

Ref: GKEL/MOEF&CC/2021-22/7465  
Date: 25.11.2021

To  
**The Director**  
**Eastern Regional Office**  
Ministry of Environment, Forests & Climate Change, Govt. of India  
A/3, Chandrasekharpur, Bhubaneswar, Odisha - 751023

**Sub: Submission of 28<sup>th</sup> Half Yearly EC Compliance Status Report of 1050 (3x350) MW, TPP at Village Kamalanga, Dhenkanal District, Odisha.**

Ref: Env. Clearance vides your letter No. J-13011/64/2007-IA.II (T) dt.5<sup>th</sup> February'2008

Dear Sir,

With reference to the subject referred above, we are pleased to submit the 28<sup>th</sup> Half Yearly EC Compliance Status Report of our 1050 (3x350) MW Thermal Power Plant at village Kamalanga, Dhenkanal District, Odisha, for your kind perusal please.

Kindly acknowledge receipt of the same.

Thanking You,

Yours Sincerely,  
for **GMR Kamalanga Energy Limited**,

**Manoj Mishra**  
Head – O & M

Encl. – As above

Copy for kind information to:

- 1) Director, MoEF&CC, GOI, New Delhi
- 2) Regional Director, CPCB Zonal Office, Kolkata
- 3) Member Secretary, SPCB - Odisha, Bhubaneswar
- 4) Regional Officer, SPCB - Odisha, Hakimpada, Angul

## EC Compliance Report

**Name of the project :** GMR Kamalanga Energy Limited, Dhenkanal, Odisha  
**Clearance Letter No. & Date :** J\_13011/64/2007-IA. II(T) dated 5th Feb 2008 (Phase-I: 3x350MW)  
**Period of Compliance Report :** April - 2021 to September - 2021

Sl.	CONDITIONS	COMPLIANCE STATUS
1	The total land requirement shall not exceed 1050 Acres for all the activities / facilities of the power project. <i>Revised Land requirement of the project is 1158.57 Acres as per the MoEF &amp;CC, New Delhi vide amendment letter dated 11.01.2019.</i>	Presently 1158.57 Acres of land is in use.
2	It shall be ensured that the project boundary is at least 500 m away from HFL of the river in conformity with the guideline in this regard.	Complied. The distance of Brahmani River from the plant boundary is > 1.5KM
3	The plant heat rate of around 2300 kcal/kwh shall be achieved and the coal consumption shall not exceed 660 tph.	Avg. Heat Rate – 2320.8 kcl/kwh Avg. Coal Consumption – 668tph
4	Ash and Sulphur contents in the coal to be used in the project shall not exceed 34% and 0.5 % respectively.	Ash and Sulphur content of fired coal are as below during compliance period ➤ Ash content – 42.13% ➤ Sulphur content- 0.44%
5	A multi-flue stack of 275 m height with exit velocity of not less than 21 m/s shall be provided with continuous online monitoring system.	Complied Velocity is being maintained as specified.
6	High efficiency Electrostatic precipitators (ESPs)with efficiency not less than 99.9% shall be installed so as to ensure that particulate emissions do not exceed 50 mg/Nm <sup>3</sup> .	Complied, The values of particulate emissions are found within the prescribed standard.
7	Appropriate mitigation measures shall be adopted to reduce the emissions of SO <sub>2</sub> . It shall be ensured that at no point of time the ground level concentration of SO <sub>2</sub> in the impact zone exceeds the prescribed limit. The proponent shall now itself also provide space for installation of FGD or other suitable measures, if required at a later stage.	➤ Being complied, ➤ GLC of SO <sub>2</sub> in impact zone was found within the prescribed limit. Monitoring report is being submitted quarterly ➤ Space provided for FGD
8	Water requirement shall not exceed 37 cusecs. No ground water shall be extracted for the project at any stage including during construction.	Complied. Water from river Brahmani is being used for operational activity, as per the approval.
9	COC of not less than 5 shall be adopted. <i>Specific water consumption shall be 3.5m<sup>3</sup>/mw as per the Ministry's Notification dated 07.12.2015</i>	Complied The avg. COC of last six months is 6.62 and Specific water consumption is 2.24m <sup>3</sup> /MW.
10	Closed circuit cooling system with induced draft cooling towers shall be provided.	Complied
11	Waste water generated shall be recycled and reused in the plant premises. There shall be no discharge of waste water outside the plant boundary except during monsoon.	Complied.
12	For controlling fugitive dust, regular sprinkling of water in the coal handling area and other vulnerable areas of the plant shall be ensured.	Being complied. Regular water spraying being done on dust vulnerable areas.



13	The project authorities should adhere to the provisions stipulated in the fly ash notification of September, 1999 and as amended in August, 2003 in regard to fly ash utilization. Fly ash shall be collected in dry form. Balance fly ash shall be disposed off in the ash pond through HCS mode and bottom ash through medium slurry mode.	Noted & Being complied. Dry fly ash collection facilities and HCS system is in place. Ash generation & utilization status for the year 2021-22 (H-1) are as follows: - ➤ Total Ash generated = 1154438.1MT ➤ Total Ash utilisation = 1577202MT (Including Pond Ash of 422763.7 MT) ➤ % of utilisation = 136.62 <i>Annual return submitted vide letter no.7237 dated 07.04.2021 for the year 2020-21</i>
14	The ash pond shall be lined with impervious lining to avoid any leaching into ground water. The ash dyke shall be so designed and strengthened to ensure guard against breaching. Adequate safety measures shall also be taken so that pond ash does not become air borne to cause air pollution in the surrounding areas.	Complied.
15	R & R plan for land oustees and homestead oustees shall be prepared in consultation with the state Revenue Authorities prepared before starting work on the project & implemented simultaneously with the start of development/ construction work on the project. A copy of the R&R plan shall also be submitted to this ministry within three months of the issue of this letter.	R&R Plan is not applicable to our project as there are no land oustees from the project area.
16	The District collector / Revenue Divisional commissioner shall be informed regarding R&R and all other benefits to be provided by the project proponent and their effective implementation shall be overseen by the District authorities.	Being Complied. Rehabilitation & periphery development Advisory committee (RPDAC) is overseeing this implementation.
17	Rain water harvesting should be adopted. Central Ground water Authority/Board shall be consulted for finalization of appropriate rain water harvesting technology within a period of three months from the date of clearance.	Rain water harvesting system is in operation.  Rain water harvesting plan already submitted to CGWA.
18	Regular monitoring of ground water quality including heavy metals shall be undertaken around ash dyke the project area to ascertain the change, if any water quality due to leaching of contaminants from ash disposal area.	Complied.
19	A greenbelt shall be developed all along the plant and ash pond boundary covering total area of at least 320 acres.	➤ Green belt with Indigenous species is being developed in phase wise. We have planted around 3,92,075 saplings till Sept-21 (including 3278 saplings in 2020-21) in around plant & township premises, avenue plantation along the Railway line & approach Road to cover land area of 357 Acres. ➤ Survival rate is around 90%. ➤ Under social voluntary project- Sabujima (A Green Initiative), 140 Nos. of fruit bearing trees were planted along with organic farming in the campus of Kamalanga Nodal High School, at Kamalanga Village. ➤ In addition to this, we have also developed avenue plantation and green belt in Dhenkanal area as required by District Administration.
20	First aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.	Complied

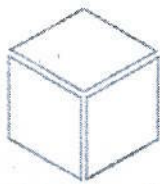
21	An alternate Goucher land shall be developed in the identified 65 acres of land for use of the villagers for grazing of their cattle's. The District Authorities and the villagers shall be informed of the same for its effective utilization.	Complied, 65.19 acres of land has already been surrendered to Govt. of Odisha as alternative Goucher land.
22	Leq of noise level should be limited to 75dBA and regular maintenance of equipment be undertaken for people working in the high noise areas, Personal Protection devices should be provided.	Noise level is being maintained. The average max. and min. noise levels at boundary are as follows: - ➤ Day time noise levels- 68.2dBA max. and 49.5 dBA min. ➤ Night time noise levels- 67.3dBA max. and 46.7dBA min. ➤ Required PPE's is being provided to the people engaged in noisy areas. Poster /wall paintings are also displayed for creating awareness.
23	Regular monitoring of the ambient air quality shall be carried out in the impact zone and records maintained. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Quarterly reports shall be submitted to Regional office of this Ministry.	AAQ is being monitored regularly by MoEF&CC accredited laboratory and records maintained. Copies of the reports are being submitted quarterly.
24	The project proponent should advertise in at least two local newspapers widely circulated in the region around the project, one of which should be in the vernacular language of the locality concerned within seven days of issue of this letter, informing that the project has been accorded environmental clearance and copies of clearance letters are available with the SPCB/ Committee and may also be seen website of the MoEF&CC in the <a href="http://envfor.nic.in">http://envfor.nic.in</a>	Complied.
25	A separate environment monitoring cell with suitable qualified staff should be set up for implementation of the stipulated environmental safeguards.	Environmental monitoring team is in place.
26	Half yearly report on the status of implementation of the conditions and environmental safeguards should be submitted to this ministry, the Regional officer, CPCB & SPCB	Being Complied. Compliance report is also available on Company URL: <a href="https://www.gmrgroup.in/kamalanga/">https://www.gmrgroup.in/kamalanga/</a>
27	Regional officer of Ministry of environment and forests located at Bhubaneswar will monitor the implementation of the stipulated conditions. A complete set of documents including Environment Management plan and the additional information/clarifications submitted subsequently should be forwarded to Regional office for their use during monitoring.	Submitted Vide our letter ref: GEL/KTPP/BLR/MOEF/08/104 Dated 23 <sup>rd</sup> May 2008.
28	Separate fund should be allocated for implementation of environmental protection measures along with item – wise break. These cost should be included as part of the project cost. The funds earmarked for the environment protection measures should not be diverted for other purposes and year- wise expenditure should be reported to ministry.	➤ Capital investment till March' 2021 (Rs. in Lakhs) = 39509.83/- ➤ Recurring Investment FY 2020-21 (Rs. in Lakhs) 6267.164/-
29	Full cooperation should be extended to the scientists/ officers from the Ministry and its Regional office at Bhubaneswar/the CPCB/the SPCB during monitoring of the project.	Agreed. Being extended.

**Monitoring report of Environmental Parameters like Stack Emission, AAQ, Effluent quality is enclosed as Annexure-I**

Date: 25.11.2021

  
Manoj Mishra  
Head – O & M





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- Mine Planning & Design
- Mineral/Sub-Soil Exploration
- Waste Management Services

Laboratory Services  
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 Soil Lab  
 Mineral Lab  
 &  
 Microbiology Lab

Ref: Envlab/21/R-5153

Date: 05.10.2021

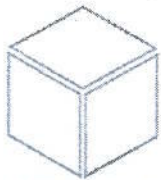
## AMBIENT AIR QUALITY MONITORING REPORT FOR SEPTEMBER-2021 (CORE ZONE)

1. Name of the Industry : M/s GMR Kamalanga Energy Ltd, Dhenkanal
2. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Analyzer, VOC Sampler
3. Sampling Location : AAQMS-1: Near Rain Water pump House Pit
4. Sample Collected By : VCSPL Representative in presence of Client's Representative

Date	PARAMETERS											
	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )
02.09.2021	47.0	25.4	8.8	17.8	5.6	0.31	21.5	BDL	BDL	BDL	BDL	BDL
06.09.2021	53.0	29.7	10.7	21.4	6.4	0.47	23.7	BDL	BDL	BDL	BDL	BDL
09.09.2021	50.0	27.6	9.1	16.8	6.1	0.26	22.8	BDL	BDL	BDL	BDL	BDL
13.09.2021	43.0	23.8	9.6	17.6	5.4	0.34	21.3	BDL	BDL	BDL	BDL	BDL
16.09.2021	56.0	30.8	9.3	19.6	5.3	0.38	25.3	BDL	BDL	BDL	BDL	BDL
20.09.2021	46.0	25.5	11.4	20.5	6.7	0.29	23.7	BDL	BDL	BDL	BDL	BDL
23.09.2021	54.0	29.6	11.7	21.2	7.1	0.37	24.4	BDL	BDL	BDL	BDL	BDL
27.09.2021	59.0	32.3	11.2	20.6	5.2	0.62	22.2	BDL	BDL	BDL	BDL	BDL
02.09.2021	47.0	25.4	8.8	17.8	5.6	0.31	21.5	BDL	BDL	BDL	BDL	BDL
Monthly Average	51.0	28.1	10.2	19.4	6.0	0.38	23.1	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	100	4	400	1	20	6	5	1
TEST METHOD	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017	Chemical Method Air Sampling, 3rd Edn. By James P. Lodge (Method-411)	Non Dispersive Infrared Method IS 5182 (Part-10):1999	Indo Phenol Blue Method Air Sampling, 3rd Edn. By James P. Lodge (Method-401)	AAS Method IS 5182(Part-22):2004			Gas Chromatography IS 5182 (Part-11):2006	Solvent Extraction IS 5182 (Part-12):2004

BDL Values: SO<sub>2</sub> < 4 µg/m<sup>3</sup>, NO<sub>x</sub> < 9 µg/m<sup>3</sup>, O<sub>3</sub> < 4 µg/m<sup>3</sup>, NH<sub>3</sub> < 20 µg/m<sup>3</sup>, Ni < 0.01 ng/m<sup>3</sup>, As < 0.001 ng/m<sup>3</sup>, C<sub>6</sub>H<sub>6</sub> < 0.001 µg/m<sup>3</sup>, BaP < 0.002 ng/m<sup>3</sup>, Pb < 0.001 µg/m<sup>3</sup>, CO < 0.1 mg/m<sup>3</sup>





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- Renewable Energy

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- Public Health Engineering

- Mine Planning & Design
- Mineral/Sub-Soil Exploration
- Waste Management Services

Ref: Envlab/21/R-5154

Date: 05.10.2021

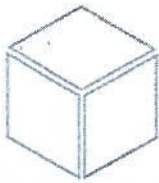
## AMBIENT AIR QUALITY MONITORING REPORT FOR SEPTEMBER-2021 (CORE ZONE)

1. Name of the Industry : M/s GMR Kamalanga Energy Ltd, Dhenkanal
2. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Analyzer, VOC Sample
3. Sampling Location : AAQMS-2: Near Security Watch Tower -4
4. Sample Collected By : VCSPL Representative in presence of Client's Representative

Date	PARAMETERS											
	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )
02.09.2021	51.0	28.6	10.8	19.7	7.7	0.38	25.3	BDL	BDL	BDL	BDL	BDL
06.09.2021	56.0	31.8	12.5	23.5	6.4	0.33	22.8	BDL	BDL	BDL	BDL	BDL
09.09.2021	49.0	27.3	10.6	22.6	5.7	0.36	24.5	BDL	BDL	BDL	BDL	BDL
13.09.2021	46.0	25.6	11.8	19.4	7.1	0.31	21.8	BDL	BDL	BDL	BDL	BDL
16.09.2021	54.0	30.4	9.7	18.8	5.4	0.28	22.7	BDL	BDL	BDL	BDL	BDL
20.09.2021	62.0	35.1	11.3	21.3	6.8	0.32	23.4	BDL	BDL	BDL	BDL	BDL
23.09.2021	48.0	27.0	10.6	18.6	6.3	0.34	24.1	BDL	BDL	BDL	BDL	BDL
27.09.2021	52.0	29.8	12.7	21.4	6.6	0.42	23.6	BDL	BDL	BDL	BDL	BDL
02.09.2021	51.0	28.6	10.8	19.7	7.7	0.38	25.3	BDL	BDL	BDL	BDL	BDL
Monthly Average	52.3	29.5	11.3	20.7	6.5	0.34	23.5	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	100	4	400	1	20	6	5	1
TEST METHOD	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved Wes & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017	Chemical Method Air Sampling, 3rd Edn. By James P. Lodge (Method-411)	Non Dispersive Infrared Method IS 5182 (Part-10):1999	Indo Phenol Blue Method Air Sampling, 3rd Edn. By James P. Lodge (Method-401)	AAS Method IS 5182(Part -22):2004			Gas Chromatography IS 5182 (Part-11):2006	Solvent Extraction IS 5182 (Part-12):2004

BDL Values: SO<sub>2</sub>< 4 µg/m<sup>3</sup>, NO<sub>x</sub>< 9 µg/m<sup>3</sup>, O<sub>3</sub><4 µg/m<sup>3</sup>, NH<sub>3</sub><20 µg/m<sup>3</sup>, Ni<0.01 ng/m<sup>3</sup>, As < 0.001 ng/m<sup>3</sup>, C<sub>6</sub>H<sub>6</sub><0.001 µg/m<sup>3</sup>, BaP<0.002 ng/m<sup>3</sup>, Pb<0.001 µg/m<sup>3</sup>, CO-<0.1 mg/m<sup>3</sup>





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- Information Technology
- Public Health Engineering

- Mine Planning & Design
- Mineral/Sub-Soil Exploration
- Waste Management Services

Ref: Envlab/21/R-5155

Date: 05.10.2021

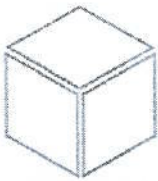
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1. Name of the Industry : M/s GMR Kamalanga Energy Ltd, Dhenkanal
2. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550) Envirotech, CO Analyzer, VOC Sampler
3. Sampling Location : AAQMS-3: Near Budhapanka Material Gate(Security Watch Tower No.1)
4. Sample Collected By : VCSPL Representative in presence of Client's Representative

Date	PARAMETERS											
	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )
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20.09.2021	53.0	30.3	12.2	21.7	7.4	0.43	22.6	BDL	BDL	BDL	BDL	BDL
23.09.2021	57.0	32.6	8.6	19.3	7.1	0.38	21.6	BDL	BDL	BDL	BDL	BDL
27.09.2021	61.0	34.8	10.7	21.4	8.3	0.44	25.5	BDL	BDL	BDL	BDL	BDL
02.09.2021	52.0	29.7	11.8	19.8	5.8	0.28	21.7	BDL	BDL	BDL	BDL	BDL
Monthly Average	54.6	31.4	11.0	20.7	6.8	0.35	23.0	BDL	BDL	BDL	BDL	BDL
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Laboratory Services  
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Soil Lab  
Mineral Lab  
&  
Microbiology Lab

Ref: Envlab/21/R-5156

Date: 05.10.2021

## AMBIENT AIR QUALITY MONITORING REPORT FOR SEPTEMBER-2021 (BUFFER ZONE)

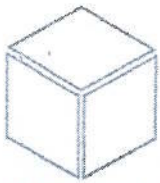
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3. Sample Collected By : VCSPL Representative in presence of Client's Representative

Location Name	Date	PARAMETERS											
		PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )
AAQMS1: Kamalanga (Township)	14.09.21	50.0	27.2	9.2	17.6	BDL	0.31	BDL	BDL	BDL	BDL	BDL	BDL
AAQMS-2: Mangalpur	15.09.21	48.0	26.0	8.6	18.1	BDL	0.26	BDL	BDL	BDL	BDL	BDL	BDL
AAQMS3: Budhapanka	16.09.21	43.0	23.8	9.5	20.2	BDL	0.37	BDL	BDL	BDL	BDL	BDL	BDL
AAQMS-4: Bhogamunda	17.09.21	44.0	24.1	6.7	15.4	BDL	0.22	BDL	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard		100	60	80	80	100	4	400	1	20	6	5	1
TEST METHOD		Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved Wes & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017	Chemical Method Air Sampling, 3rd Edn. By James P. Lodge (Method-411)	Non Dispersive Infrared Method IS 5182 (Part-10):1999	Indo Phenol Blue Method Air Sampling, 3rd Edn. By James P. Lodge (Method-401)	AAS Method IS 5182(Part-22):2004			Gas Chromatography IS 5182 (Part-11):2006	Solvent Extraction IS 5182 (Part-12):2004

BDL Values: SO<sub>2</sub>< 4 µg/m<sup>3</sup>, NO<sub>x</sub>< 9 µg/m<sup>3</sup>, O<sub>3</sub><4 µg/m<sup>3</sup>, NH<sub>3</sub><20 µg/m<sup>3</sup>, Ni<0.01 ng/m<sup>3</sup>, As < 0.001 ng/m<sup>3</sup>, C<sub>6</sub>H<sub>6</sub><0.001 µg/m<sup>3</sup>, BaP<0.002 ng/m<sup>3</sup>, Pb<0.001 µg/m<sup>3</sup>, CO-<0.1 mg/m<sup>3</sup>







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- Infrastructure Engineering
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- Agricultural Development
- Information Technology
- Public Health Engineering

- Mine Planning & Design
- Mineral/Sub-Soil Exploration
- Waste Management Services

Laboratory Services  
 Environment Lab  
 Food Lab  
 Material Lab  
 Soil Lab  
 Mineral Lab  
 &  
 Microbiology Lab

Ref: Envlab/21/R-5157

Date: 05.10.2021

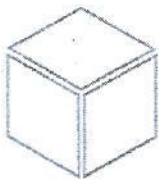
## SOURCE EMISSION MONITORING REPORT SEPTEMBER-2021

1. Name of Industry : M/s GMR Kamalanga Energy Ltd, Dhenkanal  
 2. Sampling Location : ST-1 : Stack attached to ESP Outlet of UNIT-1  
 : ST-2 : Stack attached to ESP Outlet of UNIT-2  
 : ST-3 : Stack attached to ESP Outlet of UNIT-3  
 3. Date of Sampling : 22.09.2021  
 4. Date of Analysis : 23.09.2021 to 27.09.2021  
 5. Sample Collected by : VCSPL Representative in presence of GMR representative

Sl. No.	Parameters	Unit of Measurement	Standard as per MoEF & CC & CPCB	Analysis Results		
				ST-1	ST-2	ST-3
1.	Stack Temperature	°C	--	134.0	145.0	146.0
2.	Velocity	m/sec	--	24.5	25.9	26.9
3.	Volume of Flue gas	m <sup>3</sup> /hour	--	2022067.0*	2136648.0	2217432.0
4.	Particulate Matter as PM	mg/Nm <sup>3</sup>	50.0	41.2	35.5	43.7
5.	Sulphur Dioxide as SO <sub>2</sub>	mg/Nm <sup>3</sup>	600.0	1083.0	1188.0	1122.0
6.	Oxides of Nitrogen as NO <sub>x</sub>	mg/Nm <sup>3</sup>	450.0	356.0	249.0	341.0
7.	Carbon Monoxide as CO	mg/Nm <sup>3</sup>	--	8.6	9.2	10.7
8.	Carbon Dioxide as CO <sub>2</sub>	%	--	13.1	11.8	12.8
9.	Oxygen as O <sub>2</sub>	%	--	8.0	6.1	5.9
10.	Mercury as Hg	mg/Nm <sup>3</sup>	0.03	0.0164	0.0161	0.0176

Note: The value of SO<sub>2</sub>, NO<sub>x</sub> are corrected @6% O<sub>2</sub> level in flue gas emission.





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● Quality Control & Project Management  
● Renewable Energy

● Agricultural Development  
● Information Technology  
● Public Health Engineering

● Mine Planning & Design  
● Mineral/Sub-Soil Exploration  
● Waste Management Services

Ref: Envlab/21/R-5159

Date: 05.10.2021

## ETP WATER ANALYSIS REPORT SEPTEMBER-2021

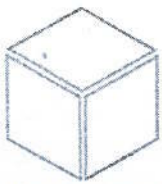
- Name of the Industry : M/s GMR Kamalanga Energy Ltd, Dhenkanal
- Sampling Location : W1: Plant ETP-Inlet  
W2: Plant ETP-Outlet
- Date of Sampling : 22.09.2021
- Date of Analysis : 23.09.2021 to 30.09.2021
- Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No	Parameter	Unit	Testing Methods	Inland Surface Water Standard Effluents Part-A	Analysis Results	
					W-1	W-2
1.	Colour and Odour	Hazen	APHA 2120 B & APHA 2150B	5 & U/O	<5.0 & Agreeable	<5.0 & Agreeable
2.	Suspended solids	mg/l	APHA 2540 D	100.0	103.0	13.0
3.	Particle size of suspended solids	--	APHA 2540 D	Shall Pass 850µ IS Sieve	<850.0	<850.0
4.	pH Value (at 25 °C)	--	APHA 4500H <sup>+</sup> B	5.5-9.0	7.6	7.9
5.	Temperature	°C	APHA 2550 B	Shall not exceed 5°C above the receiving water Temp	25.2	25.6
6.	Oil and grease	mg/l	APHA 5520 B	10.0	14.6	ND
7.	Total Residual Chlorine (as RFC)	mg/l	APHA 4500 Cl <sup>-</sup> B	1.0	ND	ND
8.	Ammonical Nitrogen (as NH <sub>3</sub> -N)	mg/l	APHA 4500 NH <sub>3</sub> F	50.0	2.3	1.1
9.	Total Kjeldahl Nitrogen (as N)	mg/l	APHA 4500 N <sub>org</sub> B	100.0	4.6	2.8
10.	Free ammonia (as NH <sub>3</sub> )	mg/l	By Calculation	5.0	ND	ND
11.	Biochemical Oxygen Demand (3 days at 27°C)	mg/l	APHA 5210 B	30.0	31.0	4.8
12.	Chemical Oxygen Demand	mg/l	APHA 5220 C	250.0	162.0	18.0
13.	Arsenic(as As)	mg/l	APHA 3114 B	0.2	BDL	BDL
14.	Mercury (As Hg)	mg/l	APHA 3500 Hg	0.01	BDL	BDL
15.	Lead (as Pb)	mg/l	APHA 3111 B,C	0.1	BDL	BDL
16.	Cadmium (as Cd)	mg/l	APHA 3111 B,C	2.0	BDL	BDL
17.	Hexavalent chromium (as Cr <sup>+6</sup> )	mg/l	APHA 3500Cr B	0.1	BDL	BDL
18.	Total chromium (as Cr)	mg/l	APHA 3111 B	2.0	0.28	0.031
19.	Copper (as Cu)	mg/l	APHA 3111 B,C	3.0	BDL	BDL
20.	Zinc (as Zn)	mg/l	APHA 3111 B,C	5.0	0.13	BDL
21.	Selenium (as Se)	mg/l	APHA 3114 B	0.05	BDL	BDL
22.	Nickel (as Ni)	mg/l	APHA 3111 B	3.0	BDL	BDL
23.	Cyanide (as CN)	mg/l	APHA 4500 CN <sup>-</sup> ,D	0.2	BDL	BDL
24.	Fluoride (as F)	mg/l	APHA 4500 F C	2.0	1.2	0.12
25.	Dissolved phosphates (as P)	mg/l	APHA 4500 P,D	5.0	1.4	0.46
26.	Sulphide (as S)	mg/l	APHA 4500 S <sup>2-</sup> D	2.0	0.72	ND
27.	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	APHA 5530 B,D	1.0	0.085	BDL
28.	Bio-assay test	mg/l	APHA 10600 D	90% survival of fish after 96 hours in 100% effluent	83%	94%
29.	Manganese (as Mn)	mg/l	APHA 3500Mn B	2.0	0.057	BDL
30.	Iron (as Fe)	mg/l	APHA 3500Fe B	3.0	0.43	0.15
31.	Vanadium (as V)	mg/l	APHA 3500V B	0.2	BDL	BDL
32.	Nitrate Nitrogen (as N)	mg/l	APHA:4500 NO <sub>3</sub> <sup>-</sup> B	10.0	2.2	0.86

Note: CL: Colourless, U/O: Unobjectionable, ND: Not Detected.

BDL (Below Detectable Limits) Values: C<sub>6</sub>H<sub>5</sub>OH<0.05 mg/l, Hg<0.002 mg/l, Cd<0.003 mg/l, Se<0.001 mg/l, CN <0.01mg/l., As<0.004 mg/l, Pb<0.01 mg/l, Zr<0.05 mg/l, Cr+6<0.01 mg/l, B<0.01 mg/l., Ni <0.05mg/l., V<0.01mg/l.





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● Renewable Energy

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● Information Technology  
● Public Health Engineering

● Mine Planning & Design  
● Mineral/Sub-Soil Exploration  
● Waste Management Services

Ref: Envlab/21/R-5160

Date: 05.10.2021

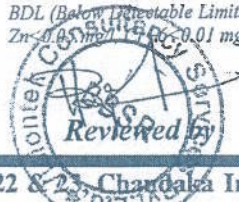
## STP WATER ANALYSIS REPORT SEPTEMBER-2021

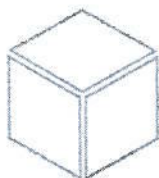
- Name of the Industry : M/s GMR Kamalanga Energy Ltd, Dhenkanal
- Sampling Location : W1: Plant STP Inlet  
W2: Plant STP Outlet
- Date of Sampling : 22.09.2021
- Date of Analysis : 23.09.2021 to 30.09.2021
- Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No	Parameter	Unit	Testing Methods	Schedule-VI and new CPCB norms (* standard as per G.S.R.1265(E))	Analysis Results	
					W-1	W-2
1.	Colour and Odour	Hazen	APHA 2120 B& APHA 2150B	5 & U/O	10 & Pungent Smell	<5.0 & Agreeable
2.	Suspended solids	mg/l	APHA 2540 D	100.0*	128.0	19.0
3.	Particle size of suspended solids	--	APHA 2540 D	Shall Pass 850µ IS Sieve	<850	<850
4.	pH Value (at 25 °C)	NTU	APHA 4500H <sup>+</sup> B	6.5-9.0*	7.0	7.92
5.	Temperature	°C	APHA 2550 B	Shall not exceed 5°C above the receiving water Temp	26.2	26.7
6.	Oil and grease	mg/l	APHA 5520 B	10.0	11.6	ND
7.	Total residual chlorine	mg/l	APHA 4500 Cl <sup>-</sup> B	1.0	ND	ND
8.	Ammonical Nitrogen (as NH <sub>3</sub> -N)	mg/l	APHA 4500 NH <sub>3</sub> F	50.0	2.6	0.6
9.	Total Kjeldahl Nitrogen (as N)	mg/l	APHA 4500 N <sub>org</sub> B	100.0	3.8	1.8
10.	Free ammonia (as NH <sub>3</sub> )	mg/l	By Calculation	5.0	ND	ND
11.	Biochemical Oxygen Demand (3 days at 27°C)	mg/l	APHA 5210 B	30.0*	41.0	6.8
12.	Chemical Oxygen Demand (as COD)	mg/l	APHA 5220 C	250.0	176.0	24.0
13.	Arsenic(as As)	mg/l	APHA 3114 B	0.2	BDL	BDL
14.	Mercury (As Hg)	mg/l	APHA 3500 Hg	0.01	BDL	BDL
15.	Lead (as Pb)	mg/l	APHA 3111 B,C	0.1	BDL	BDL
16.	Cadmium (as Cd)	mg/l	APHA 3111 B,C	2.0	BDL	BDL
17.	Hexavalent chromium (as Cr <sup>+6</sup> )	mg/l	APHA 3500Cr B	0.1	BDL	BDL
18.	Total chromium (as Cr)	mg/l	APHA 3111 B	2.0	0.12	BDL
19.	Copper (as Cu)	mg/l	APHA 3111 B,C	3.0	BDL	BDL
20.	Zinc (as Zn)	mg/l	APHA 3111 B,C	5.0	0.25	0.046
21.	Selenium (as Se)	mg/l	APHA 3114 B	0.05	BDL	BDL
22.	Nickel (as Ni)	mg/l	APHA 3111 B	3.0	BDL	BDL
23.	Cyanide (as CN)	mg/l	APHA 4500 CN <sup>-</sup> C,D	0.2	BDL	BDL
24.	Fluoride (as F)	mg/l	APHA 4500 F C	2.0	0.70	0.13
25.	Dissolved phosphates (as P)	mg/l	APHA 4500 P,D	5.0	1.32	BDL
26.	Sulphide (as S)	mg/l	APHA 4500 S <sup>2-</sup> D	2.0	0.80	ND
27.	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	APHA 5530 B,D	1.0	BDL	BDL
28.	Bio-assay test	mg/l	APHA 10600 D	90% survival of fish after 96 hours in 100% effluent	82%	95%
29.	Manganese (as Mn)	mg/l	APHA 3500Mn B	2.0	BDL	BDL
30.	Iron (as Fe)	mg/l	APHA 3500Fe B	3.0	0.42	0.11
31.	Vanadium (as V)	mg/l	APHA 3500V B	0.2	BDL	BDL
32.	Nitrate Nitrogen (as N)	mg/l	APHA4500 NO <sub>3</sub> <sup>-</sup> B	10.0	1.8	0.7
33.	Faecal Coliform (as FC)	MPN/100ml	APHA 9221 E	100	180	50

Note: CL: Colourless, U/O: Unobjectionable, ND: Not Detected.

BDL (Below Detectable Limits) Values: C6H5OH<0.05 mg/l, Hg<0.002 mg/l, Cd<0.003 mg/l, Se<0.001 mg/l, CN <0.01mg/l, As<0.004 mg/l, Pb<0.01 mg/l, Zn<0.05mg/l, V<0.01 mg/l, B<0.01 mg/l, Ni <0.05mg/l, V<0.01mg/l.





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● Information Technology  
● Public Health Engineering

● Mine Planning & Design  
● Mineral/Sub-Soil Exploration  
● Waste Management Services

Ref: Envlab/21/R-5161

Date: 05.10.2021

## STP WATER ANALYSIS REPORT SEPTEMBER-2021

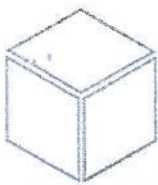
- Name of the Industry : M/s GMR Kamalanga Energy Ltd, Dhenkanal
- Sampling Location : W3 : Township STP Inlet  
W4 : Township STP Outlet
- Date of Sampling : 22.09.2021
- Date of Analysis : 23.09.2021 to 30.09.2021
- Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No	Parameter	Unit	Testing Methods	Schedule-VI and new CPCB norms (* standard as per G.S.R.1265(E))	Analysis Results	
					W-3	W-4
1.	Colour and Odour	Hazen	APHA 2120 B& APHA 2150B	5 & U/O	15 & Pungent Smell	<5.0 & Agreeable
2.	Suspended solids	mg/l	APHA 2540 D	100.0*	112.0	28.0
3.	Particle size of suspended solids	--	APHA 2540 D	Shall Pass 850µ IS Sieve	<850.0	<850.0
4.	pH Value (at 25 °C)	NTU	APHA 4500H <sup>+</sup> B	6.5-9.0*	7.23	7.82
5.	Temperature	°C	APHA 2550 B	Shall not exceed 5°C above the receiving water Temp	26.1	26.6
6.	Oil and grease	mg/l	APHA 5520 B	10.0	15.2	ND
7.	Total residual chlorine	mg/l	APHA 4500 Cl <sup>-</sup> B	1.0	ND	ND
8.	Ammonical Nitrogen (as NH <sub>3</sub> -N)	mg/l	APHA 4500 NH <sub>3</sub> F	50.0	2.7	0.9
9.	Total Kjeldahl Nitrogen (as N)	mg/l	APHA 4500 N <sub>org</sub> B	100.0	5.1	1.6
10.	Free ammonia (as NH <sub>3</sub> )	mg/l	By Calculation	5.0	ND	ND
11.	Biochemical Oxygen Demand (3 days at 27°C)	mg/l	APHA 5210 B	30.0*	61.0	7.2
12.	Chemical Oxygen Demand (as COD)	mg/l	APHA 5220 C	250.0	208.0	30.0
13.	Arsenic(as As)	mg/l	APHA 3114 B	0.2	BDL	BDL
14.	Mercury (As Hg)	mg/l	APHA 3500 Hg	0.01	BDL	BDL
15.	Lead (as Pb)	mg/l	APHA 3111 B,C	0.1	BDL	BDL
16.	Cadmium (as Cd)	mg/l	APHA 3111 B,C	2.0	BDL	BDL
17.	Hexavalent chromium (as Cr <sup>+6</sup> )	mg/l	APHA 3500Cr B	0.1	BDL	BDL
18.	Total chromium (as Cr)	mg/l	APHA 3111 B	2.0	0.031	BDL
19.	Copper (as Cu)	mg/l	APHA 3111 B,C	3.0	BDL	BDL
20.	Zinc (as Zn)	mg/l	APHA 3111 B,C	5.0	0.21	0.035
21.	Selenium (as Se)	mg/l	APHA 3114 B	0.05	BDL	BDL
22.	Nickel (as Ni)	mg/l	APHA 3111 B	3.0	BDL	BDL
23.	Cyanide (as CN)	mg/l	APHA 4500 CNC,D	0.2	BDL	BDL
24.	Fluoride (as F)	mg/l	APHA 4500 F C	2.0	0.34	0.1
25.	Dissolved phosphates (as P)	mg/l	APHA 4500 P,D	5.0	1.28	0.53
26.	Sulphide (as S)	mg/l	APHA 4500 S <sup>2-</sup> D	2.0	ND	ND
27.	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	APHA 5530 B,D	1.0	BDL	BDL
28.	Bio-assay test	mg/l	APHA 10600 D	90% survival of fish after 96 hours in 100% effluent	83%	93%
29.	Manganese (as Mn)	mg/l	APHA 3500Mn B	2.0	BDL	BDL
30.	Iron (as Fe)	mg/l	APHA 3500Fe B	3.0	0.39	0.12
31.	Vanadium (as V)	mg/l	APHA 3500V B	0.2	BDL	BDL
32.	Nitrate Nitrogen (as N)	mg/l	APHA4500 NO <sub>3</sub> <sup>-</sup> B	10.0	2.6	0.92
33.	Faecal Coliform (as FC)	MPN/100ml	APHA 9221 E	100	260	63

Note: CL: Colourless, U/O: Unobjectionable, ND: Not Detected.

BDL (Below Detectable Limits) Values: C<sub>6</sub>H<sub>5</sub>OH<0.05 mg/l, Hg<0.002 mg/l, Cd<0.003 mg/l, Se<0.001 mg/l, CN <0.01mg/l, As<0.001 mg/l, Pb<0.01mg/l, Zn<0.05 mg/l, Cr+6<0.01mg/l, B<0.01 mg/l, Ni <0.05mg/l, V<0.01mg/l.





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(Committed For Better Environment)

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Accredited by : NABET-A Grade, MOEF & CC/CPCB & SPCB-A Grade

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- Waste Management Services

Laboratory Services  
 Environment Lab  
 Food Lab  
 Material Lab  
 Soil Lab  
 Mineral Lab  
 &  
 Microbiology Lab

Ref: Envlab/21/R-5158

Date: 05.10.2021

## DRINKING WATER ANALYSIS REPORT SEPTEMBER-2021

1. Name of the Industry : M/s GMR Kamalanga Energy Ltd, Dhenkanal
2. Sampling Location : DW1: Potable Drinking Water Before Treatment  
DW2: Potable Drinking Water After Treatment
3. Date of Sampling : 22.09.2021
4. Date of Analysis : 23.09.2021 to 30.09.2021
5. Sample Collected By : VCSPL Representative in presence of Client's Representative

Sl. No	Parameter	Unit	Testing Methods	Standard as per IS -10500:2012, Amd. 2015 & 2018	Analysis Results	
					DW-1	DW-2
1.	Colour	Hazen	APHA 2120 B	5.0	<5.0	<5.0
2.	Odour	--	APHA 2150B	Agreeable	Agreeable	Agreeable
3.	Taste	--	APHA 2160 C	Agreeable	Agreeable	Agreeable
4.	Turbidity	NTU	APHA 2130 B	1	2.4	<1.0
5.	pH Value (at 25 °C)	--	APHA 4500H'B	6.5-8.5	7.35	7.1
6.	Total Hardness (as CaCO <sub>3</sub> ) (max)	mg/L	APHA 2340 C	200	102.0	60.0
7.	Iron (as Fe) (max)	mg/L	APHA 3500 Fe B	1.0	0.28	0.06
8.	Chloride (as Cl) (max)	mg/L	APHA 4500 Cl B	250.0	22.5	12.5
9.	Residual, free Chlorine (min)	mg/L	APHA 4500 Cl B	0.2	ND	ND
10.	Dissolved Solids (max)	mg/L	APHA 2540 C	500.0	162.0	86.0
11.	Calcium (as Ca) (max)	mg/L	APHA 3500 Ca B	75.0	25.2	15.6
12.	Copper (as Cu) (max)	mg/L	APHA 3111 B,C	0.05	0.034	BDL
13.	Manganese (as Mn) (max)	mg/L	APHA 3500Mn B	0.1	BDL	BDL
14.	Sulphate (as SO <sub>4</sub> ) (max)	mg/L	APHA 4500 SO <sub>4</sub> <sup>2-</sup> E	200.0	24.2	13.5
15.	Nitrate (as NO <sub>3</sub> ) (max)	mg/L	APHA 4500 NO <sub>3</sub> <sup>-</sup> E	45.0	4.30	0.54
16.	Fluoride (as F) (max)	mg/L	APHA 4500 F,C	1.0	0.61	0.11
17.	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH) (max)	mg/L	APHA 5530 B,D	0.001	BDL	BDL
18.	Mercury (as Hg) (max)	mg/L	APHA 3500 Hg	0.001	BDL	BDL
19.	Cadmium (as Cd) (max)	mg/L	APHA 3111 B,C	0.003	BDL	BDL
20.	Selenium (as Se) (max)	mg/L	APHA 3114 B	0.01	BDL	BDL
21.	Arsenic (as As) (max)	mg/L	APHA 3114 B	0.01	BDL	BDL
22.	Cyanide (as CN) (max)	mg/L	APHA 4500CN <sup>-</sup> C,D	0.05	BDL	BDL
23.	Lead (as Pb) (max)	mg/L	APHA 3111 B,C	0.05	BDL	BDL
24.	Zinc (as Zn) (max)	mg/L	APHA 3111 B,C	5.0	0.48	0.072
25.	Chromium (as Cr <sup>+6</sup> ) (max)	mg/L	APHA 3500Cr B	--	BDL	BDL
26.	Mineral Oil (max)	mg/L	APHA 5520 B	0.5	ND	ND
27.	Alkalinity (max)	mg/L	APHA 2320 B	200.0	66.0	48.0
28.	Aluminium as Al (max)	mg/L	APHA 3500Al B	0.03	BDL	BDL
29.	Boron (max)	mg/L	APHA 4500 B,B	0.5	BDL	BDL
30.	Total Coliform ( as TC)	MPN/100ml	APHA 9221 B	Shall not be detectable in any 100 ml Sample	150	<1.1
31.	E. Coli	MPN/100ml	APHA 9221 E		Absent	Absent
32.	Faecal Coliform (as FC)	MPN/100ml	APHA 9221 F		58	<1.1

Note: CL: Colourless, AI: Agreeable, U/O: Unobjectionable, ND: Not Detected.

BDL (Below Detectable Limits) Values: C<sub>6</sub>H<sub>5</sub>OH<0.05 mg/l, Hg<0.002 mg/l, Cd<0.003 mg/l, Se<0.001 mg/l, As<0.004 mg/l, Pb<0.01 mg/l, Zn<0.01 mg/l, Cr<0.05 mg/l, B<0.01 mg/l, TC & FC : MPN/100 ml < 1.1 (0-0-0)



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