005 mg/l)	mg/l
19	Boron	APHA (23rd edition) 4500B, 2017	*BDL(**DL-0.2 mg/l)	mg/l
20	Chromium as Cr	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.02 mg/l)	mg/l
21	Cadmium as Cd	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.002 mg/l)	mg/l
22	Selenium as Se	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.005 mg/l)	mg/l
23	Mercury as Hg	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.0005 mg/l)	mg/l
24	Sulphate as (SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	9.23	mg/l
25	Iron	IS:3025(P-53):2003,RA.2019:2003	0.14	mg/l
26	Manganese as Mn	APHA3111B	*BDL(**DL-0.05 mg/l)	mg/l

\*BDL-Below Detection Limit, \*\*DL-Detection Limit.

\*\*\*End of Report\*\*\*

**VIJENDRA KUMAR**  
(Checked By)  
TECHNICAL MANAGER

**RAJ KUMAR YADAV**  
(Authorized Signatory)  
G M LAB OPERATION



## 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  
Name of the Project :  
Sample Description : SURFACE WATER  
Location : Village - Raikheda (Pond Water)  
Sample Collected by : VEL Team  
Parameter Required : As Per Work Order  
Sampling and Analysis Protocol : IS 2296

Report No. : VEL/W/2106250024/B  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 29/06/2021  
Period of Analysis : 25/06/2021-29/06/2021  
Receipt Date : 25/06/2021  
Sampling Date : 15/06/2021  
Sampling Quantity : 2 ltr  
Sampling Type : Grab  
Preservation : Suitable Preservation

Dispatched Quantity : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	Colour	IS 3025: 1987 (P-4) Reaff. 2017	*BDL(**DL 1.0 Hazen)	Hazen
2	Odour	IS 3025 (P-5) : 2018	Agreeable	--
3	Anionic Surface active agents (as MBAS)	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05 mg/l)	mg/l
4	Residual Free Chlorine	IS:3025(P-26):1986,RA:2019:1986	*BDL(**DL-0.2 mg/l)	mg/l
5	Cyanide as CN	APHA 4500 CN -D	*BDL(**DL-0.05 mg/l)	mg/l
6	Aluminium as Al	IS 3025 (P-55) 2003, RA 2019	*BDL(**DL-0.03 mg/l)	mg/l
7	O & G	IS 3025 (P-39) 1991, RA 2019	*BDL(**DL-0.5 mg/l)	mg/l

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

\*\*\*End of Report\*\*\*

**VINEENDRA KUMAR**

(Checked By)

**TECHNICAL MANAGER**

**RAJ KUMAR YADAV**

(Authorized Signatory)

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## 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

Name of the Project :

Sample Description : SURFACE WATER

Location : Village - Chicholi (Pond Water)

Sample Collected by : VEL Team

Parameter Required : As Per Work Order

Sampling and Analysis Protocol : IS 2296

Report No. : VEL/W/2106250025/A

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 29/06/2021

Period of Analysis : 25/06/2021-29/06/2021

Receipt Date : 25/06/2021

Sampling Date : 18/06/2021

Sampling Quantity : 2 ltr

Sampling Type : Grab

Preservation : Suitable Preservation

Dispatched Quantity : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	pH value	IS 3025 (P-11): 1983 Reaff. 2017	7.35	--
2	Turbidity	IS 3025 (Part 10): 1984, Reaff: 2017, (Nephelometric Method)	2.00	NTU
3	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	256.00	mg/l
4	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	75.44	mg/l
5	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	135.80	mg/l
6	Total Hardness (CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	153.68	mg/l
7	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019 (EDTA method)	45.29	mg/l
8	Magnesium	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	9.90	mg/l
9	Fluoride ( as F)	APHA 23rd Edition 2017, 4500FD	0.33	mg/l
10	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019 (Chromotropic Method)	6.06	mg/l
11	Phenolic compounds	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.1 mg/l)	mg/l
12	Dissolved oxygen	IS : 3025 (Part-38) : 1989, Ref: 2019	5.2	mg/l
13	Biochemical Oxygen Demand (BOD) ( 3 days at 27°C)	IS : 3025 (Part-44): 1993, Ref: 2019	10.50	mg/l
14	Chemical Oxygen Demand (COD)	IS : 3025 (Part 58) : 2006fef: 2017	31.28	mg/l
15	Zinc as (Zn)	APHA (23rd edition), 3030D,3113B	*BDL(**DL-0.20 mg/l)	mg/l
16	Copper (Cu)	APHA (23rd edition), 3111B	*BDL(**DL-0.02 mg/l)	mg/l
17	Lead as Pb	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.005 mg/l)	mg/l

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## Test Report

Sample Number : VEL/W/02

Report No.

: VEL/W/2106250025/A

S.No.	Test Parameters	Test Method	Results	Units
18	Arsenic as As	APHA (23rd edition), 3030D,3114C, 2017	*BDL(**DL-0.005 mg/l)	mg/l
19	Boron	APHA (23rd edition) 4500B, 2017	*BDL(**DL-0.2 mg/l)	mg/l
20	Chromium as Cr	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.02 mg/l)	mg/l
21	Cadmium as Cd	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.002 mg/l)	mg/l
22	Selenium as Se	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.005 mg/l)	mg/l
23	Mercury as Hg	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.0005 mg/l)	mg/l
24	Sulphate as (SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	15.80	mg/l
25	Iron	IS:3025(P-53):2003,RA.2019:2003	0.23	mg/l
26	Manganese as Mn	APHA3111B	*BDL(**DL-0.05 mg/l)	mg/l

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

\*\*\*End of Report\*\*\*

VI  ENDRAKUMAR  
(Checked By)

TECHNICAL MANAGER

RAJ KUMAR YADAV

  
(Authorized Signatory)

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## 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

Name of the Project :

Sample Description : SURFACE WATER

Location : Village - Chicholi (Pond Water)

Sample Collected by : VEL Team

Parameter Required : As Per Work Order

Sampling and Analysis Protocol : IS 2296

Report No. : VEL/W/2106250025/B

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 29/06/2021

Period of Analysis : 25/06/2021-29/06/2021

Receipt Date : 25/06/2021

Sampling Date : 18/06/2021

Sampling Quantity : 2 ltr

Sampling Type : Grab

Preservation : Suitable Preservation

Dispatched Quantity : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	Colour	IS 3025: 1987 (P-4) Reaff.2017	*BDL(**DL 1.0 Hazen)	Hazen
2	Odour	IS 3025 (P-5) : 2018	Agreeable	--
3	Anionic Surface active agents (as MBAS)	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05 mg/l)	mg/l
4	Residual Free Chlorine	IS:3025(P-26):1986,RA:2019:1986	*BDL(**DL-0.2 mg/l)	mg/l
5	Cyanide as CN	APHA 4500 CN -D	*BDL(**DL-0.05 mg/l)	mg/l
6	Aluminium as Al	IS 3025 (P-55) 2003, RA 2019	*BDL(**DL-0.03 mg/l)	mg/l
7	O & G	IS 3025 (P-39) 1991, RA 2019	*BDL(**DL-0.5 mg/l)	mg/l

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

\*\*\*End of Report\*\*\*

VIJENDRA KUMAR

(Checked By)

TECHNICAL MANAGER

RAJ KUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION



## 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  
 Name of the Project :  
 Sample Description : SURFACE WATER  
 Location : Bangoli Dam  
 Sample Collected by : VEL Team  
 Parameter Required : As Per Work Order  
 Sampling and Analysis Protocol : IS 2296

Report No. : VEL/W/2106250026/A  
 Format No : 7.8 F-01  
 Party Reference No : NIL  
 Report Date : 29/06/2021  
 Period of Analysis : 25/06/2021-29/06/2021  
 Receipt Date : 25/06/2021  
 Sampling Date : 18/06/2021  
 Sampling Quantity : 2 ltr.  
 Sampling Type : Grab  
 Preservation : Suitable Preservation

Dispatched Quantity : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	pH value	IS 3025 (P-11): 1983 Reaff. 2017	7.20	--
2	Turbidity	IS 3025 (Part 10): 1984, Reaff. 2017, (Nephelometric Method)	2.00	NTU
3	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	172.00	mg/l
4	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	65.51	mg/l
5	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	124.16	mg/l
6	Total Hardness (CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	162.72	mg/l
7	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019 (EDTA method)	48.91	mg/l
8	Magnesium	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	9.90	mg/l
9	Fluoride ( as F)	APHA 23rd Edition 2017, 4500FD	0.35	mg/l
10	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019 (Chromotropic Method)	6.13	mg/l
11	Phenolic compounds	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.1 mg/l)	mg/l
12	Dissolved oxygen	IS : 3025 (Part-38) : 1989, Ref: 2019	5.04	mg/l
13	Biochemical Oxygen Demand (BOD) ( 3 days at 27°C)	IS: 3025 (Part-44): 1993, Ref: 2019	12.00	mg/l
14	Chemical Oxygen Demand (COD)	IS : 3025 (Part 58) : 2006fef: 2017	28.20	mg/l
15	Zinc as (Zn)	APHA (23rd edition), 3030D,3113B	*BDL(**DL-0.20 mg/l)	mg/l
16	Copper (Cu)	APHA (23rd edition), 3111B	*BDL(**DL-0.02 mg/l)	mg/l
17	Lead as Pb	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.005 mg/l)	mg/l



## Test Report

Sample Number : VEL/W/03


Report No. : VEL/W/2106250026/A

S.No.	Test Parameters	Test Method	Results	Units
18	Arsenic as As	APHA (23rd edition), 3030D,3114C, 2017	*BDL(**DL-0.005 mg/l)	mg/l
19	Boron	APHA (23rd edition) 4500B, 2017	*BDL(**DL-0.2 mg/l)	mg/l
20	Chromium as Cr	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.02 mg/l)	mg/l
21	Cadmium as Cd	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.002 mg/l)	mg/l
22	Selenium as Se	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.005 mg/l)	mg/l
23	Mercury as Hg	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.0005 mg/l)	mg/l
24	Sulphate as (SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	16.73	mg/l
25	Iron	IS:3025(P-53):2003,RA.2019:2003	0.22	mg/l
26	Manganese as Mn	APHA3111B	*BDL(**DL-0.05 mg/l)	mg/l

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

\*\*\*End of Report\*\*\*

VIHENDRA KUMAR

  
(Checked By)  
TECHNICAL MANAGERRAJ KUMAR YADAV  
(Authorized Signatory)  
G M LAB OPERATION



## 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

Name of the Project :

Sample Description : SURFACE WATER

Location : Bangoli Dam

Sample Collected by : VEL Team

Parameter Required : As Per Work Order

Sampling and Analysis Protocol : IS 2296

Report No. : VEL/W/2106250026/B

Format No : 7 8 F-01

Party Reference No : NIL

Report Date : 29/06/2021

Period of Analysis : 25/06/2021-29/06/2021

Receipt Date : 25/06/2021

Sampling Date : 18/06/2021

Sampling Quantity : 2 ltr

Sampling Type : Grab

Preservation : Suitable Preservation

Dispatched Quantity : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	Colour	IS 3025: 1987 (P-4) Reaff.2017	*BDL(**DL 1.0 Hazen)	Hazen
2	Odour	IS 3025 (P-5) : 2018	Agreeable	--
3	Anionic Surface active agents (as MBAS)	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05 mg/l)	mg/l
4	Residual Free Chlorine	IS:3025(P-26):1986,RA:2019:1986	*BDL(**DL-0.2 mg/l)	mg/l
5	Cyanide as CN	APHA 4500 CN -D	*BDL(**DL-0.05 mg/l)	mg/l
6	Aluminium as Al	IS 3025 (P-55) 2003, RA 2019	*BDL(**DL-0.03 mg/l)	mg/l
7	O & G	IS 3025 (P-39) 1991, RA 2019	*BDL(**DL-0.5 mg/l)	mg/l

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

\*\*\*End of Report\*\*\*

**VIJENDRA KUMAR**

(Checked By)

**TECHNICAL MANAGER**

**RAJ KUMAR YADAV**

(Authorized Signatory)

**G M LAB OPERATION**



## 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  
 Name of the Project :  
 Sample Description : SURFACE WATER  
 Location : Village - Mura (Pond Water)  
 Sample Collected by : VEL Team  
 Parameter Required : As Per Work Order  
 Sampling and Analysis Protocol : IS 2296

Report No. : VEL/W/2106250027/A  
 Format No : 7.8 F-01  
 Party Reference No : NIL  
 Report Date : 29/06/2021  
 Period of Analysis : 25/06/2021-29/06/2021  
 Receipt Date : 25/06/2021  
 Sampling Date : 18/06/2021  
 Sampling Quantity : 2 ltr  
 Sampling Type : Grab  
 Preservation : Suitable Preservation

Dispatched Quantity : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	pH value	IS 3025 (P-11): 1983 Reaff. 2017	7.43	--
2	Turbidity	IS 3025 (Part 10): 1984, Reaff: 2017, (Nephelometric Method)	3.00	NTU
3	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	191.00	mg/l
4	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	51.62	mg/l
5	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	89.24	mg/l
6	Total Hardness (CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	99.44	mg/l
7	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019 (EDTA method)	32.61	mg/l
8	Magnesium	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	4.40	mg/l
9	Fluoride ( as F)	APHA 23rd Edition 2017, 4500FD	0.35	mg/l
10	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019 (Chromotropic Method)	4.20	mg/l
11	Phenolic compounds	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.1 mg/l)	mg/l
12	Dissolved oxygen	IS : 3025 (Part-38) : 1989, Ref: 2019	5.4	mg/l
13	Biochemical Oxygen Demand (BOD) ( 3 days at 27°C)	IS: 3025 (Part-44): 1993, Ref: 2019	7.50	mg/l
14	Chemical Oxygen Demand (COD)	IS : 3025 (Part 58) : 2006fef: 2017	34.41	mg/l
15	Zinc as (Zn)	APHA (23rd edition), 3030D,3113B	*BDL(**DL-0.20 mg/l)	mg/l
16	Copper (Cu)	APHA (23rd edition), 3111B	*BDL(**DL-0.02 mg/l)	mg/l
17	Lead as Pb	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.005 mg/l)	mg/l



## Test Report

Sample Number : VEL/W/04


Report No. : VEL/W/2106250027/A

S.No.	Test Parameters	Test Method	Results	Units
18	Arsenic as As	APHA (23rd edition), 3030D,3114C, 2017	*BDL(**DL-0.005 mg/l)	mg/l
19	Boron	APHA (23rd edition) 4500B, 2017	*BDL(**DL-0.2 mg/l)	mg/l
20	Chromium as Cr	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.02 mg/l)	mg/l
21	Cadmium as Cd	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.002 mg/l)	mg/l
22	Selenium as Se	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.005 mg/l)	mg/l
23	Mercury as Hg	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.0005 mg/l)	mg/l
24	Sulphate as (SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	10.38	mg/l
25	Iron	IS:3025(P-53):2003,RA.2019:2003	0.24	mg/l
26	Manganese as Mn	APHA3111B	*BDL(**DL-0.05 mg/l)	mg/l

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

\*\*\*End of Report\*\*\*

VIHENDRA KUMAR

Checked By:   
TECHNICAL MANAGERRAJ KUMAR YADAV  
(Authorized Signatory)

G M LAB OPERATION



## 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  
 Name of the Project :  
 Sample Description : SURFACE WATER  
 Location : Village - Mura (Pond Water)  
 Sample Collected by : VEL Team  
 Parameter Required : As Per Work Order  
 Sampling and Analysis Protocol : IS 2296

Report No. : VEL/W/2106250027/B  
 Format No : 7 8 F-01  
 Party Reference No : NIL  
 Report Date : 29/06/2021  
 Period of Analysis : 25/06/2021-29/06/2021  
 Receipt Date : 25/06/2021  
 Sampling Date : 18/06/2021  
 Sampling Quantity : 2 ltr  
 Sampling Type : Grab  
 Preservation : Suitable Preservation

Dispatched Quantity : Grab

S.No.	Test Parameters	Test Method	Results	Units
1	Colour	IS 3025: 1987 (P-4) Reaff.2017	2.00	Hazen
2	Odour	IS 3025 (P-5) : 2018	Agreeable	--
3	Anionic Surface active agents (as MBAS)	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05 mg/l)	mg/l
4	Residual Free Chlorine	IS:3025(P-26):1986,RA:2019:1986	*BDL(**DL-0.2 mg/l)	mg/l
5	Cyanide as CN	APHA 4500 CN -D	*BDL(**DL-0.05 mg/l)	mg/l
6	Aluminium as Al	IS 3025 (P-55) 2003, RA 2019	*BDL(**DL-0.03 mg/l)	mg/l
7	O & G	IS 3025 (P-39) 1991, RA 2019	*BDL(**DL-0.5 mg/l)	mg/l

\*BDL-Below Detection Limit, \*\*DL-Detection Limit

\*\*\*End of Report\*\*\*

VIHENDRA KUMAR  
  
 (Checked By)  
 TECHNICAL MANAGER

RAJ KUMAR YADAV  
  
 (Authorized Signatory)  
 G M LAB OPERATION

### 4.5 Soil Quality Analysis



**Figure No. 8. Plan Showing Soil Sample Monitoring Location Map**

Location Code: -

S1- Near Field Hostel





## 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 : Near Field Hostel  
 Sample Collected by : VEL Team  
 Parameter Required : As Per Work Order  
 Sampling and Analysis Protocol : IS 2720, APHA & USDA

Report No. : VEL/S0/2108250001/A  
 Format No : 7.8 F-01  
 Party Reference No : NIL  
 Report Date : 29/06/2021  
 Period of Analysis : 25/06/2021-29/06/2021  
 Receipt Date : 25/06/2021  
 Sampling Date : 17/06/2021  
 Sampling Quantity : 2 Kg  
 Sampling Type : Composite  
 Packing Status : Temp. Sealed

S.No.	Parameters	Test Method	Results	Units
1	pH (at 25°C)	IS : 2720 (P- 26): 1987,RA: 2016	7.20	-
2	Electrical Conductivity	IS 14767: 2000 RA:2016	0.152	mS/cm
3	Bulk density	USDA:1954 (Page-121) RA: 2014	1.29	gm/cc
4	Chloride	USDA:1954 Method 13 (Page-98) RA: 2010	246.34	mg/kg
5	Calcium (as Ca)	Lab SOP no. VEL/STP/01: 2018	258.12	mg/kg
6	Sodium (as Na)	USDA:1954 Method 10A (Page-96) RA: 2010	145.99	mg/kg
7	Potassium (as K)	Lab SOP no. VEL/STP/01: 2018	87.13	kg/hect.
8	Organic Matter	IS 2720 (P-22) 1972 RA:2015	0.38	%
9	Magnesium (as Mg)	Lab SOP no. VEL/STP/01: 2018	167.67	mg/kg
10	Available Nitrogen (as N)	IS : 14684,1999 RA: 2015	259.20	kg. /hect.
11	Available Phosphorus	Lab SOP no. VEL/STP/01: 2018	40.07	kg. /hect.
12	Total Zinc (as Zn)	USEPA 3050 B: 1996	46.38	mg/kg
13	Total Manganese (as Mn)	USEPA 3050	176.57	mg/kg
14	Total Lead (as Pb)	USEPA 3050 B: 1996	15.46	mg/kg
15	Total Cadmium (as Cd)	USEPA 3050	10.97	mg/kg
16	Total Copper (as Cu)	USEPA 3050 B: 1996	12.98	mg/kg

\*\*\*End of Report\*\*\*

**VIJENDRA KUMAR**

(Checked By)  
**TECHNICAL MANAGER**

**RAJ KUMAR YADAV**

(Authorized Signatory)

**G M LAB OPERATION**



## 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 : Near Field Hostel

Sample Collected by : VEL Team

Parameter Required : As Per Work Order

Sampling and Analysis Protocol : IS 2720, APHA & USDA

Report No. : VEL/S0/2106250001/B

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 29/06/2021

Period of Analysis : 25/06/2021-29/06/2021

Receipt Date : 25/06/2021

Sampling Date : 17/06/2021

Sampling Quantity : 2 Kg

Sampling Type : Composite

Packing Status : Temp. Sealed

S.No.	Parameters	Test Method	Results	Units
1	Colour	USDA:1954-Reaffirmed,2010	Grey	-
2	Water holding capacity	USDA:1954-Reaffirmed,2010	21.82	%
3	Total Chromium (as Cr)	USEPA 3050 B:1996	6.98	mg/kg
4	Soil Texture	IS:2720 (P-4) RA:2006	Silty Clay	--

\*\*\*End of Report\*\*\*

**VINENDRA KUMAR**

(Checked By)

**TECHNICAL MANAGER**

**RAJ KUMAR** (Authorized Signatory)

**G M LAB OPERATION**

#### 4.6 Effluent Sample Analysis Report



#### Locations

1. STP Outlet



## 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

Sample Description : Waste Water

Location : STP Outlet

Sample Collected by : VEL Team

Parameter Required : As Per Work Order

Sampling and Analysis Protocol : IS 3025

Report No. : VEL/WW/2106250013/A

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 30/06/2021

Period of Analysis : 25/06/2021-30/06/2021

Receipt Date : 25/06/2021

Sampling Date : 18/06/2021

Sampling Quantity : 2 ltr.

Sampling Type : Grab

Packing Status : Temp Sealed

S.No.	Test Parameters	Test Method	Result	Unit	Prescribed Limit
1	pH	IS 3025 (P-11): 1983 RA2017	7.31	-	5.5 - 9.0
2	Total Suspended Solids	IS: 3025 (Part 17): 1984, RA2017	21.4	mg/l	100.0
3	Oil & Grease	IS 3025(P-39):1991 RA 2019	0.9	mg/l	10.0
4	BOD (3 days @ 27°C )	IS: 3025 (Part-44): 1993, RA: 2019	12.0	mg/l	30.0
5	COD	IS : 3025 (Part 58) : 2006 RA: 2017	41.6	mg/l	250.0

\*\*\*End of Report\*\*\*

VIJENDRA KUMAR

(Checked By)

TECHNICAL MANAGER

RAJ KUMAR YADAV

(Authorized Signatory)

G M LAB OPERATION

#### **4.7 Effluent Sample Analysis Report**

##### Locations

1. TPP (Unit-1)
2. TPP (Unit-2)



## 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

Report No. : VEL/S/2106250013/A  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 05/07/2021  
Period of Analysis : 25/06/2021-05/07/2021  
Receipt Date : 25/06/2021

Sample Description : Stack Emission Monitoring

### General Information

Sampling Location : TPP (Unit -1)  
Sample Collected by : VEL Team  
Date of Sampling : 17/06/2021  
Sampling duration (Minutes) : 30 Min (10:00 to 10:30 Hrs.)  
Stack attached to : ESP  
Make of stack : MS Plate & RCC  
Diameter of stack(m) : 7.5 M  
Height of stack(m) : 275 M  
Instrument calibration status : Calibrated  
Meteorological Condition : clear Sky  
Ambient Temperature - Ta (°C) : 30  
Temperature of Stack Gases - Ts (°C) : 131  
Velocity of Stack Gases (m/sec.) : 24.11  
Flow rate of PM (LPM) : 34  
Flow rate of Gas (LPM) : 08/07/2021 15:23:52  
Sampling condition : OK  
Protocol used : IS 11255 & EPA

S.No.	Parameters	Test Method	Results	Units	Limits
1	Particulate Matter (as PM)	IS: 11255 (Part1) : 1985, RA 2014	42.38	mg/Nm <sup>3</sup>	50.0
2	Sulphur Dioxide ( as SO <sub>2</sub> )	IS: 11255(P- 2): 1985, RA.2014	1210.93	mg/Nm <sup>3</sup>	--
3	Ammonia (as NH <sub>3</sub> )	IS: 11255 (P-6) : 1999, RA. 2014	8.15	mg/Nm <sup>3</sup>	--
4	Hydrogen Sulphide	IS: 11255(Part 4): 2006 RA: 2017	2.41	mg/Nm <sup>3</sup>	--
5	Oxide of Nitrogen as NO <sub>2</sub>	IS-11255 P-7, RA 2017	352.43	mg/Nm <sup>3</sup>	--

BDL\*(Below Detection Limit)\*\*DL Detection Limit

\*\*\*End of Report\*\*\*

DINESH SANSANIYA  
(Checked By)  
DY TECHNICAL MANAGER

RAJ KUMAR YADAV  
(Authorized Signatory)  
C.M. LAB OPERATION



## 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

Report No. : VEL/S/2106250013/B  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 05/07/2021  
Period of Analysis : 25/06/2021-05/07/2021  
Receipt Date : 25/06/2021

Sample Description : Stack Emission Monitoring

General Information  
Sampling Location : TPP (Unit -1)  
Sample Collected by : VEL Team  
Date of Sampling : 17/06/2021  
Sampling duration (Minutes) : 30 Min (10.00 to 10.30 Hrs.)  
Stack attached to : ESP  
Make of stack : MS Plate & RCC  
Diameter of stack(m) : 7.5 M  
Height of stack(m) : 275 M  
Instrument calibration status : Calibrated  
Meteorological Condition : clear Sky  
Ambient Temperature - Ta (°C) : 30  
Temperature of Stack Gases - Ts (°C) : 131  
Velocity of Stack Gases (m/sec.) : 24.11  
Flow rate of PM (LPM) : 34  
Flow rate of Gas (LPM) : 08/07/2021 15:23:52  
Sampling condition : OK  
Protocol used : IS 11255 & EPA

S.No.	Parameters	Test Method	Results	Units	Limits
1	Water Vapor	Gas Analyzer	3.42	%	--
2	Carbon Monoxide ( as CO )	Co By Analyzer	6.87	mg/Nm <sup>3</sup>	--
3	Carbon Dioxide	IS:13270, Orsat Analysis, RA:2005	7.40	%	--
4	Oxygen	SOP, SP-188, Issue No.01:2018	7.60	%	--
5	Mercury as Hg	APHA 3rd edition 2017, 303A (Page No. 365)	*BDL(DL-0.005)	mg/Nm <sup>3</sup>	0.03

BDL\*(Below Detection Limit)\*\*DL Detection Limit

\*\*\*End of Report\*\*\*

DINESH PALSANIYA  
(Checked By)  
DY TECHNICAL MANAGER

RAJ KUMAR YADAV  
(Authorized Signatory)  
G M LAB OPERATION



## 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

Report No. : VEL/S/2106250014/A  
Format No : 7 8 F-01  
Party Reference No : NIL  
Report Date : 05/07/2021  
Period of Analysis : 25/06/2021-05/07/2021  
Receipt Date : 25/06/2021

Sample Description : Stack Emission Monitoring

### General Information

Sampling Location : TPP (Unit -II)  
Sample Collected by : VEL Team  
Date of Sampling : 17/06/2021  
Sampling duration (Minutes) : 35 Min. (11.00 to 11.35 Hrs.)  
Stack attached to : ESP  
Make of stack : MS Plate & RCC  
Diameter of stack(m) : 7.5 M  
Height of stack(m) : 275 M  
Instrument calibration status : Calibrated  
Meteorological Condition : clear Sky  
Ambient Temperature - Ta (°C) : 31  
Temperature of Stack Gases - Ts (°C) : 132  
Velocity of Stack Gases (m/sec.) : 20.74  
Flow rate of PM (LPM) : 29  
Flow rate of Gas (LPM) : 08/07/2021 15:24:08  
Sampling condition : OK  
Protocol used : IS 11255 & EPA

S.No.	Parameters	Test Method	Results	Units	Limits
1	Particulate Matter (as PM)	IS: 11255 (Part1) : 1985, RA 2014	53.19	mg/Nm <sup>3</sup>	50.0
2	Sulphur Dioxide ( as SO <sub>2</sub> )	IS: 11255(P- 2): 1985, RA.2014	1184.02	mg/Nm <sup>3</sup>	--
3	Ammonia (as NH <sub>3</sub> )	IS: 11255 (P-6) : 1999, RA.2014	8.15	mg/Nm <sup>3</sup>	--
4	Hydrogen Sulphide	IS: 11255(Part 4): 2006 RA: 2017	2.31	mg/Nm <sup>3</sup>	--
5	Oxide of Nitrogen as NO <sub>2</sub>	IS-11255 P-7, RA 2017	433.11	mg/Nm <sup>3</sup>	--

BDL\*(Below Detection Limit)\*\*DL Detection Limit

\*\*\*End of Report\*\*\*

DINDEE PALSANIYA  
(Checked By)  
DY TECHNICAL MANAGER

RAJ KUMAR  
(Authorized Signatory)  
G M LAB OPERATION





## 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/2106250014/B  
 Format No : 7.8 F-01  
 Party Reference No : NIL  
 Report Date : 05/07/2021  
 Period of Analysis : 25/06/2021-05/07/2021  
 Receipt Date : 25/06/2021

**General Information**  
 Sampling Location : TPP (Unit -II)  
 Sample Collected by : VEL Team  
 Date of Sampling : 17/06/2021  
 Sampling duration (Minutes) : 35 Min. (11.00 to 11.35 Hrs )  
 Stack attached to : ESP  
 Make of stack : MS Plate & RCC  
 Diameter of stack(m) : 7.5 M  
 Height of stack(m) : 275 M  
 Instrument calibration status : Calibrated  
 Meteorological Condition : clear Sky  
 Ambient Temperature - Ta (°C) : 31  
 Temperature of Stack Gases - Ts (°C) : 132  
 Velocity of Stack Gases (m/sec.) : 20.74  
 Flow rate of PM (LPM) : 29  
 Flow rate of Gas (LPM) : 08/07/2021 15:24:08  
 Sampling condition : OK  
 Protocol used : IS 11255 & EPA

S.No.	Parameters	Test Method	Results	Units	Limits
1	Water Vapor	Gas Analyzer	3.63	%	--
2	Carbon Monoxide ( as CO )	Co By Analyzer	8.36	mg/Nm <sup>3</sup>	--
3	Carbon Dioxide	IS:13270, Orsat Analysis, RA:2005	7.10	%	--
4	Oxygen	SOP, SP-188, Issue No.01:2018	8.50	%	--
5	Mercury as Hg	APHA 3rd edition 2017, 303A (Page No. 365)	*BDL(DL-0.005)	mg/Nm <sup>3</sup>	0.03

BDL\*(Below Detection Limit)\*\*DL Detection Limit

\*\*\*End of Report\*\*\*

DINESH PALSANIYA

(Checked By)  
DY. TECHNICAL MANAGER

(Authorized Signatory)  
RAJ KUMAR YADAV

G M LAB OPERATION

## **Chapter – 5.0 CONCLUSION**

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.

<b>Sr. No.</b>	<b>Environmental Parameters</b>	<b>Conclusion</b>
5.1	Air 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 SO <sub>2</sub> , NO <sub>2</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> , CO and Mercury are well within the prescribed limits of NAAQM standards. People of township and of surrounding villages do not have any problems regarding the air quality and have no grievances because of Thermal Power Plant activities.
5.2	Water Environment	The analytical result of the samples from the ground water of villages, surface water from river, 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.
5.3	Noise Environment	The observations taken at four village 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.

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

# 2nd Quarterly Environmental Monitoring Report



## **Submitted To:**

**M/s Raipur Energen Limited**

***Formerly GMR Chhattisgarh Energy Ltd.***

**Village: Raikheda, Block-Tilda, Dist.-Raipur (Chhattisgarh)**

## **Conducted by:**

**M/s Vardan EnviroLab**

**Plot no. 82A, Sector-5, IMT Manesar, Gurugram (Haryana)**

**(Recognized by MoEF & CC, NABL 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, Dist -Raipur (Chhattisgarh), India, has engaged M/S Vardan EnviroLab, Gurugram, (HR) to provide Environmental Services in respect of ambient air quality monitoring, stack emission, noise level monitoring & Sampling and Analysis of ground water quality, surface water quality, treated effluent sewage, effluent water from ETP, and soil for Raipur Energen Limited, Raipur district of Chhattisgarh, as per guidelines of MoEF & CC and CPCB Gazette notification.

M/S Vardan EnviroLab, Gurugram, (HR) has deployed entirely its own personnel, facilities and expertise for doing this service. Sampling / Monitoring Stations were identified by the Environmental Officer of Raipur Energen Limited, Raipur, The samples were analyzed **partly** at site and **partly** at our MoEF Recognized laboratory situated at Gurugram (HR).

This report presents the data generated for the period from 13th September 2021 to 15th September 2021, i.e. for **Second quarter** which includes sampling locations, Methodology, testing procedure and compilation for the Environmental parameters i.e. Air, Water, Soil & Noise 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 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 : 21/09/2021



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## **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. Raipur Energen Limited., has commissioned its Thermal Power Plant 1370 MW (2x685 MW) Unit at Village Raikheda, Block -Tilda, Dist- Raipur, Chhattisgarh (India).

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. 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 Bangoli dam approximately 2 km. away from plant in SW direction. Mura Talab approximately 5 km. away from plant in South direction. Chhicholi Talab approximately 2 km. away from plant in East direction.

#### **2.2 Location**

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

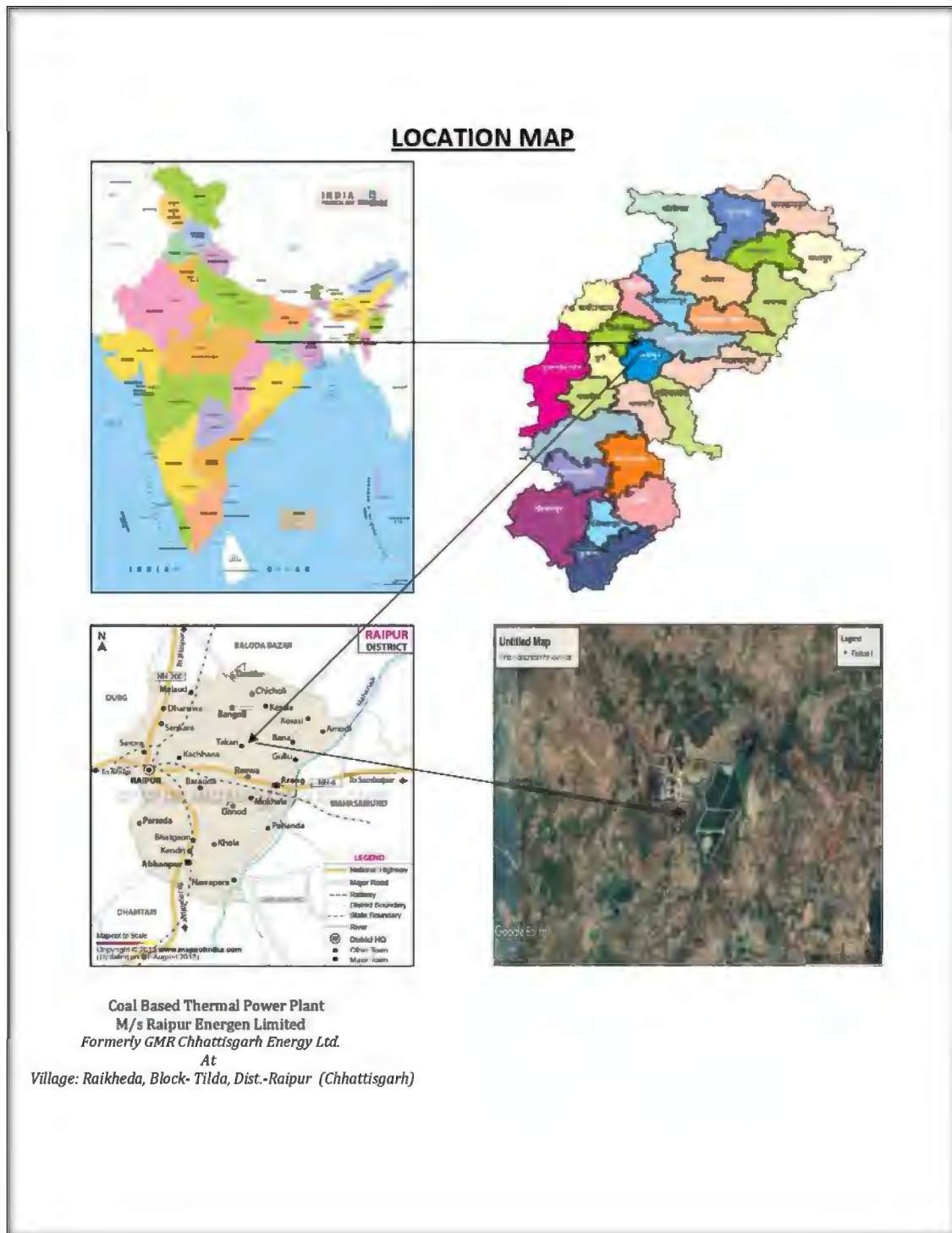
#### **2.3 Climate**

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 29.5°C - 49 °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, noise level monitoring & Sampling and Analysis of ground water quality, surface water quality, treated effluent sewage, effluent water from ETP and soil.

#### **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 assess the existing air quality of the area.

The ambient air quality monitoring was carried out for 24 hours at each station. At all stations SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, CO and Mercury were monitored. All the samples collected were analyzed for quantitative analysis of various pollutants.

The ambient air quality sampling locations were identified by the Environmental Officer of Raipur Energen Limited.

##### **3.2.2 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.

### **3.2.3 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 which is expressed in dB(A).

### **3.2.4 Soil**

The Soil samples were collected from selected locations. These samples were analyzed for Physico-Chemical parameters including heavy metals.

## 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**

Location Code: -

- A1- Raikheda Village
- A2- Mura Village
- A3- Near Doosan Village
- A4- Chicholi Village
- A5- Near STP



# Vardan EnviroLab

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

## Test Report

Sample Number: <sup>+</sup> VEL/REL/AA/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/A/2109180001  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Report Date: 21/09/2021  
Period of Analysis: 18-21/09/2021  
Receipt Date: 18/09/2021

Sample Description: Ambient Air Quality Monitoring

### General Information:-

Sampling Location : Village- Raikheda (Near Ramesh House)  
Sample collected by : VEL Team  
Sampling Equipment used : RDS & FPS  
Instrument Code : VEL/RDS/FPS/01  
Latitude : 26°48'43"  
Longitude : 75°36'41"  
Meteorological condition during monitoring : Cloudy sky  
Date of Sampling : 13/09/2021 to 14/09/2021  
Time of Sampling : 10:20 to 10:20 Hrs.  
Ambient Temperature (°C) : Min. 25°C, Max. 30 °C  
Surrounding Activity : Human, Vehicular & Other Activities  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS-5182 & CPCB Guidelines  
Sampling Duration : 24 hrs.  
Parameter Required : As Per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS 2009
1.	Particulate Matter (PM <sub>2.5</sub> )	IS 5182 (P-24) -2019	31.28	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23), 2006,RA ,2017	75.61	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6), 2006 RA-2017	23.14	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2), 2001 RA-2017	9.17	µg/m <sup>3</sup>	80
5.	Ozone (as O <sub>3</sub> )	IS: 5182 (P-9), 1947 RA.2017	8.32	µg/m <sup>3</sup>	180.0
6.	Suspended Particulate Matter	IS: 5182 (P-4), 1999 RA.2014	182.55	µg/m <sup>3</sup>	600
7.	Mercury (Hg)	Methods Of air sampling and analysis 3 <sup>rd</sup> ed,1988,method No.317	BDL(*DL0.001)	ng/ m <sup>3</sup>	--

BDL\*(Below Detection Limit) \*\* (DL Detection Limit)

(Checked By)

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# Vardan EnviroLab

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

## Test Report

**Sample Number:** VEL/REL/AA/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/A/2109180002  
**Format No.:** 7.8 F 01  
**Party Reference No.:** NIL  
**Report Date:** 21/09/2021  
**Period of Analysis:** 18-21/09/2021  
**Receipt Date:** 18/09/2021

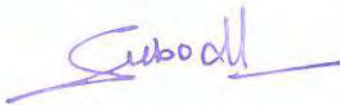
**Sample Description :** Ambient Air Quality Monitoring

### General Information:-

**Sampling Location :** Near STP  
**Sample collected by :** VEL Team  
**Sampling Equipment used :** RDS & FPS  
**Instrument Code :** VEL/RDS/FPS/02  
**Latitude :** 26°48'43"  
**Longitude :** 75°36'41"  
**Meteorological condition during monitoring :** Cloudy sky  
**Date of Sampling :** 13/09/2021 to 14/09/2021  
**Time of Sampling :** 12:10 to 12:10 Hrs.  
**Ambient Temperature (°C) :** Min. 25°C, Max. 30 °C  
**Surrounding Activity :** Human, Vehicular & Other Activities  
**Scope of Monitoring :** Regulatory Requirement  
**Sampling & Analysis Protocol :** IS-5182 & CPCB Guidelines  
**Sampling Duration :** 24 hrs.  
**Parameter Required :** As Per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS 2009
1.	Particulate Matter (PM <sub>2.5</sub> )	IS 5182 (P-24) -2019	29.21	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23), 2006,RA, 2017	71.25	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6), 2006 RA-2017	18.47	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2), 2001 RA-2017	9.32	µg/m <sup>3</sup>	80
5.	Ozone (as O <sub>3</sub> )	IS: 5182 (P-9), 1947 RA.2017	7.68	µg/m <sup>3</sup>	180.0
6.	Suspended Particulate Matter	IS: 5182 (P-4), 1999 RA.2014	206.43	µg/m <sup>3</sup>	600
7.	Mercury (Hg)	Methods Of air sampling and analysis 3 <sup>rd</sup> ed,1988,method No.317	BDL(*DL0.001)	ng/ m <sup>3</sup>	--

BDL\*(Below Detection Limit) \*\* (DL Detection Limit)



(Checked By)



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Ph: 0124-4343750/752/753, 9810355569, 9953147268 E-mail: [lab@vardanenviromet.com](mailto:lab@vardanenviromet.com), [bd@vardanenviromet.com](mailto:bd@vardanenviromet.com)



# Vardan EnviroLab

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

## Test Report

Sample Number: VEL/REL/AA/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/A/2109180003  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Report Date: 21/09/2021  
Period of Analysis: 18-21/09/2021  
Receipt Date: 18/09/2021

Sample Description: Ambient Air Quality Monitoring

### General Information:-

Sampling Location : Village- Mura (Near Petrol Pump)  
Sample collected by : VEL Team  
Sampling Equipment used : RDS & FPS  
Instrument Code : VEL/RDS/FPS/03  
Latitude : 21°26'23"  
Longitude : 81°52'10"  
Meteorological condition during monitoring : Cloudy sky  
Date of Sampling : 13/09/2021 to 14/09/2021  
Time of Sampling : 10:00 to 10:00 Hrs.  
Ambient Temperature (°C) : Min 25°C Max 29 °C  
Surrounding Activity : Human, Vehicular & Other Activities  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS-5182 & CPCB Guidelines  
Sampling Duration : 24 hrs.  
Parameter Required : As Per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS 2009
1.	Particulate Matter (PM <sub>2.5</sub> )	IS 5182 (P-24) -2019	27.84	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23), 2006,RA, 2017	65.28	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6), 2006 RA-2017	14.37	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2), 2001 RA-2017	8.36	µg/m <sup>3</sup>	80
5.	Ozone (as O <sub>3</sub> )	IS: 5182 (P-9), 1947 RA.2017	5.91	µg/m <sup>3</sup>	180.0
6.	Suspended Particulate Matter	IS: 5182 (P-4), 1999 RA.2014	188.24	µg/m <sup>3</sup>	600
7.	Mercury (Hg)	Methods Of air sampling and analysis 3 <sup>rd</sup> ed,1988,method No.317	BDL(*DL0.001)	ng/ m <sup>3</sup>	--

BDL\*(Below Detection Limit) \*\* (DL Detection Limit)

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# Vardan EnviroLab

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

## Test Report

Sample Number: VEL/REL/AA/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/A/2109180004  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Report Date: 21/09/2021  
Period of Analysis: 18-21/09/2021  
Receipt Date: 18/09/2021

Sample Description : Ambient Air Quality Monitoring

### General Information:-

Sampling Location : Village- Chicholi Chatamura Chock  
Sample collected by : VEL Team  
Sampling Equipment used : RDS & FPS  
Instrument Code : VEL/RDS/FPS/01  
Latitude : 21°27'14"  
Longitude : 81°50'57"  
Meteorological condition during monitoring : Cloudy sky  
Date of Sampling : 14/09/2021 to 15/09/2021  
Time of Sampling : 11:00 to 11:00 Hrs.  
Ambient Temperature (°C) : Min. 25°C, Max. 29 °C  
Surrounding Activity : Human, Vehicular & Other Activities  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS-5182 & CPCB Guidelines  
Sampling Duration : 24 hrs.  
Parameter Required : As per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS 2009
1.	Particulate Matter (PM <sub>2.5</sub> )	IS 5182 (P-24) -2019	34.57	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23), 2006,RA,2017	78.62	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6), 2006 RA-2017	21.68	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2), 2001 RA-2017	10.68	µg/m <sup>3</sup>	80
5.	Ozone (as O <sub>3</sub> )	IS: 5182 (P-9), 1947 RA.2017	7.12	µg/m <sup>3</sup>	180.0
6.	Suspended Particulate Matter	IS: 5182 (P-4), 1999 RA.2014	204.14	µg/m <sup>3</sup>	600
7.	Mercury (Hg)	Methods Of air sampling and analysis 3 <sup>rd</sup> ed,1988,method No.317	BDL(*DL0.001)	ng/ m <sup>3</sup>	--

BDL\*(Below Detection Limit) \*\* (DL Detection Limit)

(Checked By)

(Authorized Signatory)



VEL/E/I/TR/PN5552

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# Vardan EnviroLab

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

## Test Report

Sample Number: VEL/REL/AA/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/A/2109180005  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Report Date: 21/09/2021  
Period of Analysis: 18-21/09/2021  
Receipt Date: 18/09/2021

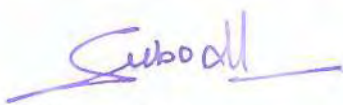
Sample Description : Ambient Air Quality Monitoring

### General Information:-

Sampling Location : Near Doosan (Old Project)  
Sample collected by : VEL Team  
Sampling Equipment used : RDS & FPS  
Instrument Code : VEL/RDS/FPS/02  
Latitude : 21°27'14"  
Longitude : 81°50'57"  
Meteorological condition during monitoring : Cloudy sky  
Date of Sampling : 14/09/2021 to 15/09/2021  
Time of Sampling : 10:10 to 10:10 Hrs.  
Ambient Temperature (°C) : Min. 25°C, Max. 31 °C  
Surrounding Activity : Human, Vehicular & Other Activities  
Scope of Monitoring : Regulatory Requirement  
Sampling & Analysis Protocol : IS-5182 & CPCB Guidelines  
Sampling Duration : 24 hrs.  
Parameter Required : As Per Work Order

S. No.	Parameter	Protocol	Result	Unit	NAAQS 2009
1.	Particulate Matter (PM <sub>2.5</sub> )	IS 5182 (P-24) -2019	38.61	µg/m <sup>3</sup>	60
2.	Particulate Matter (PM <sub>10</sub> )	IS: 5182 (P-23), 2006,RA, 2017	80.44	µg/m <sup>3</sup>	100
3.	Nitrogen Dioxide (NO <sub>2</sub> )	IS: 5182 (P-6), 2006 RA-2017	22.59	µg/m <sup>3</sup>	80
4.	Sulphur Dioxide (SO <sub>2</sub> )	IS: 5182 (P-2), 2001 RA-2017	12.16	µg/m <sup>3</sup>	80
5.	Ozone (as O <sub>3</sub> )	IS: 5182 (P-9), 1947 RA.2017	8.42	µg/m <sup>3</sup>	180.0
6.	Suspended Particulate Matter	IS: 5182 (P-4), 1999 RA.2014	198.04	µg/m <sup>3</sup>	600
7.	Mercury (Hg)	Methods Of air sampling and analysis 3 <sup>rd</sup> ed,1988,method No.317	BDL(*DL0.001)	ng/ m <sup>3</sup>	--

BDL\*(Below Detection Limit) \*\* (DL Detection Limit)



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## 4.2 Noise Level Monitoring



Figure No.4. Plan Showing Noise Level Monitoring Location Map

### Ambient Noise Level Monitoring Locations

- Location Code: -
- N1- Admin Building
  - N2- Weigh Bridge
  - N3- Gate-1 Main gate
  - N4- Gate-2 Gaitara Gate
  - N5- Gate-3 Bhatapara
  - N6- Gate-4 Mura Colony
  - N7- Gate-5 Labour Colony
  - N8- Near OHC



# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/REL/AN/01	Report No.:	VEL /N/2109180001
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 01
Sample Description:	Ambient Noise Level Monitoring	Party Reference No.:	NIL
Scope of Monitoring	Regulatory Requirement	Reporting Date:	21/09/2021
Protocol Used:	IS 9989: IS 9876	Receipt Date:	18/09/2021
Instrument Used	SLM	Sampling Duration	24 Hrs.
		Sample Collected by	VEL Team
		Instrument Calibration Status	Calibrated

### General Information:-

Sampling Location	: Near Gate No. 01
Instrument Code	: VEL/JAI/SLM/05
Meteorological condition during monitoring	: Clear sky
Date of Monitoring	: 13/09/2021 to 14/09/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Ambient Temperature (°C)	: Min. 25°C, Max. 30 °C
Surrounding Activity	: Human, Vehicular Activities
Parameter Required	: As per Work Order

Sr.No.	Test Parameter	Protocol	Test Result dB(A)	
			Day Time	Night Time
1.	L max	IS:9989,IS9876:1981	69.1	55.9
2.	L min	IS:9989,IS9876:1981	42.8	38.1
3.	Leq	IS:9989,IS9876:1981	54.17	44.53

Category of Zones	Leq in dB (A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.
  2. Night Time is reckoned between 10.00 PM to 6.00 AM.
  3. Silence Zone is defined as an area up to 100 m around premises of Hospitals, Educational and Courts. Use of vehicle horn, Loudspeaker and bursting of crackers is banned in these zones.
- Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

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# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/REL/AN/02	Report No.:	VEL /N/2109180002
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 01
Sample Description:	Ambient Noise Level Monitoring	Party Reference No.:	NIL
Scope of Monitoring	Regulatory Requirement	Reporting Date:	21/09/2021
Protocol Used:	IS 9989: IS 9876	Receipt Date:	18/09/2021
Instrument Used	SLM	Sampling Duration	24 Hrs.
		Sample Collected by	VEL Team
		Instrument Calibration Status	Calibrated

### General Information:-

Sampling Location	: Field Hostel
Instrument Code	: VEL/JAI/SLM/06
Meteorological condition during monitoring	: Clear sky
Date of Monitoring	: 13/09/2021 to 14/09/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Ambient Temperature (°C)	: Min. 25°C, Max. 30 °C
Surrounding Activity	: Human, Vehicular Activities
Parameter Required	: As per Work Order

Sr.No.	Test Parameter	Protocol	Test Result dB(A)	
			Day Time	Night Time
1.	L max	IS:9989,IS9876:1981	65.4	53.6
2.	L min	IS:9989,IS9876:1981	41.7	37.1
3.	Leq	IS:9989,IS9876:1981	52.69	41.82

Category of Zones	Leq in dB (A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.
  2. Night Time is reckoned between 10.00 PM to 6.00 AM.
  3. Silence Zone is defined as an area up to 100 m around premises of Hospitals, Educational and Courts. Use of vehicle horn, Loudspeaker and bursting of crackers is banned in these zones.
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# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/REL/AN/03	Report No.:	VEL /N/2109180003
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 01
Sample Description:	Ambient Noise Level Monitoring	Party Reference No.:	NIL
Scope of Monitoring	Regulatory Requirement	Reporting Date:	21/09/2021
Protocol Used:	IS 9989: IS 9876	Receipt Date:	18/09/2021
Instrument Used	SLM	Sampling Duration	24 Hrs.
		Sample Collected by	VEL Team
		Instrument Calibration Status	Calibrated

### General Information:-

Sampling Location	: Gate No. 02 (Gaitara Gate)
Instrument Code	: VEL/JAI/SLM/07
Meteorological condition during monitoring	: Clear sky
Date of Monitoring	: 13/09/2021 to 14/09/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Ambient Temperature (°C)	: Min. 25°C, Max. 30 °C
Surrounding Activity	: Human, Vehicular Activities
Parameter Required	: As per Work Order

Sr.No.	Test Parameter	Protocol	Test Result dB(A)	
			Day Time	Night Time
1.	L max	IS:9989,IS9876:1981	70.3	58.6
2.	L min	IS:9989,IS9876:1981	44.8	40.3
3.	Leq	IS:9989,IS9876:1981	57.84	47.27

Category of Zones	Leq in dB (A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.  
2. Night Time is reckoned between 10.00 PM to 6.00 AM.  
3. Silence Zone is defined as an area up to 100 m around premises of Hospitals, Educational and Courts. Use of vehicle horn, Loudspeaker and bursting of crackers is banned in these zones.  
Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

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

## Test Report

Sample Number:	VEL/REL/AN/04	Report No.:	VEL /N/2109180004
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 01
Sample Description:	Ambient Noise Level Monitoring	Party Reference No.:	NIL
Scope of Monitoring	Regulatory Requirement	Reporting Date:	21/09/2021
Protocol Used:	IS 9989: IS 9876	Receipt Date:	18/09/2021
Instrument Used	SLM	Sampling Duration	24 Hrs.
		Sample Collected by	VEL Team
		Instrument Calibration Status	Calibrated

### General Information:-

Sampling Location	: Near Weigh Bridge
Instrument Code	: VEL/JAI/SLM/08
Meteorological condition during monitoring	: Clear sky
Date of Monitoring	: 13/09/2021 to 14/09/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Ambient Temperature (°C)	: Min. 25°C, Max. 30 °C
Surrounding Activity	: Human, Vehicular Activities
Parameter Required	: As per Work Order

Sr.No.	Test Parameter	Protocol	Test Result dB(A)	
			Day Time	Night Time
1.	L max	IS:9989,IS9876:1981	71.2	59.1
2.	L min	IS:9989,IS9876:1981	45.0	40.7
3.	Leq	IS:9989,IS9876:1981	58.71	45.38

Category of Zones	Leq in dB (A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.
  2. Night Time is reckoned between 10.00 PM to 6.00 AM.
  3. Silence Zone is defined as an area up to 100 m around premises of Hospitals, Educational and Courts. Use of vehicle horn, Loudspeaker and bursting of crackers is banned in these zones.
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Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number:	VEL/REL/AN/05	Report No.:	VEL /N/2109180005
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 01
Sample Description:	Ambient Noise Level Monitoring	Party Reference No.:	NIL
Scope of Monitoring	Regulatory Requirement	Reporting Date:	21/09/2021
Protocol Used:	IS 9989: IS 9876	Receipt Date:	18/09/2021
Instrument Used	SLM	Sampling Duration	24 Hrs.
		Sample Collected by	VEL Team
		Instrument Calibration Status	Calibrated

### General Information:-

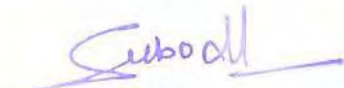
Sampling Location	: Near Admin Building
Instrument Code	: VEL/JA1/SLM/05
Meteorological condition during monitoring	: Clear sky
Date of Monitoring	: 14/09/2021 to 15/09/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Ambient Temperature (°C)	: Min. 25°C, Max. 32°C
Surrounding Activity	: Human, Vehicular Activities
Parameter Required	: As per Work Order


Sr.No.	Test Parameter	Protocol	Test Result dB(A)	
			Day Time	Night Time
1.	L max	IS:9989,IS9876:1981	72.6	61.7
2.	L min	IS:9989,IS9876:1981	48.1	43.4
3.	Leq	IS:9989,IS9876:1981	62.84	49.32

Category of Zones	Leq in dB (A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.
2. Night Time is reckoned between 10.00 PM to 6.00 AM.
3. Silence Zone is defined as an area up to 100 m around premises of Hospitals, Educational and Courts. Use of vehicle horn, Loudspeaker and bursting of crackers is banned in these zones.

Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

  
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# Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
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## Test Report

Sample Number:	VEL/REL/AN/06	Report No.:	VEL/N/2109180006
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 01
Sample Description:	Ambient Noise Level Monitoring	Party Reference No.:	NIL
Scope of Monitoring	Regulatory Requirement	Reporting Date:	21/09/2021
Protocol Used:	IS 9989: IS 9876	Receipt Date:	18/09/2021
Instrument Used	SLM	Sampling Duration	24 Hrs.
		Sample Collected by	VEL Team
		Instrument Calibration Status	Calibrated

### General Information:-

Sampling Location	: Near Mura Village Gate
Instrument Code	: VEL/JAI/SLM/06
Meteorological condition during monitoring	: Clear sky
Date of Monitoring	: 14/09/2021 to 15/09/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Ambient Temperature (°C)	: Min. 25°C, Max. 32°C
Surrounding Activity	: Human, Vehicular Activities
Parameter Required	: As per Work Order

Sr.No.	Test Parameter	Protocol	Test Result dB(A)	
			Day Time	Night Time
1.	L max	IS:9989,IS9876:1981	67.2	60.4
2.	L min	IS:9989,IS9876:1981	43.5	39.7
3.	Leq	IS:9989,IS9876:1981	56.68	46.31

Category of Zones	Leq in dB (A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.
  2. Night Time is reckoned between 10.00 PM to 6.00 AM.
  3. Silence Zone is defined as an area up to 100 m around premises of Hospitals, Educational and Courts. Use of vehicle horn, Loudspeaker and bursting of crackers is banned in these zones.
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# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/REL/AN/07	Report No.:	VEL /N/2109180007
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 01
Sample Description:	Ambient Noise Level Monitoring	Party Reference No.:	NIL
Scope of Monitoring	Regulatory Requirement	Reporting Date:	21/09/2021
Protocol Used:	IS 9989: IS 9876	Receipt Date:	18/09/2021
Instrument Used	SLM	Sampling Duration	24 Hrs.
		Sample Collected by	VEL Team
		Instrument Calibration Status	Calibrated

### General Information:-

Sampling Location	: Near OHC
Instrument Code	: VEL/JAI/SLM/07
Meteorological condition during monitoring	: Clear sky
Date of Monitoring	: 14/09/2021 to 15/09/2021
Time of Monitoring	: 06:00 AM to 06:00AM
Ambient Temperature (°C)	: Min. 25°C, Max. 32°C
Surrounding Activity	: Human, Vehicular Activities
Parameter Required	: As per Work Order

Sr.No.	Test Parameter	Protocol	Test Result dB(A)	
			Day Time	Night Time
1.	L max	IS:9989,IS9876:1981	68.4	55.3
2.	L min	IS:9989,IS9876:1981	41.7	37.9
3.	Leq	IS:9989,IS9876:1981	56.38	43.12

Category of Zones	Leq in dB (A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.
  2. Night Time is reckoned between 10.00 PM to 6.00 AM.
  3. Silence Zone is defined as an area up to 100 m around premises of Hospitals, Educational and Courts. Use of vehicle horn, Loudspeaker and bursting of crackers is banned in these zones.
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# Vardan EnviroLab

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

## Test Report

Sample Number:	VEL/REL/AN/08	Report No.:	VEL/N/2109180008
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 01
Sample Description:	Ambient Noise Level Monitoring	Party Reference No.:	NIL
Scope of Monitoring	Regulatory Requirement	Reporting Date:	21/09/2021
Protocol Used:	IS 9989: IS 9876	Receipt Date:	18/09/2021
Instrument Used	SLM	Sampling Duration	24 Hrs.
		Sample Collected by	VEL Team
		Instrument Calibration Status	Calibrated

### General Information:-

Sampling Location	: Gate No. 3 (Bhatapora)
Instrument Code	: VEL/JAI/SLM/08
Meteorological condition during monitoring	: Clear sky
Date of Monitoring	: 14/09/2021 to 15/09/2021
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 25°C, Max. 32°C
Surrounding Activity	: Human, Vehicular Activities
Parameter Required	: As per Work Order

Sr.No.	Test Parameter	Protocol	Test Result dB(A)	
			Day Time	Night Time
1.	L max	IS:9989,IS9876:1981	64.1	53.7
2.	L min	IS:9989,IS9876:1981	40.8	38.4
3.	Leq	IS:9989,IS9876:1981	51.34	43.66

Category of Zones	Leq in dB (A)	
	Day	Night
Industrial	75	70
Commercial	65	55
Residential	55	45
Silence Zone	50	40

1. Day Time is from 6.00 AM to 10.00 PM.
  2. Night Time is reckoned between 10.00 PM to 6.00 AM.
  3. Silence Zone is defined as an area up to 100 m around premises of Hospitals, Educational and Courts. Use of vehicle horn, Loudspeaker and bursting of crackers is banned in these zones.
- Note: Mixed categories of areas be declared as one of the four above mentioned categories by the competent Authority and the corresponding standards shall apply

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### 4.3 Ground water Quality Analysis



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

Location Code: -

- GW1- Chaitara Village
- GW2- Raikhera Village
- GW3- Chicholi Village
- GW4- Near Field Hostel
- GW5- Mura Village



# Vardan EnviroLab

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

## Test Report

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

Report No.: VEL/W/2109180005  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Reporting Date: 21/09/2021

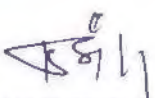
Sample Description: Water Sample  
Sampling Location: Village- Craitara Hand Pump Water  
Sample Collected by: Vardan EnviroLab Representative  
Preservation: Refrigerated  
Sampling & Analysis Protocol: IS-10500-2012


Period of Analysis: 18-21/09/2021  
Receipt Date: 18/09/2021  
Sampling Date: 14/09/2021

Sampling Type: Grab  
Sample Quantity: 2.0 Ltr.

### TEST RESULTS

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	pH	IS 3025 (P-11): 1983 Reaff. 2017	7.56	--	6.5 to 8.5	No Relaxation
2	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	362.0	mg/l	500	2000
3	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	189.10	mg/l	200	600
4	Total Hardness (as CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	221.16	mg/l	200	600
5	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019	2.98	mg/l	45	No Relaxation
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	66.87	mg/l	250	1000
7	Sulphate (as SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	22.31	mg/l	200	400
8	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019	83.98	mg/l	75	200
9	Magnesium (as Mg)	IS: 3025 (Part 46): 1994, Reaff. 2009 (EDTA method)	2.73	mg/l	30	100
10	Fluorides (as F)	APHA 23rd Edition 2017, 4500 FD	0.38	mg/l	1.0	1.5
11	Total Iron (as Fe)	IS 3025(P-53): 2003 Reaffirm 2019	0.21	mg/l	1.0	No Relaxation
12	Arsenic (as As)	APHA (23rd edition-2017), 3114 C	*BDL(**D L-0.005)	mg/l	0.01	No Relaxation
13	Copper (as Cu)	APHA 23rd Edition Year 2017 Method No. 3111B	*BDL(**D L-0.02)	mg/l	0.05	1.5
14	Zinc (as Zo)	APHA (23rd edition-2017), 3030D, 3113 B	*BDL(**D L-0.20)	mg/l	5.0	15
15	Selenium (as Se)	APHA (23rd edition-2017), 3114C	*BDL(**D L-0.005)	mg/l	0.01	No Relaxation
16	Total Coli form (By MPN Method)	IS:1622	Absent	MPN/10 0 ml	Shall not be Detectable in any 100 ml sample	NA
17	E-Coli	IS:1622	Absent	per 100 ml	Absent/100 ml	Absent/100 ml
18	Turbidity	IS 3025 (Part 10): 1984, Ref: 2017, (Nephelometric Method)	*BDL(**DL 1.0)	NTU	1	5

  
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# Vardan EnviroLab

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

## Test Report

19	Aluminium	IS 3025 (Part-55): 2003, Reaff. 2019	*BDL(**DL-0.03)	mg/l	0.03	0.2
20	Manganese (as Mn)	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	*BDL(**DL-0.05)	mg/l	0.1	0.3
21	Ammonia (as NH <sub>3</sub> )	IS-3025 (Part-34)- 1988, RA. 2019	*BDL(**DL-0.3)	mg/l	0.5	No Relaxation
22	Boron (as B)	APHA 23rd Edition Year 2017 Method No. 4500B	*BDL(**DL-0.2)	mg/l	0.5	1.0
23	Cyanide (as CN)	APHA 23rd Edition 2017, 4500CN D	*BDL(**DL-0.05)	mg/l	0.05	No Relaxation
24	Colour	IS 3025: 1983 (P-4) RA. 2017	*BDL(**DL 1.0)	Hazen Unit	5	15
25	Odour	IS 3025 (P-5): RA. 2018	Agreeable	Qualitative	Agreeable	Agreeable
26	Taste	IS 3025(P-8):1984 RA. 2017	Agreeable	Qualitative	Agreeable	Agreeable
27	Sulphide	IS: 3025 (Part 29): 1986, RA. 2009 Turbidity Method	*BDL(**DL-0.05)	mg/l	200	400
28	Phenolic Compound	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.001 mg/l)	mg/l	0.001	0.002
29	Anionic Surface Active Agent	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05)	mg/l	0.2	1.0
30	Free Residual Chlorine	IS: 3025 (Part 26): 1986 RA 2019	*BDL(**DL-0.2)	mg/l	0.2	1
31	Mineral Oil	IS 3025(P-39)	*BDL(**DL-0.05)	mg/l	0.5	No Relaxation
32	Barium as (Ba)	APHA3111B	*BDL(**DL-0.02)	mg/l	0.7	No Relaxation
33	Faecal Caliform	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	--

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# Vardan EnviroLab

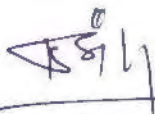
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
ISO 9001 | ISO 14001 | ISO 45001


## Test Report

Sample Number:	VEL/DW/06	Report No.:	VEL/W/2109180006
Name & Address of Party:	M/s Raipur Energen Limited Formerly GMR Chhattisgarh Energy Ltd Village- Raikheda, Block- Tilda, Dist- Raipur Chhattisgarh	Format No.:	7.8 F 01
		Party Reference No.:	NIL
		Reporting Date:	21/09/2021
Sample Description:	Water Sample	Period of Analysis:	18-21/09/2021
Sampling Location:	Village- Raikheda Tap Water	Receipt Date:	18/09/2021
Sample Collected by	Vardan EnviroLab Representative	Sampling Date:	14/09/2021
Preservation:	Refrigerated	Sampling Type:	Grab
Sampling & Analysis Protocol:	IS-10500-2012	Sample Quantity:	2.0 Ltr.

### TEST RESULTS

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	pH	IS 3025 (P-11): 1983 Reaff. 2017	7.48	--	6.5 to 8.5	No Relaxation
2	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	348.0	mg/l	500	2000
3	Total Alkalinity (as CaCO3)	IS: 3025 (Part 23): 1986, Reaff. 2019	204.9	mg/l	200	600
4	Total Hardness (as CaCO3)	IS: 3025 (Part 21): 2009, Reaff. 2019	240.56	mg/l	200	600
5	Nitrate (as NO3)	IS: 3025 (Part 34): 1988, Reaff. 2019	2.92	mg/l	45	No Relaxation
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	61.30	mg/l	250	1000
7	Sulphate (as SO4)	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	18.24	mg/l	200	400
8	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019	85.53	mg/l	75	200
9	Magnesium (as Mg)	IS: 3025 (Part 46): 1994, Reaff. 2009 (EDTA method)	6.50	mg/l	30	100
10	Fluorides (as F)	APHA 23rd Edition 2017, 4500 FD	0.34	mg/l	1.0	1.5
11	Total Iron (as Fe)	IS 3025(P-53): 2003 Reaffirm 2019	0.13	mg/l	1.0	No Relaxation
12	Arsenic (as As)	APHA (23rd edition-2017), 3114 C	*BDL(**DL-0.005)	mg/l	0.01	No Relaxation
13	Copper (as Cu)	APHA 23rd Edition Year 2017 Method No. 3111B	*BDL(**DL-0.02)	mg/l	0.05	1.5
14	Zinc (as Zn)	APHA (23rd edition-2017), 3030D, 3113 B	*BDL(**DL-0.20)	mg/l	5.0	15
15	Selenium (as Se)	APHA (23rd edition-2817), 3114C	*BDL(**DL-0.005)	mg/l	0.01	No Relaxation
16	Total Coli form (By MPN Method)	IS:1622	Absent	MPN/10 0 ml	Shall not be Detectable in any 100 ml sample	NA
17	E-Coli	IS:1622	Absent	per 100 ml	Absent/100 ml	Absent/100 ml
18	Turbidity	IS 3025 (Part 10): 1984, Ref: 2017, (Nephelometric Method)	*BDL(**DL 1.0)	NTU	1	5

  
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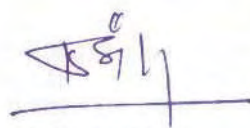


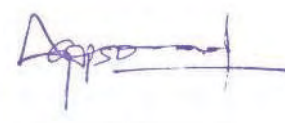
# Vardan EnviroLab

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

## Test Report

19	Aluminium	IS 3025 (Part-55): 2003, Reaff. 2019	*BDL(**DL-0.03)	mg/l	0.03	0.2
20	Manganese (as Mn)	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	*BDL(**DL-0.05)	mg/l	0.1	0.3
21	Ammonia (as NH <sub>3</sub> )	IS-3025 (Part-34)- 1988, RA. 2019	*BDL(**DL-0.3)	mg/l	0.5	No Relaxation
22	Boron (as B)	APHA 23rd Edition Year 2017 Method No. 4500B	*BDL(**DL-0.2)	mg/l	0.5	1.0
23	Cyanide (as CN)	APHA 23rd Edition 2017, 4500CN D	*BDL(**DL-0.05)	mg/l	0.05	No Relaxation
24	Colour	IS 3025: 1983 (P-4) RA.. 2017	*BDL(**DL 1.0)	Hazen Unit	5	15
25	Odour	IS 3025 (P-5): RA. 2018	Agreeable	Qualitative	Agreeable	Agreeable
26	Taste	IS 3025(P-8):1984 RA. 2017	Agreeable	Qualitative	Agreeable	Agreeable
27	Sulphide	IS: 3025 (Part 29): 1986, RA. 2009 Turbidity Method	*BDL(**DL-0.05)	mg/l	200	400
28	Phenolic Compound	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.001)	mg/l	0.001	0.002
29	Anionic Surface Active Agent	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05)	mg/l	0.2	1.0
30	Free Residual Chlorine	IS: 3025 (Part 26): 1986 RA 2019	*BDL(**DL-0.2)	mg/l	0.2	1
31	Mineral Oil	IS 3025(P-39)	*BDL(**DL-0.05)	mg/l	0.5	No Relaxation
32	Barium as (Ba)	APHA3111B	*BDL(**DL-0.02)	mg/l	0.7	No Relaxation
33	Faecal Caliform	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	--

  
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# Vardan EnviroLab

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

## Test Report

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

Report No.: VEL/W/2109180007  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Reporting Date: 21/09/2021  
Period of Analysis: 18-21/09/2021  
Receipt Date: 18/09/2021  
Sampling Date: 14/09/2021  
Sampling Type: Grab  
Sample Quantity: 2.0 Ltr.

Sample Description: Water Sample  
Sampling Location: Village- Chicholi Hand Pump Water  
Sample Collected by: Vardan EnviroLab Representative  
Preservation: Refrigerated  
Sampling & Analysis Protocol: IS-10500-2012

### TEST RESULTS

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	pH	IS 3025 (P-11): 1983 Reaff. 2017	7.44	--	6.5 to 8.5	No Relaxation
2	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff. 2017	335.0	mg/l	500	2000
3	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	193.10	mg/l	200	600
4	Total Hardness (as CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	201.76	mg/l	200	600
5	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019	2.10	mg/l	45	No Relaxation
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	59.44	mg/l	250	1000
7	Sulphate (as SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	19.27	mg/l	200	400
8	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019	73.09	mg/l	75	200
9	Magnesium (as Mg)	IS: 3025 (Part 46): 1994, Reaff. 2009 (EDTA method)	4.63	mg/l	30	100
10	Fluorides (as F)	APHA 23rd Edition 2017, 4500 FD	0.30	mg/l	1.0	1.5
11	Total Iron (as Fe)	IS 3025(P-53): 2003 Reaffirm 2019	0.12	mg/l	1.0	No Relaxation
12	Arsenic (as As)	APHA (23rd edition-2017), 3114 C	*BDL(**DL-0.005)	mg/l	0.01	No Relaxation
13	Copper (as Cu)	APHA 23rd Edition Year 2017 Method No. 3111B	*BDL(**DL-0.02)	mg/l	0.05	1.5
14	Zinc (as Zn)	APHA (23rd edition-2017), 3030D, 3113 B	*BDL(**DL-0.20)	mg/l	5.0	15
15	Selenium (as Se)	APHA (23rd edition-2017), 3114C	*BDL(**DL-0.005)	mg/l	0.01	No Relaxation
16	Total Coli form (By MPN Method)	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	NA
17	E-Coli	IS:1622	Absent	per 100 ml	Absent/100 ml	Absent/100 ml
18	Turbidity	IS 3025 (Part 10): 1984, Ref: 2017, (Nephelometric Method)	*BDL(**DL 1.0)	NTU	1	5

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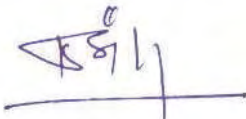



# Vardan EnviroLab

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

## Test Report

19	Aluminium	IS 3025 (Part-55): 2003, Reaff. 2019	*BDL(**DL-0.03)	mg/l	0.03	0.2
20	Manganese (as Mn)	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	*BDL(**DL-0.05)	mg/l	0.1	0.3
21	Ammonia (as NH <sub>3</sub> )	IS-3025 (Part-34)- 1988, RA. 2019	*BDL(**DL-0.3)	mg/l	0.5	No Relaxation
22	Boron (as B)	APHA 23rd Edition Year 2017 Method No. 4500B	*BDL(**DL-0.2)	mg/l	0.5	1.0
23	Cyanide (as CN)	APHA 23rd Edition 2017, 4500CN D	*BDL(**DL-0.05)	mg/l	0.05	No Relaxation
24	Colour	IS 3025: 1983 (P-4) RA.. 2017	*BDL(**DL 1.0)	Hazen Unit	5	15
25	Odour	IS 3025 (P-5): RA. 2018	Agreeable	Qualitative	Agreeable	Agreeable
26	Taste	IS 3025(P-8):1984 RA. 2017	Agreeable	Qualitative	Agreeable	Agreeable
27	Sulphide	IS: 3025 (Part 29): 1986, RA. 2009 Turbidity Method	*BDL(**DL-0.05)	mg/l	200	400
28	Phenolic Compound	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.001)	mg/l	0.001	0.002
29	Anionic Surface Active Agent	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05)	mg/l	0.2	1.0
30	Free Residual Chlorine	IS: 3025 (Part 26): 1986 RA 2019	*BDL(**DL-0.2)	mg/l	0.2	1
31	Mineral Oil	IS 3025(P-39)	*BDL(**DL-0.05)	mg/l	0.5	No Relaxation
32	Barium as (Ba)	APHA3111B	*BDL(**DL-0.02)	mg/l	0.7	No Relaxation
33	Faecal Caliform	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	

  
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# Vardan EnviroLab

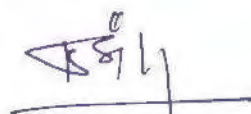
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
ISO 9001 | ISO 14001 | ISO 45001


## Test Report

Sample Number:	VEL/DW/08	Report No.:	VEL/W/2109180008
Name & Address of Party:	M/s Raipur Energen Limited Formerly GMR Chhattisgarh Energy Ltd Village- Raikheda, Block- Tilda, Dist- Raipur Chhattisgarh	Format No.:	7.8 F 01
		Party Reference No.:	NIL
		Reporting Date:	21/09/2021
Sample Description:	Water Sample	Period of Analysis:	18-21/09/2021
Sampling Location:	Near Field Hostal	Receipt Date:	18/09/2021
Sample Collected by	Vardan EnviroLab Representative	Sampling Date:	14/09/2021
Preservation:	Refrigerated	Sampling Type:	Grab
Sampling & Analysis Protocol:	IS-10500-2012	Sample Quantity:	2.0 Ltr.

### TEST RESULTS

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	pH	IS 3025 (P-11): 1983 Reaff. 2017	7.47	--	6.5 to 8.5	No Relaxation
2	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	308.0	mg/l	500	2000
3	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	177.30	mg/l	200	600
4	Total Hardness (as CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	174.60	mg/l	200	600
5	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019	2.36	mg/l	45	No Relaxation
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	72.45	mg/l	250	1000
7	Sulphate (as SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	18.29	mg/l	200	400
8	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019	55.98	mg/l	75	200
9	Magnesium (as Mg)	IS: 3025 (Part 46): 1994, Reaff. 2009 (EDTA method)	8.42	mg/l	30	100
10	Fluorides (as F)	APHA 23rd Edition 2017, 4500 FD	0.30	mg/l	1.0	1.5
11	Total Iron (as Fe)	IS 3025(P-53): 2003 Reaffirm 2019	0.14	mg/l	1.0	No Relaxation
12	Arsenic (as As)	APHA (23rd edition-2017), 3114 C	*BDL(**DL-0.005)	mg/l	0.01	No Relaxation
13	Copper (as Cu)	APHA 23rd Edition Year 2017 Method No. 3111B	*BDL(**DL-0.02)	mg/l	0.05	1.5
14	Zinc (as Zn)	APHA (23rd edition-2017), 3030D, 3113 B	*BDL(**DL-0.20)	mg/l	5.0	15
15	Selenium (as Se)	APHA (23rd edition-2017), 3114C	*BDL(**DL-0.005)	mg/l	0.01	No Relaxation
16	Total Coli form (By MPN Method)	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	NA
17	E-Coli	IS:1622	Absent	per 100 ml	Absent/100 ml	Absent/100 ml
18	Turbidity	IS 3025 (Part 10): 1984, Ref: 2017, (Nephelometric Method)	*BDL(**DL 1.0)	NTU	1	5

  
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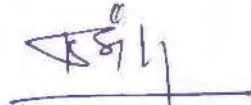



# Vardan EnviroLab

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

## Test Report

19	Aluminium	IS 3025 (Part-55): 2003, Reaff. 2019	*BDL(**DL-0.03)	mg/l	0.03	0.2
20	Manganese (as Mn)	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	*BDL(**DL-0.05)	mg/l	0.1	0.3
21	Ammonia (as NH <sub>3</sub> )	IS-3025 (Part-34)- 1988, RA. 2019	*BDL(**DL-0.3)	mg/l	0.5	No Relaxation
22	Boron (as B)	APHA 23rd Edition Year 2017 Method No. 4500B	*BDL(**DL-0.2)	mg/l	0.5	1.0
23	Cyanide (as CN)	APHA 23rd Edition 2017, 4500CN D	*BDL(**DL-0.05)	mg/l	0.05	No Relaxation
24	Colour	IS 3025: 1983 (P-4) RA. 2017	*BDL(**DL 1.0)	Hazen Unit	5	15
25	Odour	IS 3025 (P-5): RA. 2018	Agreeable	Qualitative	Agreeable	Agreeable
26	Taste	IS 3025(P-8):1984 RA. 2017	Agreeable	Qualitative	Agreeable	Agreeable
27	Sulphide	IS: 3025 (Part 29): 1986, RA. 2009 Turbidity Method	*BDL(**DL-0.05)	mg/l	200	400
28	Phenolic Compound	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.001)	mg/l	0.001	0.002
29	Anionic Surface Active Agent	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05)	mg/l	0.2	1.0
30	Free Residual Chlorine	IS: 3025 (Part 26): 1986 RA 2019	*BDL(**DL-0.2)	mg/l	0.2	1
31	Mineral Oil	IS 3025(P-39)	*BDL(**DL-0.05)	mg/l	0.5	No Relaxation
32	Barium as (Ba)	APHA3111B	*BDL(**DL-0.02)	mg/l	0.7	No Relaxation
33	Faecal Caliform	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	--

  
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(Authorized Signatory)





# Vardan EnviroLab

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

## Test Report

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

Report No.: VEL/W/2109180009  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Reporting Date: 21/09/2021

Sample Description: Water Sample  
Sampling Location: Village- Mura Hand Pump Water  
Sample Collected by: Vardan EnviroLab Representative  
Preservation: Refrigerated  
Sampling & Analysis Protocol: IS-10500-2012

Period of Analysis: 18-21/09/2021  
Receipt Date: 18/09/2021  
Sampling Date: 14/09/2021

Sampling Type: Grab

Sample Quantity: 2.0 Ltr.

### TEST RESULTS

S.No.	Parameters	Protocols	Results	Units	IS:10500-2012	
					Acceptable Limits	Permissible Limits
1	pH	IS 3025 (P-11): 1983 Reaff. 2017	7.56	--	6.5 to 8.5	No Relaxation
2	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	342.0	mg/l	500	2000
3	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	169.40	mg/l	200	600
4	Total Hardness (as CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	186.24	mg/l	200	600
5	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019	2.31	mg/l	45	No Relaxation
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	81.73	mg/l	250	1000
7	Sulphate (as SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	22.29	mg/l	200	400
8	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019	59.09	mg/l	75	200
9	Magnesium (as Mg)	IS: 3025 (Part 46): 1994, Reaff. 2009 (EDTA method)	9.36	mg/l	30	100
10	Fluorides (as F)	APHA 23rd Edition 2017, 4500 FD	0.29	mg/l	1.0	1.5
11	Total Iron (as Fe)	IS 3025(P-53): 2003 Reaffirm 2019	0.18	mg/l	1.0	No Relaxation
12	Arsenic (as As)	APHA (23rd edition-2017), 3114 C	*BDL(**DL-0.005)	mg/l	0.01	No Relaxation
13	Copper (as Cu)	APHA 23rd Edition Year 2017 Method No. 3111B	*BDL(**DL-0.02)	mg/l	0.05	1.5
14	Zinc (as Zn)	APHA (23rd edition-2017), 3030D, 3113 B	*BDL(**DL-0.20)	mg/l	5.0	15
15	Selenium (as Se)	APHA (23rd edition-2017), 3114C	*BDL(**DL-0.005)	mg/l	0.01	No Relaxation
16	Total Coli form (By MPN Method)	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	NA
17	E-Coli	IS:1622	Absent	per 100 ml	Absent/100 ml	Absent/100 ml
18	Turbidity	IS 3025 (Part 10): 1984, Ref: 2017, (Nephelometric Method)	*BDL(**DL 1.0)	NTU	1	5

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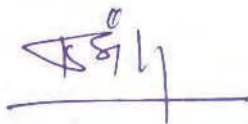



# Vardan EnviroLab

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

## Test Report

19	Aluminium	IS 3025 (Part-55): 2003, Reaff. 2019	*BDL(**DL-0.03)	mg/l	0.03	0.2
20	Manganese (as Mn)	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	*BDL(**DL-0.05)	mg/l	0.1	0.3
21	Ammonia (as NH <sub>3</sub> )	IS-3025 (Part-34)- 1988, RA. 2019	*BDL(**DL-0.3)	mg/l	0.5	No Relaxation
22	Boron (as B)	APHA 23rd Edition Year 2017 Method No. 4500B	*BDL(**DL-0.2)	mg/l	0.5	1.0
23	Cyanide (as CN)	APHA 23rd Edition 2017, 4500CN D	*BDL(**DL-0.05)	mg/l	0.05	No Relaxation
24	Colour	IS 3025: 1983 (P-4) RA. 2017	*BDL(**DL 1.0)	Hazen Unit	5	15
25	Odour	IS 3025 (P-5): RA. 2018	Agreeable	Qualitative	Agreeable	Agreeable
26	Taste	IS 3025(P-8):1984 RA. 2017	Agreeable	Qualitative	Agreeable	Agreeable
27	Sulphide	IS: 3025 (Part 29): 1986, RA. 2009 Turbidity Method	*BDL(**DL-0.05)	mg/l	200	400
28	Phenolic Compound	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.001)	mg/l	0.001	0.002
29	Anionic Surface Active Agent	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05)	mg/l	0.2	1.0
30	Free Residual Chlorine	IS: 3025 (Part 26): 1986 RA 2019	*BDL(**DL-0.2)	mg/l	0.2	1
31	Mineral Oil	IS 3025(P-39)	*BDL(**DL-0.05)	mg/l	0.5	No Relaxation
32	Barium as (Ba)	APHA3111B	*BDL(**DL-0.02)	mg/l	0.7	No Relaxation
33	Faecal Caliform	IS:1622	Absent	MPN/100 ml	Shall not be Detectable in any 100 ml sample	--

  
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(Authorized Signatory)



#### 4.4 Surface water Quality Analysis



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

Location Code: - SW1. Raikheda Talab

SW2. Bangoli Dam

SW3. Mura Talab

SW4. Chhicholi Talab



# Vardan EnviroLab

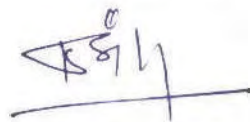
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
ISO 9001 | ISO 14001 | ISO 45001


## Test Report

Sample Number:	VEL/DW/01	Report No.:	VEL/W/2109180001
Name & Address of Party:	M/s Raipur Energen Limited Formerly GMR Chhattisgarh Energy Ltd Village- Raikheda, Block- Tilda, Dist- Raipur Chhattisgarh	Format No.:	7.3 F 01
		Party Reference No.:	NIL
		Reporting Date:	21/09/2021
		Period of Analysis:	18-21/09/2021
Sample Description:	Water Sample	Receipt Date:	18/09/2021
Sampling Location:	Village- Raikheda (Pond Water)	Sampling Date:	14/09/2021
Sample Collected by	Vardan EnviroLab Representative	Sampling Type:	Grab
Preservation:	Refrigerated	Sample Quantity:	2.0 Ltr.
Sampling & Analysis Protocol:	IS-10500-2012		

### TEST RESULTS

S.No.	Test Parameters	Test Method	Results	Units
1	Colour	IS 3025: 1987 (P-4) Reaff.2017	*BDL(**DL 1.0)	Hazen
2	Odour	IS 3025 (P-5) : 2018	Agreeable	--
3	pH value	IS 3025 (P-11): 1983 Reaff. 2017	7.23	--
4	Turbidity	IS 3025 (Part 18): 1984, Reaff: 2017, (Nepbelometric Method)	4.0	NTU
5	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	190.0	mg/l
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	52.01	mg/l
7	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	98.5	mg/l
8	Total Hardness [CaCO <sub>3</sub> ]	IS: 3025 (Part 21): 2009, Reaff. 2019	93.12	mg/l
9	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019 (EDTA method)	32.66	mg/l
10	Magnesium	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	2.79	mg/l
11	Fluoride ( as F)	APHA 23rd Edition 2017, 4500FD	0.29	mg/l
12	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019 (Chromotropic Method)	1.92	mg/l
13	Phenolic compounds	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.1)	mg/l
14	Anionic Surface active agents (as MBAS)	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05)	mg/l
15	Dissolved oxygen	IS : 3025 (Part-38) : 1989, Ref: 2019	5.5	mg/l
16	Biochemical Oxygen Demand (BOD) [ 3 days at 27°C]	IS: 3025 (Part-44): 1993, Ref: 2019	4.0	mg/l
17	Chemical Oxygen Demand (COD)	IS : 3025 (Part 58) : 2006ref: 2017	14.0	mg/l
18	Residual Free Chlorine	IS:3025(P-26):1986,RA:2019:1986	*BDL(**DL-0.2)	mg/l

  
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# Vardan EnviroLab

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

## Test Report

19	Zinc as (Zn)	APHA (23rd edition), 3030D,3113B	*BDL(**DL-0.20)	mg/l
20	Copper (Cu)	APHA (23rd edition), 3111B	*BDL(**DL-0.02)	mg/l
21	Lead as Pb	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.005)	mg/l
22	Arsenic as As	APHA (23rd edition), 3030D,3114C, 2017	*BDL(**DL-0.005)	mg/l
23	Cyanide as CN	APHA 4500 CN -D	*BDL(**DL-0.05)	mg/l
24	Aluminium as Al	IS 3025 (P-55) 2003, RA 2019	*BDL(**DL-0.03)	mg/l
25	Boron	APHA (23rd edition) 4500B, 2017	*BDL(**DL-0.2)	mg/l
26	Chromium as Cr	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.02)	mg/l
27	Cadmium as Cd	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.002)	mg/l
28	Selenium as Se	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.005)	mg/l
29	Mercury as Hg	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.0005)	mg/l
30	O & G	IS 3025 (P-39) 1991, RA 2019	*BDL(**DL-0.5)	mg/l
31	Sulphate as (SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	8.54	mg/l
32	Iron	IS:3025(P-53):2003,RA.2019:2003	0.12	mg/l
33	Manganese as Mn	APHA3111B	*BDL(**DL-0.05)	mg/l

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# Vardan EnviroLab

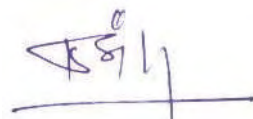
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
ISO 9001 | ISO 14001 | ISO 45001


## Test Report

Sample Number:	VEL/DW/02	Report No.:	VEL/W/2109180002
Name & Address of Party:	M/s Raipur Energen Limited Formerly GMR Chhattisgarh Energy Ltd Village- Raikheda, Block- Tilda, Dist- Raipur Chhattisgarh	Format No.:	7.8 F 01
		Party Reference No.:	NIL
		Reporting Date:	21/09/2021
Sample Description:	Water Sample	Period of Analysis:	18-21/09/2021
Sampling Location:	Village- Chicholi (Pond Water)	Receipt Date:	18/09/2021
Sample Collected by	Vardan EnviroLab Representative	Sampling Date:	14/09/2021
Preservation:	Refrigerated	Sampling Type:	Grab
Sampling & Analysis Protocol:	IS-10500-2012	Sample Quantity:	2.0 Ltr.

### TEST RESULTS

S.No.	Test Parameters	Test Method	Results	Units
1	Colour	IS 3025: 1987 (P-4) Reaff.2017	*BDL(**DL 1.0)	Hazen
2	Odour	IS 3025 (P-5) : 2018	Agreeable	--
3	pH value	IS 3025 (P-11): 1983 Reaff. 2017	7.38	--
4	Turbidity	IS 3025 (Part 10): 1984, Reaff: 2017, (Nephelometric Method)	3.0	NTU
5	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	272.0	mg/l
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	79.08	mg/l
7	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	141.80	mg/l
8	Total Hardness (CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	159.08	mg/l
9	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019 (EDTA method)	55.73	mg/l
10	Magnesium	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	18.82	mg/l
11	Fluoride ( as F)	APHA 23rd Edition 2017, 4500FD	0.31	mg/l
12	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019 (Chromotropic Method)	5.62	mg/l
13	Phenolic compounds	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.1)	mg/l
14	Anionic Surface active agents (as MBAS)	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05)	mg/l
15	Dissolved oxygen	IS : 3025 (Part-38) : 1989, Ref: 2019	5.3	mg/l
16	Biochemical Oxygen Demand (BOD) ( 3 days at 27°C)	IS: 3025 (Part-44): 1993, Ref: 2019	10.0	mg/l
17	Chemical Oxygen Demand (COD)	IS : 3025 (Part 58) : 2006ref: 2017	26.0	mg/l
18	Residual Free Chlorine	IS:3025(P-26):1986,RA:2019:1986	*BDL(**DL-0.2)	mg/l

  
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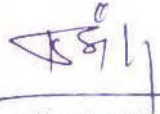



# Vardan EnviroLab

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

## Test Report

19	Zinc as (Zn)	APHA (23rd edition), 3030D,3113B	*BDL(**DL-0.20)	mg/l
20	Copper (Cu)	APHA (23rd edition), 3111B	*BDL(**DL-0.02)	mg/l
21	Lead as Pb	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.005)	mg/l
22	Arsenic as As	APHA (23rd edition), 3030D,3114C, 2017	*BDL(**DL-0.005)	mg/l
23	Cyanide as CN	APHA 4500 CN -D	*BDL(**DL-0.05)	mg/l
24	Aluminium as Al	IS 3025 (P-55) 2003, RA 2019	*BDL(**DL-0.03)	mg/l
25	Boron	APHA (23rd edition) 4500B, 2017	*BDL(**DL-0.2)	mg/l
26	Chromium as Cr	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.02)	mg/l
27	Cadmium as Cd	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.002)	mg/l
28	Selenium as Se	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.005)	mg/l
29	Mercury as Hg	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.0005)	mg/l
30	O & G	IS 3025 (P-39) 1991, RA 2019	*BDL(**DL-0.5)	mg/l
31	Sulphate as (SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	12.41	mg/l
32	Iron	IS:3025(P-53):2003,RA.2019:2003	0.21	mg/l
33	Manganese as Mn	APHA3111B	*BDL(**DL-0.05)	mg/l

  
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# Vardan EnviroLab

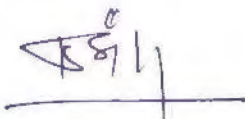
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
ISO 9001 | ISO 14001 | ISO 45001

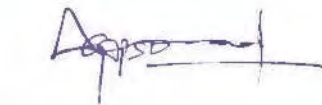
## Test Report

Sample Number:	VEL/DW/03	Report No.:	VEL/W/2109180003
Name & Address of Party:	M/s Raipur Energen Limited Formerly GMR Chhattisgarh Energy Ltd Village- Raikheda, Block- Tilda, Dist- Raipur Chhattisgarh	Format No.:	7.8 F 01
		Party Reference No.:	NIL
		Reporting Date:	21/09/2021
Sample Description:	Water Sample	Period of Analysis:	18-21/09/2021
Sampling Location:	Village- Bangoli Dam (Pond Water)	Receipt Date:	18/09/2021
Sample Collected by	Vardan EnviroLab Representative	Sampling Date:	14/09/2021
Preservation:	Refrigerated	Sampling Type:	Grab
Sampling & Analysis Protocol:	IS-10500-2012	Sample Quantity:	2.0 Ltr.

### TEST RESULTS

S.No.	Test Parameters	Test Method	Results	Units
1	Colour	IS 3025: 1987 (P-4) Reaff.2017	*BDL(**DL 1.0)	Hazen
2	Odour	IS 3025 (P-5) : 2018	Agreeable	--
3	pH value	IS 3025 (P-11): 1983 Reaff. 2017	7.26	--
4	Turbidity	IS 3025 (Part 10): 1984, Reaff: 2017, (Nephelometric Method)	2.0	NTU
5	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	190.0	mg/l
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	68.73	mg/l
7	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	126.10	mg/l
8	Total Hardness (CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	166.84	mg/l
9	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019 (EDTA method)	49.76	mg/l
10	Magnesium	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	10.31	mg/l
11	Fluoride ( as F)	APHA 23rd Edition 2017, 4500FD	0.32	mg/l
12	Nitrate (as ND3)	IS: 3025 (Part 34): 1988, Reaff. 2019 (Chromotropic Method)	5.68	mg/l
13	Phenolic compounds	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.1)	mg/l
14	Anionic Surface active agents (as MBAS)	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05)	mg/l
15	Dissolved oxygen	IS : 3025 (Part-38) : 1989, Ref: 2019	5.2	mg/l
16	Biochemical Oxygen Demand (BOD) [ 3 days at 27°C)	IS: 3025 (Part-44): 1993, Ref: 2019	8.0	mg/l
17	Chemical Oxygen Demand (COD)	IS : 3025 (Part 58) : 2006ref: 2017	26.0	mg/l
18	Residual Free Chlorine	IS:3025(P-26):1986,RA:2019:1986	*BDL(**DL-0.2)	mg/l

  
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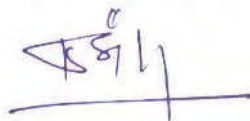


# Vardan EnviroLab

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

## Test Report

19	Zinc as (Zn)	APHA (23rd edition), 3030D,3113B	*BDL(**DL-0.20)	mg/l
20	Copper (Cu)	APHA (23rd edition), 3111B	*BDL(**DL-0.02)	mg/l
21	Lead as Pb	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.005)	mg/l
22	Arsenic as As	APHA (23rd edition), 3030D,3114C, 2017	*BDL(**DL-0.005)	mg/l
23	Cyanide as CN	APHA 4500 CN-D	*BDL(**DL-0.05)	mg/l
24	Aluminium as Al	IS 3025 (P-55) 2003, RA 2019	*BDL(**DL-0.03)	mg/l
25	Boron	APHA (23rd edition) 4500B, 2017	*BDL(**DL-0.2)	mg/l
26	Chromium as Cr	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.02)	mg/l
27	Cadmium as Cd	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.002)	mg/l
28	Selenium as Se	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.005)	mg/l
29	Mercury as Hg	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.0005)	mg/l
30	O & G	IS 3025 (P-39) 1991, RA 2019	*BDL(**DL-0.5)	mg/l
31	Sulphate as (SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	13.44	mg/l
32	Iron	IS:3025(P-53):2003,RA.2019:2003	0.20	mg/l
33	Manganese as Mn	APHA3111B	*BDL(**DL-0.05)	mg/l

  
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# Vardan EnviroLab

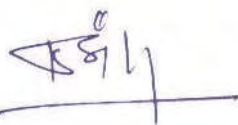
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
ISO 9001 | ISO 14001 | ISO 45001


## Test Report

Sample Number:	VEL/DW/04	Report No.:	VEL/W/2109180004
Name & Address of Party:	M/s Raipur Energen Limited Formerly GMR Chhattisgarh Energy Ltd Village- Raikheda, Block- Tilda, Dist- Raipur Chhattisgarh	Format No.:	7.8 F 01
		Party Reference No.:	NIL
		Reporting Date:	21/09/2021
Sample Description:	Water Sample	Period of Analysis:	18-21/09/2021
Sampling Location:	Village- Mura (Pond Water)	Receipt Date:	18/09/2021
Sample Collected by	Vardan EnviroLab Representative	Sampling Date:	14/09/2021
Preservation:	Refrigerated	Sampling Type:	Grab
Sampling & Analysis Protocol:	IS-10500-2012	Sample Quantity:	2.0 Ltr.

### TEST RESULTS

S.No.	Test Parameters	Test Method	Results	Units
1	Colour	IS 3025: 1987 (P-4) Reaff.2017	*BDL(**DL 1.0)	Hazen
2	Odour	IS 3025 (P-5) : 2018	Agreeable	--
3	pH value	IS 3025 (P-11): 1983 Reaff. 2017	7.52	--
4	Turbidity	IS 3025 (Part 10): 1984, Reaff: 2017. (Nephelometric Method)	4.0	NTU
5	Total Dissolved Solids	IS 3025 (P-16): 1984 Reaff 2017	210.0	mg/l
6	Chloride (as Cl)	IS: 3025 (Part 32): 1988, Reaff. 2019	53.87	mg/l
7	Total Alkalinity (as CaCO <sub>3</sub> )	IS: 3025 (Part 23): 1986, Reaff. 2019	94.60	mg/l
8	Total Hardness (CaCO <sub>3</sub> )	IS: 3025 (Part 21): 2009, Reaff. 2019	108.64	mg/l
9	Calcium (as Ca)	IS: 3025 (Part 40): 1991 Reaff. 2019 (EDTA method)	35.77	mg/l
10	Magnesium	IS: 3025 (Part 46): 1994, Reaff. 2019 (EDTA method)	4.67	mg/l
11	Fluoride ( as F)	APHA 23rd Edition 2017, 4500FD	0.32	mg/l
12	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part 34): 1988, Reaff. 2019 (Chromotropic Method)	3.82	mg/l
13	Phenolic compounds	APHA 23rd Edition 2017, 5530C	*BDL(**DL-0.1)	mg/l
14	Anionic Surface active agents (as MBAS)	APHA 23rd Edition 2017, 5540C	*BDL(**DL-0.05)	mg/l
15	Dissolved oxygen	IS : 3025 (Part-38) : 1989, Ref: 2019	5.3	mg/l
16	Biochemical Oxygen Demand (BOD) ( 3 days at 27°C)	IS: 3025 (Part-44): 1993, Ref: 2019	6.0	mg/l
17	Chemical Oxygen Demand (COD)	IS : 3025 (Part 5B) : 2006ref: 2017	30.0	mg/l
18	Residual Free Chlorine	IS:3025(P-26):1986,RA:2019:1986	*BDL(**DL-0.2)	mg/l

  
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(Authorized Signatory)





# Vardan EnviroLab

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

## Test Report

19	Zinc as (Zn)	APHA (23rd edition), 3030D,3113B	*BDL(**DL-0.20)	mg/l
20	Copper (Cu)	APHA (23rd edition), 3111B	*BDL(**DL-0.02)	mg/l
21	Lead as Pb	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.005)	mg/l
22	Arsenic as As	APHA (23rd edition), 3030D,3114C, 2017	*BDL(**DL-0.005)	mg/l
23	Cyanide as CN	APHA 4500 CN -D	*BDL(**DL-0.05)	mg/l
24	Aluminium as Al	IS 3025 (P-55) 2003, RA 2019	*BDL(**DL-0.03)	mg/l
25	Boron	APHA (23rd edition) 4500B, 2017	*BDL(**DL-0.2)	mg/l
26	Chromium as Cr	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.02)	mg/l
27	Cadmium as Cd	APHA (23rd edition), 3030D,3113B, 2017	*BDL(**DL-0.002)	mg/l
28	Selenium as Se	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.005)	mg/l
29	Mercury as Hg	APHA (23rd edition),3114C, 2017	*BDL(**DL-0.0005)	mg/l
30	O & G	IS 3025 (P-39) 1991, RA 2019	*BDL(**DL-0.5)	mg/l
31	Sulphate as (SO <sub>4</sub> )	IS: 3025 (Part 24): 1986, Reaff. 2019 Turbidity Method	12.92	mg/l
32	Iron	IS:3025(P-53):2003,RA.2019:2003	0.22	mg/l
33	Manganese as Mn	APHA3111B	*BDL(**DL-0.05)	mg/l

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### 4.5 Soil Quality Analysis



**Figure No. 8. Plan Showing Soil Sample Monitoring Location Map**

Location Code: -

- S1- Near Field Hostel
- S2- Raikhera Village
- S3- Mura Village
- S4- Gaitara Village
- S5- Chicholi Village



# Vardan EnviroLab

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

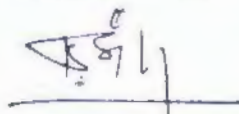
## Test Report

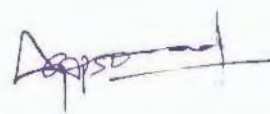
Sample Number : VEL/SO/01  
Name & Address of the Party : M/s Raipur Energen Limited  
Formerly GMR Chhattisgarh Energy Ltd  
Village- Raikheda, Block- Tilda, Dist- Raipur Chhattisgarh

Report No.: VEL/SO/2109180001  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Reporting Date: 21/09/2021  
Period of Analysis : 18-21/09/2021  
Receipt Date: 18/09/2021  
Sampling Date: 14/09/2021  
Sample Quantity: 2 kg.  
Sampling Type: Composite  
Packing Status: Temp. Sealed

Sample Description : SOIL  
Location : Near Field Hostel  
Sample Collected By : VEL Team  
Parameter Required : As per work order  
Sampling and Analysis Protocol : IS 2720, APHA & USDA

S. No.	Parameters	Test Method	Results	Units
1	pH(at 25°C)	IS: 2720 (P- 26): 1907,RA: 2016	7.34	-
2	Electrical Conductivity	IS14767: 2800 RA:2016	0.168	mS/cm
3	Colour	USDA:1954-Reaffirmed,2010	Grey	-
4	Water holding capacity	USDA:1954-Reaffirmed,2010	20.12	%
5	Bulkdensity	USDA:1954(Page-121) RA: 2014	1.18	gm/cc
6	Chloride	USDA:1954Method 13 (Page-98) RA: 2010	252.13	mg/kg
7	Calcium(as Ca)	LabSOP no. VEL/STP/01: 2018	250.37	mg/kg
0	Sodium(as Na)	USDA:1954Method 10A (Page-96) RA: 2010	141.28	mg/kg
9	Potassium(as K)	LabSOP no. VEL/STP/01: 2018	82.64	Kg/hect.
10	Organic Matter	IS2720 (P-22) 1972 RA:2015	0.40	%
11	Magnesium(as Mg)	LabSOP no. VEL/STP/01: 2018	156.19	mg/kg
12	Available Nitrogen (as N)	IS: 14684,1999 RA: 2015	248.33	kg./hect.
13	Total Zinc (as Zn)	USEPA3050 B: 1996	50.41	mg/kg
14	Total Manganese (as Mn)	USEPA3050	172.34	mg/kg
15	Total Chromium (as Cr)	USEPA3058 B:1996	6.12	mg/kg
16	Total Lead (as Pb)	USEPA3050 B: 1996	14.26	mg/kg
17	Total Cadmium (as Cd)	USEPA3050	9.43	mg/kg
18	Total Copper (as Cu)	USEPA3050 B: 1996	10.55	mg/kg
19	Soil Texture	IS:2720(P-4) RA:2006	Silty Clay	--
20	Available Phosphorus	Lab SOP No.VEL/STP/01:2018	38.10	kg./hect.

  
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# Vardan EnviroLab

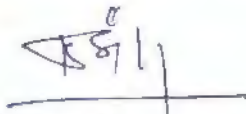
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
ISO 9001 | ISO 14001 | ISO 45001

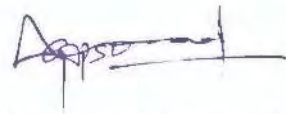
## Test Report

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  
Report No.: VEL/S0/2109180002  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Reporting Date: 21/09/2021  
Period of Analysis : 18-21/09/2021  
Receipt Date: 18/09/2021  
Sampling Date: 14/09/2021  
Sample Quantity: 2 kg.  
Sampling Type: Composite  
Packing Status: Temp. Sealed

Sample Description : SOIL  
Location : Village- Raikheda  
Sample Collected By : VEL Team  
Parameter Required : As per work order  
Sampling and Analysis Protocol : IS 2720, APHA & USDA

S. No.	Parameters	Test Method	Results	Units
1	pH(at 25°C)	IS: 2720 (P- 26): 1987,RA: 2016	7.14	-
2	Electrical Conductivity	IS14767: 2000 RA:2016	0.138	mS/cm
3	Colour	USDA:1954-Reaffirmed,2010	Grey	-
4	Water holding capacity	USDA:1954-Reaffirmed,2010	34.20	%
5	Bulkdensity	USDA:1954(Page-121) RA: 2014	1.22	gm/cc
6	Chloride	USDA:1954Method 13 (Page-98) RA: 2010	74.01	mg/kg
7	Calcium(as Ca)	LabSOP no. VEL/STP/01: 2018	396.3	mg/kg
8	Sodium(as Na)	USDA:1954Method 10A (Page-96) RA: 2010	172.5	mg/kg
9	Potassium(as K)	LabSOP no. VEL/STP/01: 2018	268.1	Kg/hect.
10	Organic Matter	IS2720 (P-22) 1972 RA:2015	0.24	%
11	Magnesium(as Mg)	LabSOP no. VEL/STP/01: 2018	136.0	mg/kg
12	Available Nitrogen (as N)	IS: 14684,1999 RA: 2015	216.4	kg./hect.
13	Total Zinc (as Zn)	USEPA3050 B: 1996	64.7	mg/kg
14	Total Manganese (as Mn)	USEPA3050	198.8	mg/kg
15	Total Chromium (as Cr)	USEPA3050 B:1996	4.61	mg/kg
16	Total Lead (as Pb)	USEPA3050 B: 1996	19.0	mg/kg
17	Total Cadmium (as Cd)	USEPA3050	9.2	mg/kg
18	Total Copper (as Cu)	USEPA3050 B: 1996	15.4	mg/kg
19	Soil Texture	IS:2720(P-4) RA:2006	Silty Clay	--
20	Available Phosphorus	Lab SOP No.VEL/STP/01:2018	48.9	kg./hect.

  
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# Vardan EnviroLab

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

## 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  
Report No.: VEL/S0/2109180003  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Reporting Date: 21/09/2021  
Period of Analysis : 18-21/09/2021  
Receipt Date: 18/09/2021  
Sampling Date: 14/09/2021  
Sample Quantity: 2 kg.  
Sampling Type: Composite  
Packing Status: Temp. Sealed

Sample Description : SOIL  
Location : Village-Mura  
Sample Collected By : VEL Team  
Parameter Required : As per work order  
Sampling and Analysis Protocol : IS 2720, APHA & USDA

S. No.	Parameters	Test Method	Results	Units
1	pH(at 25°C)	IS: 2720 (P- 26): 1987,RA: 2016	6.97	-
2	Electrical Conductivity	IS14767: 2000 RA:2016	0.152	mS/cm
3	Colour	USDA:1954-Reaffirmed,2010	Grey	-
4	Water holding capacity	USDA:1954-Reaffirmed,2010	38.6	%
5	Bulkdensity	USDA:1954(Page-121) RA: 2014	1.42	gm/cc
6	Chloride	USDA:1954Method 13 (Page-98) RA: 2010	70.0	mg/kg
7	Calcium(as Ca)	LabSOP no. VEL/STP/81: 2018	423.1	mg/kg
8	Sodium(as Na)	USDA:1954Method 10A (Page-96) RA: 2010	174.8	mg/kg
9	Potassium(as K)	LabSOP no. VEL/STP/01: 2018	276.5	Kg/hect.
10	Organic Matter	IS2720 (P-22) 1972 RA:2015	0.67	%
11	Magnesium(as Mg)	LabSOP no. VEL/STP/01: 2018	143.5	mg/kg
12	Available Nitrogen (as N)	IS: 14684,1999 RA: 2015	238.2	kg./hect.
13	Total Zinc (as Zn)	USEPA3050 B: 1996	71.0	mg/kg
14	Total Manganese (as Mn)	USEPA3050	204.4	mg/kg
15	Total Chromium (as Cr)	USEPA3050 B:1996	6.2	mg/kg
16	Total Lead (as Pb)	USEPA3050 B: 1996	23.1	mg/kg
17	Total Cadmium (as Cd)	USEPA3050	4.86	mg/kg
18	Total Copper (as Cu)	USEPA3050 B: 1996	16.5	mg/kg
19	Soil Texture	IS:2720(P-4) RA:2006	Silty Clay	--
20	Available Phosphorus	Lab SOP No.VEL/STP/01:2018	54.0	kg./hect.

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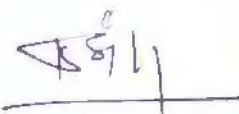
# Vardan EnviroLab

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

## 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  
Report No.: VEL/S0/2109180004  
Format No.: 7.0 F 01  
Party Reference No.: NIL  
Reporting Date: 21/09/2021  
Period of Analysis : 10-21/09/2021  
Sample Description : SOIL  
Location : Village- Gaitara  
Receipt Date: 18/09/2021  
Sample Collected By : VEL Team  
Sampling Date: 14/09/2021  
Parameter Required : As per work order  
Sample Quantity: 2 kg.  
Sampling and Analysis Protocol : IS 2720, APHA & USDA  
Sampling Type: Composite  
Packing Status: Temp. Sealed

S. No.	Parameters	Test Method	Results	Units
1	pH(at 25°C)	IS: 2720 (P- 26): 1987,RA: 2016	7.32	-
2	Electrical Conductivity	IS14767: 2000 RA:2016	0.162	mS/cm
3	Colour	USDA:1954-Reaffirmed,2010	Grey	-
4	Water holding capacity	USDA:1954-Reaffirmed,2010	36.0	%
5	Bulkdensity	USDA:1954(Page-121) RA: 2014	1.28	gm/cc
6	Chloride	USDA:1954Method 13 (Page-98) RA: 2010	64.8	mg/kg
7	Calcium(as Ca)	LabSOP no. VEL/STP/01: 2018	418.2	mg/kg
8	Sodium(as Na)	USDA:1954Method 10A (Page-96) RA: 2010	168.0	mg/kg
9	Potassium(as K)	LabSOP no. VEL/STP/01: 2018	281.6	Kg/hect.
10	Organic Matter	IS2720 (P-22) 1972 RA:2015	0.42	%
11	Magnesium(as Mg)	LabSOP no. VEL/STP/01: 2018	207.3	mg/kg
12	Available Nitrogen (as N)	IS: 14684,1999 RA: 2015	204.7	kg./hect.
13	Total Zinc (as Zn)	USEPA3050 B: 1996	56.9	mg/kg
14	Total Manganese (as Mn)	USEPA3050	198.1	mg/kg
15	Total Chromium (as Cr)	USEPA3050 B:1996	5.8	mg/kg
16	Total Lead (as Pb)	USEPA3050 B: 1996	22.4	mg/kg
17	Total Cadmium (as Cd)	USEPA3050	5.2	mg/kg
18	Total Copper (as Cu)	USEPA3058 B: 1996	16.0	mg/kg
19	Soil Texture	IS:2720(P-4) RA:2006	Silty Clay	--
20	Available Phosphorus	Lab SOP No.VEL/STP/01:2018	51.3	kg./hect.

  
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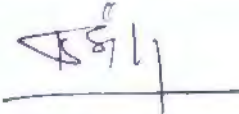
# Vardan EnviroLab

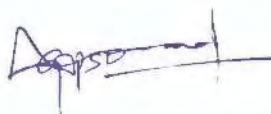
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
ISO 9001 | ISO 14001 | ISO 45001

## 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  
Report No.: VEL/S0/2109180005  
Format No.: 7.8 F 01  
Party Reference No.: NIL  
Reporting Date: 21/09/2021  
Period of Analysis : 18-21/09/2021  
Sample Description : SOIL  
Receipt Date: 18/09/2021  
Location : Village- Chicholi  
Sampling Date: 14/09/2021  
Sample Collected By : VEL Team  
Sample Quantity: 2 kg.  
Parameter Required : As per work order  
Sampling Type: Composite  
Sampling and Analysis Protocol : IS 2720, APHA & USDA  
Packing Status: Temp. Sealed

S. No.	Parameters	Test Method	Results	Units
1	pH(at 25°C)	IS: 2720 (P- 26): 1987,RA: 2016	6.89	-
2	Electrical Conductivity	IS14767: 2000 RA:2016	0.146	mS/cm
3	Colour	USDA:1954-Reaffirmed,2010	Grey	-
4	Water holding capacity	USDA:1954-Reaffirmed,2010	38.4	%
5	Bulkdensity	USDA:1954(Page-121) RA: 2014	1.08	gm/cc
6	Chloride	USDA:1954Method 13 (Page-98) RA: 2010	80.6	mg/kg
7	Calcium(as Ca)	LabSOP no. VEL/STP/01: 2018	392.4	mg/kg
8	Sodium(as Na)	USDA:1954Method 10A (Page-96) RA: 2010	188.0	mg/kg
9	Potassium(as K)	LabSOP no. VEL/STP/01: 2018	302.7	Kg/hect.
10	Organic Matter	IS2720 (P-22) 1972 RA:2015	0.40	%
11	Magnesium(as Mg)	LabSOP no. VEL/STP/01: 2018	173.5	mg/kg
12	Available Nitrogen (as N)	IS: 14684,1999 RA: 2015	242.0	kg./hect.
13	Total Zinc (as Zn)	USEPA3050 B: 1996	60.2	mg/kg
14	Total Manganese (as Mn)	USEPA3050	234.8	mg/kg
15	Total Chromium (as Cr)	USEPA3050 B:1996	5.88	mg/kg
16	Total Lead (as Pb)	USEPA3050 B: 1996	22.7	mg/kg
17	Total Cadmium (as Cd)	USEPA3050	5.69	mg/kg
18	Total Copper (as Cu)	USEPA3050 B: 1996	16.2	mg/kg
19	Soil Texture	IS:2720(P-4) RA:2006	Silty Clay	--
20	Available Phosphorus	Lab SOP No.VEL/STP/01:2018	60.4	kg./hect.

  
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#### 4.6 Effluent Sample Analysis Report



#### Locations

1. STP Outlet



# Vardan EnviroLab

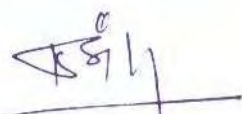
Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Haryana)  
ISO 9001 | ISO 14001 | ISO 45001

## Test Report

Sample Number:	VEL /WW/01	Report No.:	VEL/WW/2109180001
Name & Address of Party:	M/s Raipur Energen Limited Formerly GMR Chhattisgarh Energy Ltd Village- Raikheda, Block- Tilda, Dist- Raipur Chhattisgarh	Format No.:	7.8 F-01
Sample Description:	Waste Water	Party Reference No.:	NIL
Sampling Location :	STP Outlet	Reporting Date:	21/09/2021
Sample Collected by:	Vardan EnviroLab Representative	Period Analysis	18/09/2021 to 21/09/2021
		Receipt Date:	18/09/2021
		Sampling Date:	14/09/2021
		Sampling Quantity:	2 Ltr
		Parameter Required:	As per Work Order

### TEST RESULT

S. No.	Parameter	Test-Method	Result	Unit	Prescribed Limits
1.	pH	IS 3025(P-11):1983.RA.2017	7.14	-	5.5-9.0
2.	Total Suspended Solids	IS 3025(P-17):1984.RA.2017	18.30	mg/l	100.0
3.	Oil & Grease	IS 3025(P-39):1991.RA.2019	0.8	mg/l	10.0
4.	BOD(3 days @ 27°C)	IS 3025(P-44):1993.RA.2019	14.0	mg/l	30.0
5.	COD	IS 3025(P-58):2006.RA.2017	69.0	mg/l	250.0

  
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**Project Name:** Raipur Energen Limited

**Formerly GMR Chhattisgarh Energy Ltd. Village: Raikheda, Block- Tilda, Dist.-Raipur (Chhattisgarh)**

**2nd Quarterly Environmental Monitoring Report**

#### **4.7 Stack Emission Analysis Report**

Locations

1. TPP (Unit-1)
2. TPP (Unit-2)



# Vardan EnviroLab

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

## Test Report

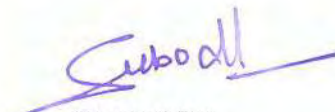
Sample Number: VEL/REL/S/01 Report No.: VEL/S/2109180001  
Name & Address of Party: M/s Raipur Energen Limited Format No.: 5.10 F-01  
Formerly GMR Chhattisgarh Energy Ltd  
Village- Raikheda, Block- Tilda, Dist- Raipur Chhattisgarh  
Party Reference No.: NIL  
Reporting Date: 21/09/2021  
Period of Analysis: 18-21/09/2021  
Sample Description: STACK EMISSION MONITORING Receipt Date: 18/09/2021


Sample Collected : VEL Team  
Date & Time of Sampling : 14/09/2021  
Location : TPP (Unit-I)  
Sampling duration (Minutes) : 28.0 & 11:00 to 11:28 Hrs.  
Meteorological Condition : Clear Sky  
Stack Attached : ESP  
Stack Diameter : 7.5 m  
Stack Height : 275 m  
Instrument calibration status : Calibrated  
Ambient Temperature - Ta (°C) : 32.0  
Temperature of Stack Gases - Ts (°C) : 128  
Velocity of Stack Gases (m/sec.) : 24.68  
Flow rate of PM (LPM) : 36.0  
Total Gas Quantity : 3923194.0 Nm<sup>3</sup>/hr  
Sampling condition : Isokinetic  
Protocol used : IS-11255 & EPA

### RESULTS

S. No.	Parameter	Protocol	Results	Units	Limits
1.	Particulate Matter (as PM)	IS 11255 (P-1) :1985,RA,2014	41.28	mg/Nm <sup>3</sup>	50.0
2.	Sulphur Dioxide (as SO <sub>2</sub> )	IS: 11255 (p-2)1985, RA. 2014	1190.14	mg/Nm <sup>3</sup>	--
3.	Ammonia (as NH <sub>3</sub> )	IS:11255 (P-6):1999,RA.2014	7.91	mg/Nm <sup>3</sup>	--
4.	Hydrogen Sulphide	IS:11255 (P-4):2006,RA.2014	2.13	mg/Nm <sup>3</sup>	--
5.	Oxide of Nitrogen (as NO <sub>2</sub> )	IS 11255 (P-7)RA,2017	342.66	mg/Nm <sup>3</sup>	--
6.	Water Vapor	Gas Analyzer	3.22	%	--
7.	Carbon Monoxide (as CO)	CO By Analyzer	6.17	mg/Nm <sup>3</sup>	--
8.	Carbon Dioxide	IS:13270, Orsat Analysis ,RA 2005	7.18	%	--
9.	Oxygen	SOP, SP-188,Issue No. 01.2018	7.40	%	--
10.	Mercury (as Hg)	APHA 3rd ed,2017, 303A (Page No. 365)	BDL(DL0.005)	mg/Nm <sup>3</sup>	0.03

BDL\*(Below Detection Limit) \*\* (DL Detection Limit)

  
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# Vardan EnviroLab

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

## Test Report

Sample Number: VEL/REL/S/02 Report No.: VEL/S/2109180002  
Name & Address of Party: M/s Raipur Energen Limited  
Formerly GMR Chhattisgarh Energy Ltd  
Village- Raikheda, Block- Tilda, Dist- Raipur Chhattisgarh  
Format No.: 5.10 F-01  
Party Reference No.: NIL  
Reporting Date: 21/09/2021  
Period of Analysis: 18-21/09/2021  
Sample Description: STACK EMISSION MONITORING Receipt Date: 18/09/2021

Sample Collected : VEL Team  
Date & Time of Sampling : 14/09/2021  
Location : TPP (Unit-II)  
Sampling duration (Minutes) : 32.0 & 12:00 to 12:30 Hrs.  
Meteorological Condition : Clear Sky  
Stack Attached : ESP  
Stack Diameter : 7.5 m  
Stack Height : 275 m  
Instrument calibration status : Calibrated  
Ambient Temperature - Ta (°C) : 31.0  
Temperature of Stack Gases - Ts (°C) : 130  
Velocity of Stack Gases (m/sec.) : 21.24  
Flow rate of PM (LPM) : 31  
Total Gas Quantity : 3376363.0 Nm<sup>3</sup>/hr  
Sampling condition : Isokinetic  
Protocol used : IS-11255 & EPA

### RESULTS

S. No.	Parameter	Protocol	Results	Units	Limits
1.	Particulate Matter (as PM)	IS 11255 (P-1) :1985,RA,2014	50.17	mg/Nm <sup>3</sup>	50.0
2.	Sulphur Dioxide (as SO <sub>2</sub> )	IS: 11255 (p-2)1985, RA. 2014	1168.23	mg/Nm <sup>3</sup>	--
3.	Ammonia (as NH <sub>3</sub> )	IS:11255 (P-6):1999,RA.2014	7.74	mg/Nm <sup>3</sup>	--
4.	Hydrogen Sulphide	IS:11255 (P-4):2006,RA.2014	2.06	mg/Nm <sup>3</sup>	--
5.	Oxide of Nitrogen (as NO <sub>2</sub> )	IS 11255 (P-7)RA,2017	412.31	mg/Nm <sup>3</sup>	--
6.	Water Vapor	Gas Analyzer	3.10	%	--
7.	Carbon Monoxide (as CO)	CO By Analyzer	6.39	mg/Nm <sup>3</sup>	--
8.	Carbon Dioxide	IS:13270, Orsat Analysis ,RA 2005	7.12	%	--
9.	Oxygen	SOP, SP-188, Issue No. 01.2018	6.30	%	--
10.	Mercury (as Hg)	APHA 3rd ed,2017, 303A (Page No. 365)	BDL(DL0.005)	mg/Nm <sup>3</sup>	0.03

BDL\*(Below Detection Limit) \*\* (DL Detection Limit)

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## **Chapter – 5.0 CONCLUSION**

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.

<b>Sr. No.</b>	<b>Environmental Parameters</b>	<b>Conclusion</b>
5.1	Air 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 SO <sub>2</sub> , NO <sub>2</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> , CO and Mercury are well within the prescribed limits of NAAQM standards. People of township and of surrounding villages do not have any problems regarding the air quality and have no grievances because of Thermal Power Plant activities.
5.2	Water Environment	The analytical result of the samples from the ground water of villages, surface water from river, 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.
5.3	Noise Environment	The observations taken at four village 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.

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

**Raipur Energen Limited**  
1370 MW (2x685 MW) Coal Based Thermal Power Plant

Annexure II

**Fly Ash Generation & Utilization Details**

Sl. No.	Ash Generation & Utilization (LMT)				Mode of Ash Utilization and Utilization in Each Mode (LMT)				
	Month	Ash Generation	Ash Utilization	% age Utilization	In making of Fly Ash based Bricks / Blocks / Tiles etc.	In construction of Portland Pozzolana Cement	In construction of Highways & Roads including Flyovers	In Reclamation of Low-Lying Area	In Mine Filing (Pond Ash reutilization)
1	April-21	2.136	1.448	67.80	0.033	1.086	0.015	0.070	0.244
2	May-21	2.029	1.896	93.42	0.033	0.610	0.189	0.073	0.991
3	June-21	1.824	1.773	97.18	0.024	1.011	0.019	0.076	0.643
4	July-21	1.989	1.790	89.98	0.038	0.852	0.081	0.121	0.699
5	August-21	1.855	1.734	93.50	0.020	0.676	0.049	0.155	0.835
6	September-21	1.163	1.182	101.56	0.021	0.418	0.016	0.088	0.639
<b>TOTAL</b>		<b>10.997</b>	<b>9.822</b>	<b>89.32</b>	<b>0.168</b>	<b>4.653</b>	<b>0.369</b>	<b>0.581</b>	<b>4.051</b>

**Raipur Energen Limited**  
1370 MW (2x685 MW) Coal Based Thermal Power Plant

Annexure - III

### Green Belt Development Details (till 30.09.2021)

Sl. No.	Description	Quaintly / 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 2020-21	9718 Nos.
6	Total no. of plantation in FY 2021-22 (till 30.09.2021)	5760 Nos.
7	Survival Rate	>90%

### Plant species Planted at Raipur Energen Limited, Raikheda

Sl. No.	Tree Species		Tree (Nos.)
	Scientific Name	Common Name	
<b>A. Planted Species Details:</b>			
1	Dalbergia sisoo	Sisum	1800
2	Azadiracta indica	Neem	3000
3	Peltophorum ferrugineum	Peela Gulmohar (Yellow Flame)	1400
4	Delonix regia	Gulmohar	1500
5	Tamarindus indica	Imli (Tamarind)	120
6	Phyllanthus emblica	Amla /Awalla	120
7	Eagal marmelose	Bel Patri	30
8	Ficus religiosa	Peepal	112
9	Ficus bengalensis	Banyan Tree (Bargad)	108
10	Pongamia pinnata	Karanj	1680
11	Cassia siamia	Kassod	1500
12	Callistemon	Bottle Brush	312
13	Mangifera indica	Mango	460
14	Cassia fistula	Amaltas	2400
15	Ashoka pendula	Ashok	96
16	Mimusoaps illengii	Moulsiri / Bakul	800
<b>B. Naturally regenerated vegetation (Mixed Species)</b>			217762
<b>Total</b>			<b>233200</b>

**Station Name : REL, Raipur**

**Department : CSR, Adani Foundation**

**Half Yearly CSR Report (2021-22)**

adani

Growth  
with  
Goodness



# CSR at A Glance.....

Coverage:- 16 Villages

Population :- 37000

## EDUCATION

- Navodaya Vidyalaya Coaching.
- Prayas Coaching.
- School Celebrations & Events

## COMMUNITY

### Health

- Mobile Medical Health Unit Van.
- Gynae Camps
- Specialized Health Camps
- SuPoshan

## SKILL LIVELIHOOD DEVELOPMENT

- Income Generation Activity
- Women Empowerment
- Gou Jattan
- SRI Program
- ASDC (Sewing Training & Production Centre)
- Community Events Support

## INFRASTRUCTURE DEVELOPMENT

Development / Construction works related to:-

- Community (Village)
- School (Education)
- Health
- ICDS (Anganbadi)
- Public Drinking Infrastructures
- Village Transportaion Infrastructure

## Navodaya Coaching Center (6 Villages Covering) :- 80 Students

Year	Raikheda	Gaitra	Chicholi	Tarashiv	Total
2011		3			3
2012		2			2
2013			1		1
2014	1	2			3
2015	1				1
2016		2			2
2017	4	1	1		6
2018		2		3	5
2019	3		2	3	8
2020	1	3		2	6
2021	2		1	5	8
	<b>12</b>	<b>15</b>	<b>5</b>	<b>13</b>	<b>45</b>



S. L	Total Seat in Navodaya School (Raipur District)	Total Seats for Tilda Block	Total Seats Tilda (Urban)	Total Seats Tilda (Rural)	Adani Foundation Navodaya Successful Candidates. (2021-22)	Total Student Selected till Date.
1	80 Nos.	20 Nos.	6 Nos.	14 Nos.	8 Nos. (Under Rural Seat Reservation Category)	45 Nos. (Since 2011)

## PRAYAS Coaching & Community 5S Training :-

- **Prayas:-** 35 students from local villages are preparing for Defense/ Police Force entrance exam from our Prayas Coaching center located in CSR office, REL Raikheda. Physical Training to students is being imparted & supported by retired Army Federation, Tilda.
- **5S Training:-** 5S training to community enables to learn discipline & effectively execution of work in timebound manner. 50 community members participated in training organized in REL office conference hall.

PRAYAS Coaching



5S Training at REL for Community Members



## Mobile Medical Health Care Unit:-

- **MMHU:-** Free primary health care services to the community is being given at 16 villages by team of experienced Doctor, Nurse & compounder in Mobile Medical Health Care Unit. Total beneficial villagers were 10,364 nos. from MMHU since April'21 till Oct'21.
- **Gynae Camp:-** Total Women/ Girls benefitted since April'21 to Oct'21 is 281 nos.



Month (2021-22)	Gen.	Skin	ENT/ Dental	Cardio Vascular	Ophthal	Gastro Intestine	RTI	Renal & Genitourinary	Neuro/ Muscular	Gyneac	Cancer	Total
April	571			813								1384
May	379			862								1241
June	367			924								1291
July	325			816								1141
Aug	401	46	22	691	15	39	285	3				1502
Sep.	470	33	96	509	60	164	427	5	18	21	0	1803
Oct.	564	63	28	606	15	78	598	10	6	34	0	2002



<b>SuPoshan:-</b> <b>(A flagship CSR Program)</b>		Total Anthropometry	Total SAM identified	Total MAM identified	Total Healthy identified
		25	25	0	0
Particulars	Total No.	No. of villages covered	No. of participants		
Child Anthropometry	25	6	25		
Family Counselling	24	6	157		
Focus Group Discussion	18	6	105		
Cooking Demonstration	6	6	44		
Mass awareness	Poster, Wall writing, Slogan, Rally, Hand Wash & Food Day	6	96		
Webinar					
Tele-Counselling					
Kitchen Garden					
Other					



Global Hand Wash Day 15<sup>th</sup> Oct

## Suposhan Program Activities



## Income Generation Activities (IGA)

- To encourage women self help groups to Income Generation Activity.
- Arranging support assistance for training, exposure visits as per requirement.
- Encourage bank linkage & Marketing Platforms.
- Farmers field Demonstration, training exposure for enhance productivity.
- Dairy Development activity for Cattle owners for income generation activity.

S. L	Activity	Details	No. of Participants	Villages:-
1.	<b>Income Generation Activity (Petticoat Sewing)</b>	10 girls from said gram Panchayat are getting Petticoat Sewing Training at Production Centre.	10	Gaurkheda, Tarashiv, Chicholi
2.	<b>LED Bulb manufacturing training</b>	6 nos. women from SHG are involved in LED Bulb Manufacturing at village Tarashiv	6	Tarashiv
3.	<b>Vermi Compost Bag Screen Printing work (Gothan)</b>	<b>Linkage with Government Project</b>	15	Chicholi
4.	<b>Exhibition participation at Chhattisgarh Rajyaotsav</b>	Chirag Mahila Swa-sahayata Samuh actively participated in Exhibition cum sale at Chhattisgarh Rajyaotsav.	10	Chicholi Raikheda Gaitra
5.	<b>Systematic Rice Intensification (SRI)</b>	23 Farmers from Bartori, Chicholi, Raikheda have cultivated rice through SRI pattern in 23 acres of land.	23	Bartori, Chicholi, Raikheda
6.	<b>Gou Jattan (A Dairy Development Program)</b>	34 farmers were given exposure & training at Sarda Dairy, Kharora for in house dairy unit development, high milking cattle breed, fodder demonstration, medications & vaccinations.	34	Raikheda, Khamahariya, Tarashiv.

### Chhattisgarh Rajyotsov – Exhibition Cum Sale



**“Saheli Mahila Shashakt Silai Samuh” supported by Adani Foundation (RAIPUR ENERGEN LIMITED, RAIKHEDA)** participated in Exhibition cum sale at Chhattisgarh Rajyotsav from 28.10.21 to of inhouse sewing center made products by sewing trainees. Products like School Bag, Tiffin Bag, water bottle bags, Carry Bags, Vegetable bags, Ladies purse, mobile case, nose masks, rice papads ect. Adani Foundation Sarguja Team also participated with products from MUBS like packed masala, rice (Joiphool), nose masks & khada masala. Stall visitors were informed about Adani Foundation services & activities by leaflets distribution. Total products approx. Rs. 16,000/- sold through stall till end of the last day.

## Glimpse of AF-REL Stall



## Gothan Vermi Bag Printing Work



## SRI Field Demonstration



## Gou Jattan Program:-

Gou Jattan program focus on providing secondary income generation oppertunity for farmers & cattle owners in rural region. At the initial phase of program, AF imparts training, exposure & medical aids for cattle& motivates farmers for Animal Husbandry practices.

S.L	5Activity	Target Group	July	Aug	Sep	OCT	Total Benef. (QTY)
1	Deworming	Cattle			70	20	90
2	Vaccination	Cattle			124	31	155
3	Vermi Compost & Azola Training	Cattle Owner	20	30	12	12	74
4	Urea Treatment	Cattle Owners			08	01	09
5	Vermi Bed Distribution	Cattle Owners	07	11	09	06	33
6	Azola Bed Distribution	Cattle Owners	07	15	04	04	32
7	Infertility Treatment	Cattles				01	01
8	Exposure Visits of Cattle Owners	Cattle Owners				34	34

SLD- Gou Jattan Program





## Community Infrastructure Development:

Community Infrastructure Works initiated for the community development this year with special focus on community drinking water, village road,

- Oxygen Plant Shed Construction & Installation completed at Tilda & Kharora.
- C.C. road for infrastructure work started at Bartori.
- CC Road construction work at Tulsi & Chicholi village under WO.
- 950 Meter Potable Pipeline fitting with Water Tank at Raikheda Gaitra under PO process.
- 250 Nos. LED light fitting work Raikheda, Gaitara, Chicholi, Tarashiv, Murra, village under Vendor Registration & PO process.



Oxygen Plant Shed – CHC Tilda

al

# adani

Power

Ref. No: REL/ENV/20-21/ 139

14<sup>th</sup> Sep.,2021

**The Member Secretary,  
Chhattisgarh Environmental Conservation Board**  
Paryavas Bhavan, North Block, Sector 19, Atal Nagar,  
Nawa Raipur, Dist.- Raipur, Chhattisgarh (492002)

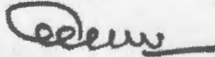
**Sub:** Submission of Environmental Statement Report (Form-V) for our 1370 MW (2×685 MW) coal based thermal power plant at Village-Raikheda, Block – Tilda, District-Raipur, and Chhattisgarh.

Dear Sir,

This has reference to the above subject and the General Conditions of the Environment Clearance Letter above cited issued by MoEF & CC, New Delhi. We are hereby submitting Environmental Statement Report (Form-V) for the period of April' 2020 to March' 2021.

Thanking You,

Yours's faithfully,  
For, M/s Raipur Energen Limited (REL)



**[Gattu Rambhav]**  
**Station Head**

Encl: As cited above

CC : Regional Officer, C.E.C.B. Kabir Nagar, Raipur (C.G.).



**ENVIRONMENTAL STATEMENT REPORT**

**(Year 2020-21)**

**1370 (2×685) MW**

**RAIPUR THERMAL POWER PLANT**

**At**

**VILLAGE RAIKHEDA, GAITARA & CHICHOLI,**

**BLOCK TILDA, DISTRICT RAIPUR**

**CHHATTISGARH**

**Submitted to:**

**CHHATTISGARH ENVIRONMENT CONSERVATION BOARD,  
RAIPUR (C.G.)**

**Submitted by:**

**adani**

**Power**

**Environment Management Department**

**Raipur Energen Limited**

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

**FORM - V**

**(See Rule 14)**

**ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING  
31<sup>st</sup> MARCH 2021**

**PART - A**

- (i) Name and address of owner/occupier of the industry operation or process. : Mr. Rambhav Gattu.  
**Raipur Energen Limited**  
(Formerly Known as GMR Chhattisgarh Energy Limited)  
Village: Raikheda, Block: Tilda  
Distt.: Raipur, Chhattisgarh  
PIN: 493225
- (ii) Industry categories : Large scale industry
- (iii) Production capacity : 1370 (2x685) MW
- (iv) Year of establishment : 2014
- (v) Date of last environmental statement submitted : 21.10.2020

**PART - B**

**WATER AND RAW MATERIAL CONSUMPTION**

**I. Water Consumption (m<sup>3</sup> / Day)**

- Process : 1,341.2 m<sup>3</sup>/day  
Cooling : 43,446 m<sup>3</sup>/day  
Domestic : 74.2 m<sup>3</sup>/day

SN	Name of product	Process water consumption per unit of product output.
1	Electricity	During the current financial Year 2020-21
		2.23 m <sup>3</sup> /MWh

## II. Raw Material Consumption

SN.	Name of raw material	Name of product	Consumption of raw material per unit of output	
			During the Previous financial Year 2019-20	During the current financial Year 2020-21
1	Coal	Electricity	0.67 MT/MWh	0.72 MT/MWh

### PART - C

#### **POLLUTION DISCHARGED TO ENVIRONMENT/ UNIT OF OUTPUT** (Parameter as specified in the consent issued)

SN	Pollutants	Quantity of pollutants discharged (Ton/day)	Concentrations of pollutants in discharges (mg/Nm <sup>3</sup> )	Percentage of variation from prescribed standards with reason
a	Water	0.00	0.00	Plant is designed for zero discharge
b	Air: <b>PM</b>	3.02	30	Within the standards of CECB/CPCB
	SO <sub>2</sub>	111.07	989	Communicated with MoEF & CC regarding time of alignment with CEA phasing plan for achievement of new emission standards.
	NO <sub>x</sub>	52.95	434	Communicated with MoEF & CC regarding time of alignment with CEA phasing plan for achievement of new emission standards.

Monitoring report of ambient air quality, Ground water quality, Surface water quality, Sound level are being submitted regularly to MoEF & CC, CPCB and CECB.

**PART - D**

**HAZARDOUS WASTES**

**AS SPECIFIED UNDER HAZARDOUS WASTES (MANAGEMENT, HANDLING AND TRANS BOUNDARY MOVEMENT) RULES, 2008**

<b>Hazardous wastes</b>	<b>Total quantity (KL)</b>	
	<b>During the previous financial year 2019-20</b>	<b>During the current financial year 2020-21</b>
a) From process	15.048 kl used oil	9.5 KL used oil
b) From pollution control facility	0.00	0.00

**PART - E**

**SOLID WASTES (ASH)**

<b>SN</b>	<b>Solid Wastes</b>	<b>Total Quantity in MT</b>	
		<b>During the previous financial year 2019-20</b>	<b>During the current financial year 2020-21</b>
(a)	From Process (Ash)	1,308,258	1,665,252
(b)	From pollution control facility	0.00	0.00
(c)	(1) Quantity recycled or re-utilized within the unit	0.00	0.00
	(2) Sold	0.00	0.00
	(3) Disposed	1,310,415	1,665,252

## PART- F

**PLEASE SPECIFY THE CHARACTERIZATIONS (IN TERMS OF COMPOSITION OF QUANTUM) OF HAZARDOUS AS WELL AS SOLID WASTE AND INDICATE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTES.**

**Hazardous waste:** Used oil which generated as part of process was collected in MS drum from source; disposed of through Authorized recyclers.

**Solid waste:** Fly ash is generated as solid waste in our plant & we are putting every effort as illustrated below for utilization of fly ash:

- We have made agreements with various cement manufacturers in Dist: Raipur, Balodabazar, Bhilai-Chhattisgarh for utilization of fly ash. Presently, we are providing fly ash to M/S Shree Cement, Ultratech Cement Hirni, Ultra Tech Rawan, J.K.Lakshmi Cement, UTCL-Baikunth and Aditya Cement plant.
- We have made agreements with various Bricks & Blocks manufacturers units in Dist: Raipur, Chhattisgarh for utilization of fly ash. Presently, we are providing fly ash to M/s.Ecorex Buildtech Private Limited, R.K.Bricks, Sun Bricks and Positive Associates etc.
- We have made agreement & signed MOUs with M/s. Shree cement Limited for We are providing Pond Ash approx. 3.0 Lac MT /month and also we are in discussion with various cement manufactures to maximize ash utilization in cement manufacturing.
- In addition to above, we are providing fly ash to Road Projects to M/s. Bilaspur Pathrapali Road Project, Punjab Roadways and in other construction activities.
- Also, we are planning to supply bottom ash in fly ash bricks manufactures for replacement of sand.
- We are in discussion with Local red bricks manufactures for "Use of Bottom Ash in Production of Red Bricks
- We made an agreement with M/s. Sharma construction for lifting Bottom ash and filling for mine stowing.
- Planning and discussion going on with local Mine people for disposal of Pond ash for mines filling for maximum utilization of ash.

## **PART - G**

### **IMPACT OF THE POLLUTION ABATEMENT MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION**

- i) We have been using fly ash brick for all the construction activities in our plant.
- ii) Extensive tree plantation has been already done, as a part of greenbelt development, which will control the impact of Air Pollution and optimize the ambient temperature of surrounding area.
- iii) We have constructed the rainwater harvesting ponds in our plant premises to recharge ground water.
- iv) Rainwater harvesting in the form of conservation of monsoon run off, reuse, and recycle of water is in place.

## **PART - H**

### **ADDITIONAL MEASURES / INVESTMENT PROPOSALS FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION, PREVENTION OF POLLUTION**

- (1) Adoption of Good House-Keeping practices, in which proper & systematic stacking & movement of construction materials, packing material etc. has been implemented.
- (2) All the internal roads have been made pucca in order to reduce fugitive dust emission.
- (3) 03 Nos. Online ambient air quality monitoring systems as well as meteorological monitoring system is installed which helps us to take corrective action instantaneously in case of any deviation. Data of all CAAQMS is connected to board.
- (4) ETP has been installed to treat industrial wastewater if any with online quality monitoring system and PTZ Camera. Data of the same is connected with Board.
- (5) STP is also provided for domestic water treatment.
- (6) Organic Waste Converter is being installed at site for scientific disposal of food waste. The generated manure will be used in green belt development.
- (7) Rain guns and water sprinkling systems has been provided for CHP area.
- (8) We are in process to ban the use of Single use plastic in plant premises and we had hired CII to get the SUP free plant certificate.
- (9) Biodiversity policy has been implemented.
- (10) Integrated Management System has been implemented in plant.
- (11) WE are also planning to Implement IFC performance standards.
- (12) Waste management policy has been implemented and we are working for zero landfill.
- (13) Rainwater Harvesting system will be strengthened to increase the water recharge quantity.





# Vardan EnviroLab

Laboratory: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur (Rajasthan) 302020  
MoEF & CC Recognized | ISO 9001 | ISO 45001



TC-8852

## 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

Report No. : VEL/S/2012230007/A

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 31/12/2020

Period of Analysis : 23/12/2020-31/12/2020

Receipt Date : 23/12/2020

Sample Description : Stack Emission Monitoring

### General Information

Sampling Location : TPP (Unit-I)

Sample Collected by : VEL Team

Date of Sampling : 15/12/2020

Sampling duration (Minutes) : 26 Min. (16.10 to 16.36 hrs.)

Stack attached to : ESP

Make of stack : MS Plate & RCC

Diameter of stack(m) : 7.5 M

Height of stack(m) : 275 M

Instrument calibration status : Calibrated

Meteorological Condition : Clear Sky

Ambient Temperature - Ta (°C) : 27

Temperature of Stack Gases - Ts (°C) : 131

Velocity of Stack Gases (m/sec.) : 27.4

Flow rate of PM (LPM) : 52

Flow rate of Gas (LPM) : 2.0

Sampling condition : OK

Protocol used : IS 11255 & EPA

S.No.	Parameters	Test Method	Results	Units	Limits
1	Particulate Matter (as PM)	IS: 11255 (Part 1) : 1985, RA 2014	39.92	mg/Nm3	50.0
2	Sulphur Dioxide ( as SO <sub>2</sub> )	IS: 11255(P- 2): 1985, RA.2014	1163.63	mg/Nm3	---
3	Ammonia (as NH <sub>3</sub> )	IS: 11255 (P-6) : 1999, RA.2014	8.20	mg/Nm3	---
4	Hydrogen Sulphide	IS: 11255(Part 4): 2006 RA: 2017	2.10	mg/Nm3	---
5	Oxide of Nitrogen as NO <sub>2</sub>	IS-11255 P-7, RA 2017	321.52	mg/Nm3	---

BDL-Below Detection Limit DL Detection Limit

\*\*\*End of Report\*\*\*

(Checked By)



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Page No. 1/1

Note: Terms & conditions refer on backside of test report.



# Vardan EnviroLab



Laboratory: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur (Rajasthan) 302020  
MoEF & CC Recognized | ISO 9001 | ISO 45001

## 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

Report No. : VEL/S/2012230007/B  
Format No : 7.8 F-01  
Party Reference No : NIL  
Report Date : 31/12/2020  
Period of Analysis : 23/12/2020-31/12/2020  
Receipt Date : 23/12/2020

Sample Description : Stack Emission Monitoring

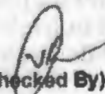
### General Information

Sampling Location : TPP (Unit-I)  
Sample Collected by : VEL Team  
Date of Sampling : 15/12/2020  
Sampling duration (Minutes) : 26 Min. (16.10 to 16.36 hrs.)  
Stack attached to : ESP  
Make of stack : MS Plate & RCC  
Diameter of stack(m) : 7.5 M  
Height of stack(m) : 275 M  
Instrument calibration status : Calibrated  
Meteorological Condition : Clear Sky  
Ambient Temperature - Ta (°C) : 27  
Temperature of Stack Gases - Ts (°C) : 131  
Velocity of Stack Gases (m/sec.) : 27.4  
Flow rate of PM (LPM) : 52  
Flow rate of Gas (LPM) : 2.0  
Sampling condition : Ok  
Protocol used : IS 11255 & EPA

S.No.	Parameters	Test Method	Results	Units	Limits
1	Water Vapor	Gas Analyzer	3.10	%	--
2	Carbon Monoxide ( as CO )	Co By Analyzer	7.44	mg/Nm3	--
3	Carbon Dioxide	IS:13270, Orsat Analysis, RA:2005	7.40	%	--
4	Oxygen	SOP, SP-188, Issue No.01:2018	6.40	%	--
5	Mercury as Hg	APHA 3rd edition 2017, 303A (Page No. 365)	BDL(DL 0.005)	mg/Nm3	0.03

BDL-Below Detection Limit DL Detection Limit

\*\*\*End of Report\*\*\*

  
(Checked By)





# Vardan EnviroLab



Laboratory: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur (Rajasthan) 302020  
MoEF & CC Recognized | ISO 9001 | ISO 45001

## 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

Report No. : VEL/S/2012230008/A

Format No : 7.8 F-01

Party Reference No : NIL

Report Date : 31/12/2020

Period of Analysis : 23/12/2020-31/12/2020

Receipt Date : 23/12/2020

Sample Description : Stack Emission Monitoring

### General Information

Sampling Location : TPP (Unit-II)

Sample Collected by : VEL Team

Date of Sampling : 16/12/2020

Sampling duration (Minutes) : 33 Min. (15.25 to 15.58 hrs.)

Stack attached to : ESP

Make of stack : MS Plate & RCC

Diameter of stack(m) : 7.5 M

Height of stack(m) : 275 M

Instrument calibration status : Calibrated

Meteorological Condition : Clear Sky

Ambient Temperature - Ta (°C) : 28

Temperature of Stack Gases - Ts (°C) : 133

Velocity of Stack Gases (m/sec.) : 21.5

Flow rate of PM (LPM) : 41

Flow rate of Gas (LPM) : 2.0

Sampling condition : Ok

Protocol used : IS 11255 & EPA

S.No.	Parameters	Test Method	Results	Units	Limits
1	Particulate Matter (as PM)	IS: 11255 (Part1) : 1985, RA 2014	44.18	mg/Nm3	50.0
2	Sulphur Dioxide ( as SO2 )	IS: 11255(P- 2): 1985, RA.2014	1159.34	mg/Nm3	---
3	Ammonia (as NH3 )	IS: 11255 (P-6) : 1999, RA.2014	7.42	mg/Nm3	---
4	Hydrogen Sulphide	IS: 11255(Part 4): 2008 RA: 2017	2.30	mg/Nm3	---
5	Oxide of Nitrogen as NO2	IS-11255 P-7, RA 2017	456.68	mg/Nm3	---

BDL - Below Detection Limit DL Detection Limit

\*\*\*End of Report\*\*\*

(Checked By)





# Vardan EnviroLab



Laboratory: Plot No. 24 & 25, Narayan Vihar, B-Block, Jaipur (Rajasthan) 302020  
MoEF & CC Recognized | ISO 9001 | ISO 45001

## 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

Report No. : VEL/S/2012230008/B  
 Format No : 7.8 F-01  
 Party Reference No : NIL  
 Report Date : 31/12/2020  
 Period of Analysis : 23/12/2020-31/12/2020  
 Receipt Date : 23/12/2020

Sample Description : Stack Emission Monitoring

### General Information

Sampling Location : TPP (Unit-II)  
 Sample Collected by : VEL Team  
 Date of Sampling : 15/12/2020  
 Sampling duration (Minutes) : 33 Min. (15.25 to 15.58 hrs.)  
 Stack attached to : ESP  
 Make of stack : MS Plate & RCC  
 Diameter of stack(m) : 7.5 M  
 Height of stack(m) : 275 M  
 Instrument calibration status : Calibrated  
 Meteorological Condition : Clear Sky  
 Ambient Temperature - Ta (°C) : 28  
 Temperature of Stack Gases - Ts (°C) : 133  
 Velocity of Stack Gases (m/sec.) : 21.5  
 Flow rate of PM (LPM) : 41  
 Flow rate of Gas (LPM) : 2.0  
 Sampling condition : Ok  
 Protocol used : IS 11255 & EPA

S.No.	Parameters	Test Method	Results	Units	Limits
1	Water Vapor	Gas Analyzer	3.30	%	--
2	Carbon Monoxide ( as CO )	Co By Analyzer	8.24	mg/Nm <sup>3</sup>	--
3	Carbon Dioxide	IS:13270, Orsat Analysis, RA:2005	7.60	%	--
4	Oxygen	SOP, SP-188, Issue No.01:2018	6.80	%	--
5	Mercury as Hg	APHA 3rd edition 2017, 303A (Page No. 365)	BDL(DL 0.005)	mg/Nm <sup>3</sup>	0.03

BDL - Below Detection Limit DL Detection Limit

\*\*\*End of Report\*\*\*

(Checked By)

