The Singareni Collieries Company Limited
(A Government Company)
Environment Department
Ramagundam-III Area.

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Ref.No.RG3/ENV/37/2025/108

Dt: 18.09.2025

To
The Member Secretary,
T.S.Pollution Control Board,
Paryavarana Bhavan,
A-3, Industrial Estate,
Sanathnagar,
Hyderabad-500018.

Dear Sir,

Sub: Environmental statement Form-V pertaining to Ramagundam Opencast project-I, Coal mine project expansion phase-II, RG-III Area of SCCL for the year 2024-2025 - Reg.
Ref.No: CONSENT ORDER NO: 20234660523, Dt:19.10.2023.

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With reference to the above cited subject please find enclosed here with the environmental statement pertaining to Ramagundam Opencast project-I, coal mine project expansion phase-II, RG-III Area of SCCL for the year 2024-2025.

Thanking you,

Yours faithfully,

General Manager,
Ramagundam-III Area.

Encl: As above
Cc: EE, TSPCB, RO-RGM.
GM (Env), KGM.
PO, RG OCM-I

Environmental statement of Ramagundam Opencast –I Coal Mine Project Expansion –Phase-II of SCCL for the year 2024-2025.

Introduction:

Singareni Collieries Company Limited (SCCL) the only coal production company in South India is a joint undertaking of Government of Telangana and Government of India, with the equity capital shares of in the ratio 51:49, SCCL produces about 10% of countries coal production and 80% of this production is supplies to Thermal Power Plants in AP, Maharashtra and Karnataka states. The remaining part of SCCL coal production is supplied to cement companies and other industries. There are 24 underground mines and 18 opencast mines in operation.

About the Project:

Ramagundam Opencast-I Project is and old opencast mine started in 1974 with a capital investment of Rs 230.0 crores and produced 75.32 MT of coal by excavating 294.65 M.cu.m of overburden material since inception as on 31-03-2013. The mining activities are spread over an area of 367.44. Ha. Environmental clearance is accorded in 2006 by MoEF for increasing the lease hold area from 503.0 ha to 710.13 ha including 12.0 ha of forest land with and life of the project 18 years from the year 2008-09 with an annual production rate of 1.50 MT vide ref ltr no J-1105/142/2005-IA II (M) dated 11th Sept 2006 and Annual production rate 1.5 MTPA to 3 MTPA with a peak production of 3.3 MTPA vide ref . no J-1105/ 534/ 2007-IA II(M) date 31st July 2008. Environmental clearance for phase II extension is also accorded by MoEF to increase the mine lease area from 710.13 ha to 923.88 ha and rate of production from 3.3 MT to 5.3 MT per annum vide ref. no F.No.23-71/2018-IA(III) date 16 January 2023. The Extension Project is commenced from April 2008.

Location:

This project is falling under Ramagiri Mandal of Peddapalli District of Telangana. The proposed project is covered under the South Godavari Mining Lease hold of SCCL to an extent of 6847.40 Ha. (6564.00 Ha of non-forest land and 283.40 Ha. of Forest land), which is valid up to 31.12.2034. The area is located in between north latitudes 18^0 35' 00" to 18^0 50' 00" and East longitudes 79^0 28'00" to 79^0 35'00" covered in Survey of India Topo Sheet No. 56 M/8. RG OCP I (Ext) phase II project comprises the following features:

Topography:

The Block area is plain terrain, sloping towards Northeast. In general, the block is covered mostly with sandy soil. A part of the block is covered with external OB dumps of the existing OCP-I.

Drainage:

The area is drained by Jallaram vagu, Maddula vagu and Bokkala vagu which join River Godavari near Gunjapadugu and manthani.

Climatology:

A typical tropical climate prevails in this area with hot summer, cold winters and good rainfall. Average maximum and minimum temperatures recorded are 47 – 26° C in summer and 35° – 11°c in winter season. The average rainfall in the area is 1316.5mm.

During post monsoon and winter season i.e. from October to December wind blow from North to Northeast. In summer wind blow from South west and west. During monsoons wind blow from southwest and northwest directions. The average annual wind speed was find to be 6.1KM /H.

A. Industrial activities within 10KM radius this project:

1) MINES, GDK-10, ADRIYALA LONGWALL PROJECT , RG OCP-II, RG OCP-III,

B. Method of Mining:

The quarry is opened by initial box cut in the area of concealed outcrop of IV seam with Shovel-dumper combination. Dragline was worked up to 2020 Haul road will be maintained in the middle of the property and sump will be made by extending the haul road. Advance stripping will be done by Shovel-dumper combination. Sump will be progressed as per the progress of workings. That any seepage of water will automatically be drained into the sump.

Before coal extraction, the blasted ceiling OB above the coal seam will be removed by the hydraulic Shovel, this will be applicable for situations where the coal seam is developed/ depillared.

C. Dumping strategy:

Initially, the box cut volume of OB was dumped in the void of RG OCP-I. Internal dumping with Dragline and begin from 2nd year onwards along with parting OB between III and IV Seams. In the initial years height of the Internal dump will be about +20 m from ground level, as the quarry progress the internal dumping will be confined to ground level. 59.56% of the total OB will be dumped externally and the rest of mine life, entire OB is being dumped internally. Internal dumping of OB is less due to maintenance of haul road in the middle of the property.

THE SINGARENI COLLIERIES COMPANY LIMITED
(A Government Company)
RAMAGUNDAM-III AREA

Ramagundam Opencast-I coal mine project expansion phase-II

A. SALIENT FEATURES OF THE PROJECT:

1	Name of the Project	:	Ramagundam Opencast-I coal mine Project expansion Phase-II (RGOC-I Exp Ph-II)
2	Organization	:	Singareni Collieries Company Limited
3	Coalfield	:	South Godavari Mining lease & Additional South Godavari Mining lease
4	Type of Mine	:	Opencast
5	Technology	:	Shovel dumper combination & Dragline
6	Environmental Clearance	:	
	A. Letter No & date		F.No.23-71/2018-IA (III)], Dt: 16.01.2023.
	B. Sanction capacity		From 3.3 MTPA to 5.3 MTPA
	C. Mining Lease Area		923.86 Ha.
	D. Date of Public Hearing		25.03.2021.
7	Location of the Project	:	Ramagiri Mandal, Peddapally Dt.505212
	A. Village		Julapalli
	B. Tehasil		Ramagiri
	C. District		Peddapalli
	D. State		Telangana State
	E. Latitude		N 18^0 39 ' 07 "to N18 ^{0}41' 05"
	F. Longitude		E79^0 32' 37" E to 79^0 33' 53"
	G. Topo Sheet		56N/10
	H. Nearest railway station		Ramagundam Railway Station
	I. Nearest Airport		Hyderabad
	J. Nearest town		Ramagundam
8	Address for Correspondence	:	
	A. Name		Sri. J. Rajasekhar, (DGM)
	B. Designation		Project Officer
	C. Address		Godavari 8 inc Colony (PO), Ramagiri Mandal,Peddapalli Dist. 505212 T.S.
	D. Pin Code		505211
	E. E-mail ID		Po_oc1_rg3@scclmines.com
	F. Telephone No. G. Mobile No.		08728-250082 7382068945

9	**Life of the Project**	:	
	A. Date of commencement		Phase-I Project 1st April 2008 Phase-II Project 23rd Oct., 2008
	B. Total Life of the project as per EMP		23 years
	C. Balance Life		1 year
10	**Reserves**	:	
	A. Total Geological Reserves		68.23 MT
	B. Total Extractable Reserves		2.5 MT
	C. Reserves already Extracted		71.63 MT
	D. Balance Reserves		2.5 MT
	E. Coal production during last year		3.269 MT
11	**Statutory Clearances**	:	
	A. Ground Water Clearance		Vide Lr.No.Memo No.231/Hgl/NOC Mines/PDPL/2025, dt. 08.05.2025 Valid up to 07.05.2027.
	B. Consent for Establishment		Vide Order .No.04/TSPCB/CFE/RO-RGM/HO/2023, DT. 29-04-2023.
	C. Consent for Operation		Order No. 20234660523, Dt.19.10.2023 valid up to 31.03.2026
	D. Forest Clearance		Lr.No.8-109/2005 DT.02-05-2008
	E. Mining Lease		Project Area falls in South Godavari Mining Lease and South Godavari Additional Mining Lease. 1) As per the approval of Ministry of Coal GOI Lr.No.13016/0/2013-CA II, Dated 05.02.2015, Vide GOMS NO. 02, dated 12.01.2015 lease was granted and executed for 20 years i.e from 01.01.2015 to 31.12.2034 2) 1st renewal of South Godavari Additional ML as per approval of GOI lr.NO.13013/9/07-CA.II.8.01.08, vide GOMS NO. 201 dated 31.07.2008 of AP lease was granted and executed 20 years i.e from 07.09.2005 to 16.09.2025
	F. Others (Specify)		---
12	R & R Involved	:	Not involved

COMPLIANCE STATUS OF CONDITIONS STIPULATED IN CONSENT FOR OPERATION (CFO) FOR M/S. SINGARENI COLLIERIES CO. LTD., (EXPANSION PROJECT) PHASE-II, RAMAGUNDAM OCP-I, RG-III AREA.

Consent Order No. 20234660523, Dt.19.10.2023 valid up to 31.03.2026.

SCHEDULE-A

Sl No.	Conditions	Compliance Status
1	The applicant shall make applications through online for renewal of Consent (Under Water and Air Acts) and Authorization under HWM Rules at least 120 days before the date of expiry of this order, along with prescribed fee under Water and Air Acts for obtaining Consent &HW Authorization of the Board. The applicant can also apply for Auto Renewal of the CFO atleast 30 days before the expiry of this order as per the procedure and eligibility stipulated in the Board Circular dt: 19.11.2015 & 08.12.2015 (available in Board's Website: http://tspcb.cgg.gov.in/Pages/Circulars.aspx).	Noted and being complied. Online application will be submitted 120 days before the date of expiry of this order, along with prescribed fee under Water and Air Acts for obtaining Consent &HW Authorization of the Board along with detailed compliance to the conditions stipulated in the CFO and HWA Consent Order No. 20234660523, Dt.19.10.2023 valid up to 31.03.2026.
2	This Order is issued in line with Board's **CFE (Expansion) order dt...29.04.2023.** Concealing the factual data or submission of false information /fabricated data and failure to comply with any of the conditions mentioned in this order may result in withdrawal of this order and attract action under the provisions of relevant pollution control Acts. The mine shall comply with all other conditions of **CFE (Expansion) order dt. 29.04.2023** is still applicable	Noted and being complied. All conditions stipulated in the present CFO order are being complied
3	Any person aggrieved by an order made by the State Board under section 25, section 26, section 27 of water act, 1974 or section 21 of Air Act 1981 may within thirty days from the date on which the order is communicated to him. Prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules 1982 so such authority (therein after referred to as the appellate Authority) constituted under section 28 of the Water prevention and Control of Pollution Act 1974 and section 31 of the Air (prevention and control of Pollution) Act 1981.	Noted
4	The mine may explore the possibility of tapping the solar energy or their energy requirements	Being complied. SCCL is planning to install Solar Power Plants, Solar Heaters, LED Lighting, etc. The Solar power plants details are given

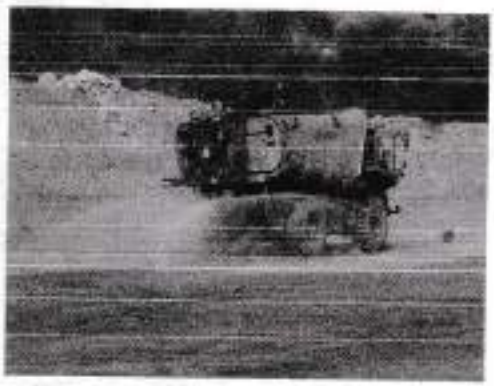
		below. Already solar energy was established on RG-III GM's Office, 50 mega watts solar plant is proposed at RG-III Area  
5	The Board reserves its right to modify above conditions or stipulate any further conditions and to take action including revoke of this order in the interest of protection of public health and environment	Noted

Area	Solar plant proposed (MW)
Manuguru	30
Kothagudem	25
Yellandu	60
Bhupalapalli	10
Mandamarri	60
Bellampalli	30
Ramagundam stage 2	25
Ramagundam stage 1	50
STPP premises	10
TOTAL	**300**

SCHEDULE-B

<table>
<tr><th>Sl No.</th><th>Conditions</th><th>Compliance Status</th></tr>
<tr><td>1</td><td>Total water Consumption shall not exceed: 2346 KLD.
<table>
<tr><th>S. No.</th><th>Purpose</th><th>Quantity in KLD</th></tr>
<tr><td>1.</td><td>Process (Dust suppression, plantation & washing of HEMM)</td><td>1600</td></tr>
<tr><td>2.</td><td>Domestic</td><td>40</td></tr>
<tr><td></td><td>Total</td><td>1640</td></tr>
</table></td><td>Being complied.
All necessary measures are being taken to restrict the water consumption below the stipulated quantity i.e.1640 KLD</td></tr>
<tr><td>2</td><td>The effluent discharged should not contain constituents in excess of the tolerance limits prescribed below.
<table>
<tr><th>Outlet</th><th>Parameter*</th><th>Limiting Standards</th></tr>
<tr><td rowspan="6">1&2</td><td>PH</td><td>6.5 – 8.5</td></tr>
<tr><td>Total suspended Solids (TSS)</td><td>100 mg/l</td></tr>
<tr><td>Oil & Grease</td><td>10 mg/l</td></tr>
<tr><td>BOD (3 days at 27 degrees C)</td><td>100 mg/l</td></tr>
<tr><td>Chemical Oxygen Demand (COD)</td><td>250 mg/l</td></tr>
<tr><td>Total Dissolved solids (TDS)</td><td>2100 mg/l</td></tr>
<tr><td rowspan="6">3</td><td>PH</td><td>5.5 – 9.0</td></tr>
<tr><td>Total suspended Solids (TSS)</td><td>100 mg/l</td></tr>
<tr><td>Oil & Grease</td><td>10 mg/l</td></tr>
<tr><td>BOD (3 days at 27 degrees C)</td><td>30 mg/l</td></tr>
<tr><td>Chemical Oxygen Demand (COD)</td><td>2100 mg/l</td></tr>
<tr><td>Total Dissolved solids (TDS)</td><td>250 mg/l</td></tr>
</table></td><td>Being complied.
Treated Effluents are being monitoring by EPTRI and all the parameters are with the limits only.
EPTRI, Hyderabad, which is a CPCB, recognized and NABL accredited laboratory.</td></tr>
<tr><td>3</td><td>The mine should ensure segregation of Acid Mine Discharges (AMD) from abandoned mines, coal stocks, coal handling facilities, washeries & coal waste tips etc. and should adopt adequate treatment to achieve</td><td>Being complied.
The pH values of monitoring data show that the water is not acidic and there is no acid mine discharge from this mine.</td></tr>
</table>

	prescribed standards for the AMD as stipulated at S.No.2 prior to disposal. The plan of action for segregation, AMD, technology of the proposed treatment and mode of disposal should be submitted to Board.	
4.	The mine shall comply with ambient air quality standards of PM10 (Particulate Matter size less than 10µm)-100 µg/m^3. PM2.5 (Particulate Matter size less than 2.5µm)-60 µg/m^3. SO2- 80 µg/m^3. NOX-80 µg/m^3. outside the factory premises at the periphery of the industry. Standards of other parameters as mentioned in the National Ambient Air Quality Standards CPCB Notification No.B-29016/20/90/PCI-I, dated 18.11.2009. **Noise Levels:** Day time (6 AM to 10 PM) – 75 dB (A) Night time (10PM to 6 AM) – 70 dB (A)	Being complied. The ambient air quality is being monitored by outside agency, EPTRI, Hyd. All the parameters of ambient air quality are within the stipulated limits and The noise levels are being monitored and noise levels are within the stipulated limits.
5.	The existing CFO order dt. 06.11.2021 with a validity upto 31.03.2026 stands cancelled.	Being complied. CFO Payment done up to 31.03.2026 as per the advice of TGPCB, RGM.
6.	The mine has paid CFO fee of Rs. 30,22,900/- for a period upto 31.03.2026.	Being complied. CFO Payment done up to 31.03.2026 as per the advice of TGPCB, RGM.
7.	The mine either paying annual fee or total fee for Consented period, shall pay the balance fee as per the revised rates as applicable from time to time.	Being complied. CFO Payment done up to 31.03.2026 as per the advice of TGPCB, RGM.
8.	The mine shall not produce beyond the permitted capacity as mentioned in this order, without obtaining prior CFE & CFO of the Board. The mining capacity of the coal also shall not be increased more than IBM approved capacity.	Being complied
9.	The industry shall install and maintain CC cameras to ensure that no coal transporting Lorries shall pass without complete covering with tarpaulins.	Being complied
10	The mine shall provide & maintain water meters for recording water consumption for industrial and domestic purposes, and also maintain daily records.	Being complied. Water meters are provided and records are being maintained.
11	The mine shall maintain the sand filter properly for removal of suspended solids from mine discharge water.	Being complied
12	The mine shall analyze the quality of excess mine discharge water being disposed outside and submit the reports to the RO, Ramagundam. The mine also shall adopt necessary treatment for excess mine discharged water, if required, to meet the discharge standards.	Being complied

13	The mine shall not produce beyond the permitted capacity as mentioned in this order, without obtaining prior CFE & CFO of the Board. The mining capacity of the coal also shall not be increased more than IBM approved capacity.	Being complied.
14	The mine shall maintain separate water meters for recording water consumption for various purposes and also maintain daily records.	Being complied
15	The mine shall provide fixed water sprinklers along the permanent haul roads of the mine within three months.	Being complied. 
16	The mine shall maintain the water spraying system properly by adopting preventive maintenance schedule to avoid fugitive dust emissions.	Being complied 
17	The mine shall carryout water spraying oh haul roads to avoid fugitive dust emissions due to vehicular movement.	Being complied 
18	The industry should comply with standards applicable to coal mining for core zone as per GSR 742 (E) dates 25th September 2000 issued by MOEF&CC and also comply with National Ambient Air Quality Standards (NAAQS) in the buffer zone.	Being complied
19	The mine shall clean the roads regularly by procuring mechanical sweeping	Being complied.

	machine within five months to avoid fugitive emissions as committed.	Mechanical sweeping machine at OC-I 
20	The mine shall maintain water mist sprayers at coal bunkers, to control fugitive emissions.	Being complied
21	The mine shall take effective measures such as covering coal transport vehicles with tarpaulins, mechanical sweeping of roads & water sprinkling, etc., to avoid fugitive emissions.	Being complied
22	The mine shall use atleast 25% of fly ash on volume to volume basis of the total material used for external dump of overburden and same percentage in upper benches of back filling of open cast mines, as per Fly Ash Notification.	**Agreed to comply.** As per S.O.5481(E), dated 31.12.2021 issued by the MoEF&CC, GoI, a committee headed by Chairperson of CPCB, representatives of MoEF&CC, MoC, MoP, DGMS and IBM was constituted to identify mines (Both underground and opencast) for fly ash utilization. The committee in its meeting opined that, in running mines, fly ash filling is not possible due to safety issues as per various studies conducted by CIL and advised to fill ash in the abandoned mine voids. Guidelines in this regard are awaited. All the directions/guidelines stipulated by the Committee with regard to utilization of fly ash will be implemented. Further, MoEF&CC also advised SCCL to conducted a scientific study through CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad in one of its opencast mines i.e., Manuguru Opencast Project to ascertain the stability of overburden dumps by mixing of fly ash. CSIR-CIMFR submitted its final draft report on 27.02.2024. As per the reoprt, it is not advisable and feasible to use 25 % of Ash and 75 % of Overburden in external as well as in internal dumps of MNG OCP both under present and post mining scenario. Further, CSIR-CIMFR will submit its final report within a short period. Based on the report findings, SCCL will request MoEF&CC for exempting the EC condition regarding usage of fly ash in dumps and back filling opeartions in the running mines of SCCL.

		However, it is to submit that the fly ash is being utilized in the underground mines of SCCL for stowing of goaved out areas. Till now, around 112.83 Lakh Cu.m of ash has been utilized for this purpose.
23	The mine shall comply with MOEF Notification No.GSR.02 (E), dt. 02.01.2014 for supply of coal with Ash content not exceeding 34% to coal based Thermal Power plants.	Being complied
24	The personnel working in dusty areas should wear protective / respiratory devices / respiratory devices and they should also be provided with adequate training and information on safety and health aspects.	Being complied. Persons working in dusty areas are provided with protective/respiratory devices. Special training program conducted for the people those who are exposing to dust.
25	Blasting should be sequential in such a manner as to achieve minimum vibration.	Being complied. Controlled blasting is being practiced using NONELs to control the ground vibrations and the fly rock.
26	The mine shall comply with the following for controlling air pollution.	
	➢ To avoid the dust generation from the drilling operations, wet-drilling should be done	Being complied. Only wet drilling is being practiced for dust suppression.
	➢ Use of appropriate explosives for controlled blasting and avoid overcharging the blast holes	Being complied. Controlled blasting is being practiced using NONELs to control the ground vibrations and the fly rock and overcharging is being done.
	➢ The volume of dust rising from dumps by the action of wind should be controlled significantly by planting grasses on slopes and plants on dumps soon after their formation	Being complied. 3 tier Plantation is being taken up on finished dumps every year to prevent dust rising from dumps by the action of wind.
	➢ To overcome the problems of dust generation from mine haul roads, the following steps should be adopted. • Black topping of permanent roads like routes to coal handling plant, permanent internal roads etc. • Water spraying on haul roads and permanent transport routes at required frequencies. Provision should be made for procurement of six water sprinklers for this purpose. • Avenue plantation along roads should be adopted.	Being complied. Routes to the coal handling plant and permanent internal roads were block toped. 7 nos. of 28 kilo liter capacity water sprinklers are being used for spraying water on haul roads, O.B. dumps and other road ways. In addition to this, fixed point sprinkling system, dust fighter, water sprinkling arrangement at crusher, mist spray arrangements, etc., are provided to avoid fugitive dust emissions. Avenue plantation along the roads of core zone and buffer of mine is implementing.
	➢ Effective dust suppression measures should be taken up at pit head coal handling plant (CHP). The crusher	Being complied. The crusher house and coal transfer points were enclosed to possible extent and water spraying arrangements and mist spray

	house should be enclosed to the extent possible and dust suppression arrangement should be provided at suitable locations in the CHP. All the conveyors, screens, crusher etc. should be provided with covers to avoid fugitive dust during operation. Some of the measures proposed to be adopted at CHP in order to control dust emission include: • Height of fall to be minimized at all coal transfer points. • Internal lining of chutes and bins should be done to take care of abrasion & dust.	arrangements were provided for effective dust suppression. Height of fall at coal transfer points was kept minimum.
27	Dumping of overburden, if done, shall use the retreating pyramid bench formation with concurrent, physical and biological reclamation. Dumps should be contoured and provided with relief control and stabilized. Dump tops should be compacted, leveled and be properly drained.	Being complied. Dumping is being done in retreating pyramid bench formation and concurrent physical and biological reclamation is being done. Dumps are being contoured and provided with relief control and stabilizer, Dump tops are compacted, leveled and be properly drained.
28	Soil binding and nitrogen fixing plants should be planted in the Mining Lease Area. Biological reclamation should be done in two phase the first phase should be plant appropriate quick growing grass and shrubs and the second phase should be growing native shrubs and trees.	Being complied. Plantation is being taken up by planting soil binding nitrogen fixing plants in initial stages species like stylosarathus hamata, Glydisidia maculata, acasia nitotica. Sesbania grandiflora, vettiveria giginoidis, sacharum munja grass slips and crotolaria juntia) followed by other nitrogen fixing plants. In later stages, the native indigenous species like Ficus bengalensis, ficus relisiosa, hardwikhia binota, dolichandrone crispa, pterocarpus marsupium, ingadulsi, embica officinalis, dendro calamus strictus, terminalia bellerica, etc., are being planted.
29	The mine shall develop and maintain greenbelt as per norms.	Noted, Agreed to comply.
30	The mine shall develop greenbelt along the haul roads and around the mine exhaust system to control air pollution.	Being complied. So far plantation was done in 236 ha by planting native hardy species at 2500 plants per Ha. Plantation is being done every year as per approved EMP. Plantation was taken up in company vacant lands, colony, mine lease areas, etc., and fruit bearing and flower plants are being distributed every year to schools and surrounding villagers at free of cost.
31	Ground water table levels should be monitored every season. Any lowering of the ground water table in comparison to the previous season should be reported	Being complied. Ground water levels are being monitored & recorded four times a year (every season) and found that there is no decrease in the

	to the Board immediately. Discarded pits should be allowed to fill with water.	ground water level. Ground water monitoring data is being submitted to the Ground Water Department, Peddapalli, T.S., & CPCB, New Delhi.
32	Vehicles should be well maintained and engine idling should be minimized. Vehicle cabs should be made dust-proof.	Being complied. Preventive maintenance and engine tuning is being done for all vehicles/HEMM as per manufacturers schedules. All most all the HEMM cabins are covered and made sound and dust proof by providing AC cabins.
33	All waste material should be accommodated within the Mining Lease Area.	Noted, Agreed to comply
34	The natural drainage of water should be maintained. Dump sites should not cross any streams, water flow from the Mining Lease Area, even during the monsoon, should be free of suspended matter and conform to prescribed water quality standards.	Being complied. Dumping is being done in retreating pyramid bench formation and concurrent physical and biological reclamation is being done. Dumps are being contoured and provided with relief control and stabilizer, Dump tops are compacted, leveled and be properly drained.
35	Check dams and filter beds should be constructed to protect from stream runoffs.	Noted, Agreed to comply
36	The mine shall comply with the directions issued by the board from time to time.	Noted, Agreed to comply
37	The mine shall explore the possibility for usage of ash instead of sand stowing operations.	Noted, Agreed to comply
38	The mine shall maintain water mist sprayers at coal bunkers, to coal handling plant to control fugitive emissions.	Being complied.
39	The mine should adopt eco-friendly mining practices. The maximum charges used for blasting should be limited to ensure vibrations created in the neighborhood area are within acceptable limits.	Noted, Agreed to comply
40	The mine should adopt blasting technique using shock tube and delay detonators. Dust collectors are to be provided for the drilling equipment. Mine should adopt fugitive dust control measure like water sprinkling near loading areas.	Noted, Agreed to comply
41	The mine should submit the detailed mine closure plan with a timeframe and pattern of reclamation in each period. The ultimate plan should show finished ground contours that will be reforested and the area that will be left open.	Noted, Agreed to comply

42	All waste material should be accommodated within the Mining Lease Area.	Noted, Agreed to comply
43	The natural drainage of water should be maintained. Dump sites should not cross any streams, water flow from the Mining Lease Area, even during the monsoon, should be free of suspended matter and conform to prescribed water quality standards.	Noted, Agreed to comply . Dumping is being done in retreating pyramid bench formation and concurrent physical and biological reclamation is being done. Dumps are being contoured and provided with relief control and stabilizer, Dump tops are compacted, leveled and be properly drained.
44	Soil binding and nitrogen fixing plants should be planted in the Mining Lease Area. Biological reclamation should be done in two phase the first phase should be plant appropriate quick growing grass and shrubs and the second phase should be growing native shrubs and trees.	Being complied. Plantation is being taken up by planting soil binding nitrogen fixing plants in initial stages species like stylosarathus hamata, Glydisidia maculata, acasia nitotica. Sesbania grandiflora, vettiveria giginoidis, sacharum munja grass slips and crotolaria juntia) followed by other nitrogen fixing plants. In later stages, the native indigenous species like Ficus bengalensis, ficus relisiosa, hardwikhia binota, dolichandrone crispa, pterocarpus marsupium, ingadulsi, embica officinalis, dendro calamus strictus, terminalia bellerica, etc., are being planted.
45	The mine should undertake suitable artificial recharge measures in the project are augmentation of ground water resources. Ground water table levels should be monitored every season. Any lowering of the ground water table in comparison to the previous season should be reported to the Board immediately. Discarded pits should be allowed to be fill with water.	Noted, Agreed to comply .
46	The mine shall install continuous the Ambient Air Quality in the buffer zone for monitoring of RSPM, SPM, NOx and SO2 by 25.10.2023 as committed during the CFO Committee meeting held on 03.10.2023 and maintain the AAQM in core zone. The location of ambient air quality stations shall be decided based on metrological data, topographical features and environmentally and ecologically sensitive targets and the frequency of monitoring shall be undertaken in consultation with Regional office of the Board.	Being complied
47	The industry shall install online effluent monitoring system at the outlet of ETP for the parameters pH, TDS, BOD & COD by 04.12.2023 as committed during the CFO Committee meeting held on 03.10.2023.	Complied

48	The applicant should submit Environment statement in Form V before 30th September of every year as per Rule No.14 of E(P) Rules, 1986 & amendments thereof.	Being complied. Every year before 30th September, Form- V is being submitted to the member secretary, T.S. pollution control Board, Paryavam bhavan, A-3, Indistrial estate, Sanath nagar, Hyderbad, 500018 and to RO, TSPCB, Karimnagar.
49	All the rules & regulations notified by Ministry of Law and Justice, Government of India regarding Public Liability Insurance Act, 1991 should be followed	Being complied. All the rules & regulations notified by Ministry of Law and Justice. Government of India regarding the Liability Insurance Act, 1991 is being followed.
50	The conditions stipulated in this order are without any prejudice to rights and contentions of this Board in any Hon'ble court of Law.	Noted, assured to abide the conditions.

Project officer,
RG OCP-I, RG-III.

PROJECT OFFICER
RGOCM-1, RG-3

PART-B

CONSUMPTION OF RAW MATERIAL DURING THE YEAR 2024-25 OF OC-I STORES RG-III AREA

Sl.No.	Description	Units	Consumption
1	Explosive for coal	Kgs	---
2	Explosives for OB	Kgs	---
3	Detonators (Nonels)	Nos	---
4	Detonators (EDS)	Nos	---
5	Detonating fuse	Mtrs	---
6	Gear oils of all types	Ltrs	3990
7	Hydraulic oils of all types	Ltrs	190260
8	Break oil	Ltrs	840
9	Transformer oil	Ltrs	---
10	Transmission oil	Ltrs	136290
11	Engine oil	Ltrs	64050
12	Kersone oil	Ltrs	---
13	Diesel oil	Ltrs	41794063
14	Grease	Kgs	42042
15	Conveyor belt	Mtrs	6800
16	Tyres of different sizes	Nos	72
17	HEMM batteries	Nos	163

HAZARDOUS WASTES AND STOCK POSITION DETAILS OF RG OC-I STORES WORKSHOP DURING THE YEAR 2024-25

Sl. No	Hazardous wastes	Stock as on 01-04-2024	Received during the last year	Reused/sent to other areas	Disposed during the year	Stock at the end of the 31-03-2025
1	Waste Oil (ltrs)	453.21	80	---	75	458.21
2	Empty oil & grease drums (Nos)	614	931	---	1000	545
3	Waste batteries	315	319	---	380	254
4	Non-ferrous metal scrap (in M.Tons)	104.88	---	---	19.930	84.95
5	Scrap iron (in M.Tons)	697.962	600	---	650	647.962

PART-C

1. AIR POLLUTION SOURCES:

Main sources of air pollution are drilling and blasting operations, loading and unloading operations of coal and over burden, exhausting gases from the Heavy Earth Moving Machinery (HEMM), coal transportation vehicles, coal handling operations at the coal handling plants, coal heaps and OB dumps.

The ambient air quality status in and around the mining area during the year **2024-25** is furnished in Annexure-I enclosed herewith.

I. AIR POLLUTION CONTROL MEASURES:

1. Water spraying is being done on haul roads dump yards and at coal loading and unloading points to reduce the dust arising due to movement of vehicles and wind. 7 Nos. of 28 KL and 6 Nos. of 10 KL capacity water tankers are being deployed for this purpose.
2. As far as possible all the coal produced is dispatched, except in few exceptional cases.
3. At In pit feeder breaker, Automatic sprinkling system under the control of operator with a solenoid valve is provided. Portable mist spraying systems 2 nos were provided at CHP.
4. Asphalting of Coal transport road to a length of 7.00 Kms is completed.
5. Water spraying pipeline with nozzles, laid along the center of the haul road for dust Suppression, for Continuous water sprinkling from east junction to surface coal yard.
6. 4 Nos. water filling points provided in various horizons for loading water into tankers without wastage of time and diesel.
7. At transfer points along conveyor belt, hoppers provided with mist of spray nozzles for dust suppression.
8. 360 Degrees swing swivel type nozzles are provided at coal stockyards for wetting the coal before loading into the trucks/dumpers.
9. Dumpers are parked inside the quarry to minimize the unnecessary travel distance and raise of dust.
10. Two numbers of portable mist spray equipments were established at OC-I CHP, and they are working in good condition.
11. Wind Barrier of length is more than 200m up to the height of 8 m at both sides of GL Bunkers at CHP.

II. GASEOUS POLLUTION CONTROL:

1. Periodical maintenance of all diesel/petrol operated machinery vehicles is being done to control SO2 NOx & CO in the exhaust emissions.
2. Proper blasting pattern with optimum charge of explosives and use of delay action detonators is being adopted to reduce noxious gases and dust emissions.
3. No burning of coal or wood or cotton waste impregnated with oil and grease is done in the mine premises.
4. NONELS are being used to reduce ground vibrations and fly rock.

5. Employees are being provided with free LPG gas cylinders instead of coal to discourage coal burning for domestic use. All employees are using LPG gas in place of coal.

2. WATER POLLUTION SOURCES AND CONTROL MEASURES

Sources of water pollution are mainly wastewater generated at workshops, mine discharge water runoff water from dump yards. The wastewater from workshops is treated in ETP and recycled for washing of HEMM and irrigation of plants. The mine seepage water is collected in big sumps inside the quarry and after settling the water it is pumped out to surface .the mine discharge water is used for spraying, washing, firefighting etc. Excess water is let out on surface, which joins near by Bokkala Vagu. The water from Bokkalavagu is being used for irrigation on the down steam side.

Wastewater is discharged from the workshops is recycled after passing through oil and grease trap (ETP). The small quantities of waste water from offices is treated in septic tanks and let out in to plantation area.

The water analysis data for the year **2024-25** is enclosed as **Annexure-II**

3. LAND MANAGEMENT:

Activity wise Land Requirement	:	**As per EMP (in Ha)**	**Present Status (in Ha)**
A. Quarry Area		367.44	363.14
B. External OB Dumps(voids of OC-I area		403.31	388.286
C. Infrastructures		30.52	30.52
D. Others		123.61	141.952
E. Total		923.88	923.88

4. Overburden Management

1	Total Overburden	:	363.137 M.Cu.m			
2	Total OB removed since inception	:	463.6 M.Cu.m			
3	Total OB removed during last year	:	7.607 M.Cu.m.			
4	Details of External OB dumps	:	Area (in Ha)	Quantity in (M.Cu.M)	Height (m)	Overall slope
5	Dump-1(voids of old OC-I)	:	388.268	296.598	120	28 degree
6	Details of Internal dump (Backfilling)		254.15	55.330	reached up to +30 from ground level	

5. Plantation:

1	No of plants planted during last year.	15000 plants
2	Area covered in Ha	6.000 Ha
3	Total area brought under plantation so far.	In mine lease area : 236.30 Ha Around silo and townships out side the mine lease area: 100 Ha
4	Total no of plants planted so far since inception	In mine lease area: 6,50,750
5	Species of plants planted	Babool, Neem, Casiasiamia, Bamboo, Pongaamia, Tamarind, usiri,ficus etc.

6. Water Balance Statement:

Sl.No	Description	Quantity in KLD
1	Average quantity of water pumped out of the mine	1800KLD
2	Water used for dust suppression	1100 KLD
3	Water used for washing of HEMM	200 KLD
4	Water used for plantation	100 KLD
5	Water supplied for domestic purpose	40 KLD
6	Excess water let out	360 KLD
7	Point of discharge (as per CFO)	Bokkala Vagu via settling ponds and filter bed.
8	Discharge Consent from TSPCB	2346 KLD

PART –D

Noise pollution control measures.

a. Regular maintenance of vehicles and heavy equipment to minimize the noise level.
b. Provision of noise proof cabins for Heavy earth moving machines.
c. Earplugs have been provided to the Operators exposed to high noise levels
d. Raising of plantation in vacant lands to attenuate noise level
e. Noise levels are recorded at different locations in and around the project area are within the statutory limits.
f. Noise levels recorded for the year **2024-25** are furnished as **Annexure-III**

PART –E

The solid wastes generated are overburden materials excavated from the quarry and some iron scrap and other used materials like scrap tyres etc.

OVERBURDEN MATERIALS:

In the process of coal extraction overlying earth cover is removed to expose the coal seam by blasting. The blasted material consists of top soil, sand, broken rock material, clay and shale. This blasted material is loaded into dumpers by shovels and transported to dump yards. In the initial stages until sufficient de-coaled area is available the overburden material removed is dumped in external dump yards and after some advancement of quarry the material is dumped in the de-coaled area. The topsoil removed is preserved for future use and some soil is spreader on completed dump decks and slopes.

PART – F

Characterization of solid waste and disposal practice

1. Overburden material:

Over burden material consists of soil, sand, broken hard rock and clay and some carbo-clay, shale etc. All these materials are excavated for exposing the coal seams underneath the earth cover in benches by blasting .The blasted material is lifted in to dumpers by shovels and transported to dump yards. In initial stages these over burden materials is dumped outside the quarry and after some advancement of the quarry these materials are dumped into the de-coaled area to back fill the voids created. Saplings of different plant species are being over these dumps after proper sloping and leveling.

2. Iron / metallic scrap and other materials:

Iron scrap generated consists of old worn out parts of different machines, body chassis of dumpers, trucks, bearings, old wire ropes, flat & iron scrap etc. Some of these materials are used at the unit level for some or other appropriate purpose with some alterations. The remaining scrap is sold out once in a while by tender auction. Old tyres of dumpers, trucks, jeeps and old batteries are stocked in the stores and sold out periodically to TSPCB authorized agencies by tender auction. Old conveyor belt is used within unit for chute plate liners and also used for making detonator canisters bags and for coursing of air in underground workings.

PART-G

Impact of pollution control measures taken on conservation of natural resources and on the cost of production

1. Extensive water spraying arrangements have been made at all the opencast mines and coal handling plants. 6 Nos. of 28K.lit capacity and 1 nos 10 kilo liter capacity water tankers are being used for spraying water on haul roads from the quarry to O.B. dumps and other road ways. Water spraying lines lay inside the quarry and at coal benches and in coal handling plants. Mist spraying system was arranged at Ground Bunkers of CHP.
2. Plantation was done in the OB and vacant land
3. Desilting of garland drains, settling ponds.
4. NONNELS are being used to control blast vibrations.
5. Filter beds and ETP is maintaining in good condition.
6. To control erosion and water pollution bio engineering structures like rock toe walls, rock fill dams, garland drains, masonry drains on OB dumps slopes etc,. were made on and around OB dumps.

PART — H

Additional measures/investment proposals for environmental protection and control of pollution

1. Plantation of 6.0 Ha of OB Dump area during the year 2024-25 and the area with 15,000 plantation was completed
2. Stabilization of OB dump slopes with seed sowing, Agave suckers etc.

PART- I

Socio-economic Measures:

01.	Quarters we constructed on non coal bearing areas will facilities such as Hospitals Schools, Market place, Post Office, Telegraph Office, Power Supply, Community Halls, Recreation Clubs, Play Grounds and protected water supply and well netted sewage and drainage line systems.
02.	LPG gas is being supplied free of cost to the employees
03.	Free medical treatment is being given to workmen and their families, and all children of workmen are covered under immunization program. out sourcing manpower also provided with medical treatment facilities.
04.	Incentive schemes for popularizing family planning is in vogue where by Rs.1000 paid for the persons Undergoing vasectomy operation and Rs. 800/- paid for spouse undergoing tubectomy operations in addition to the grant of 6 days special leave.
05.	One (01) RO plant were provided in Mulkalapalli Village.
06.	Land given to JNTUH, Krushi vignan, Horticulture polytechnic
07.	Bore cells are provided in colonies. The drinking water which is supplied to the colony is chlorinated to the prescribed standards
08.	Recreation clubs are provided with adequate facilities
09.	Free medical Camps are being conducting regularly to the surrounding villages
10.	Encouragement D sparks and games is given by forming works people's sports and games association for conducting inter area meets etc.
11.	Giving training to the unemployed youth in different types of self employment schemes through Singareni SEWA Samithi.

Project officer,
RG OCP-I, RG-III.
PROJECT OFFICER
RGOCM-1, RG-3

ANNEXURE-I

ANALYSIS OF AIR QUALITY MOINITORING REPORTS OF RG OC-I FOR THE YEAR APRIL 2024 TO MARCH 2025

1. RG OC-I SITE OFFICE (CORE ZONE).

S.No	Location name & code date of sampling	parameter			
	OC-I Site Office (CA-1)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
	Coal mine standards, GSR 742(E), Dated 25.09.2000 & NAAQS, Dated 18.11.2009.	250	-	120	120
1	09.04.2024	208	35.4	17.7	23.5
2	29.04.2024	214	49.5	19.2	25.4
3	14.05.2024	223	37.2	18.2	24.4
4	29.05.2024	242	35.1	23.7	28.0
5	07.06.2024	169	66.5	11.0	14.1
6	24.06.2024	172	65.4	11.0	14.0
7	01.07.2024	103	44.3	9.2	12.2
8	24.07.2024	99	39.3	9.1	12.1
9	06.08.2024	106	49.2	9.7	12.6
10	24.08.2024	109	44.3	9.6	12.7
11	05.09.2024	109	44.2	9.8	12.5
12	19.09.2024	110	44.2	9.7	12.8
13	07.10.2024	177	55.2	12.2	15.8
14	21.10.2024	162	45.4	10.7	17.0
15	07.11.2024	162	69.6	9.8	14.1
16	26.11.2024	162	52.8	11.7	15.5
17	05.12.2024	154	59.4	10.5	13.9
18	26.12.2024	138	54.8	13.4	17.5
19	11.01.2024	111	39.3	9.8	12.5
20	21.01.2025	110	44.2	9.7	12.8
21	05.02.2025	141	44.2	10.0	12.6
22	19.02.2025	144	39.3	10.9	13.4
23	05.03.2025	149	39.3	10.6	13.8
24	21.03.2025	138	44.9	11.0	14.1
Min		99	35.1	9.1	12.1
MAX		242	69.6	23.7	28
Aver		150.5	47.6	12.0	15.7
98 per		233.3	68.2	21.6	26.8

2. RG OC-I, BASE WORKSHOP (CORE ZONE)

S.No	Location name & code date of sampling	Parameter			
	OC-I BWS (CA-2)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
	Coal mine standards, GSR 742(E),Dated 25.09.2000 & NAAQS, Dated 18.11.2009.	250	-	120	120
1	09.04.2024	208	35.4	17.7	23.5
2	29.04.2024	214	49.5	19.2	25.4
3	14.05.2024	187	45.0	19.4	26.1
4	29.05.2024	203	48.2	21.4	26.8
5	07.06.2024	199	72.8	9.8	13.9
6	24.06.2024	208	69.8	10.4	13.4
7	01.07.2024	111	39.3	9.8	13.8
8	24.07.2024	108	34.4	9.6	13.4
9	06.08.2024	114	44.3	10.1	13.9
10	24.08.2024	119	39.3	10.0	13.7
11	05.09.2024	117	39.1	10.4	13.8
12	19.09.2024	121	39.3	10.1	13.8
13	07.10.2024	192	57.5	11.9	16.0
14	21.10.2024	182	52.2	12.9	17.1
15	07.11.2024	176	75.4	8.8	15.3
16	26.11.2024	183	57.6	13.8	16.1
17	05.12.2024	179	64.9	9.6	13.9
18	26.12.2024	184	62.4	11.5	15.7
19	11.01.2025	121	34.2	10.0	13.8
20	21.01.2025	121	39.3	10.1	13.8
21	05.02.2025	151	39.1	11.4	14.2
22	19.02.2025	159	44.0	11.7	13.7
23	05.03.2025	157	34.2	11.5	14.3
24	21.03.2025	142	39.3	12.2	14.4
Min		108	34.2	8.8	13.4
Max		214	75.4	21.4	26.8
Average		160.7	48.2	12.2	16.2
98 per		211.2	74.2	20.5	26.5

3. RG OC-I CHP (CORE ZONE)

S.No	Location name & code date of sampling	Parameter			
	RG OC-I CHP (CA-3)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
	Coal mine standards, GSR 742(E), Dated 25.09.2000 & NAAQS, Dated 18.11.2009.	250	-	120	120
1	09.04.2024	205	38.5	16.4	22.8
2	29.04.2024	218	51.7	18.4	24.8
3	14.05.2024	210	42.1	16.3	22.7
4	29.05.2024	235	38.6	18.2	23.1
5	07.06.2024	116	55.6	9.5	13.6
6	24.06.2024	134	49.9	10.2	14.2
7	01.07.2024	114	35	10.1	12.6
8	23.07.2024	110	30	9.8	12.5
9	06.08.2024	117	40	10.2	13
10	23.08.2024	125	41.3	10.2	13.1
11	05.09.2024	119	39.8	10.5	13.1
12	19.09.2024	127	41.0	10.4	13.2
13	07.10.2024	152	54.4	9.1	13.1
14	21.10.2024	137	49.4	11.2	17.1
15	07.11.2024	142	57.9	10.6	16.4
16	26.11.2024	209	62.4	11.4	15.2
17	05.12.2024	119	48.5	9.5	13.7
18	26.12.2024	159	57.5	9.8	14.6
19	11.01.2025	126	34.8	10.5	13.1
20	21.01.2025	133	45.2	10.4	13.2
21	05.02.2025	157	40.5	12.0	13.9
22	19.02.2025	164	45.5	12.5	14.2
23	05.03.2025	160	35.4	11.5	12.9
24	21.03.2025	156	46.2	11.1	12.6
Min		110	30	9.1	12.5
Max		235	62.4	18.4	24.8
Average		151.8	45.1	11.7	15.4
Percentile		227.2	60.3	18.3	24.0

4. SMS Plant (CORE ZONE)

S.No	Location name & code date of sampling	Parameter			
	SMS Plant (CA-4)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
	Coal mine standards, GSR 742(E), Dated 25.09.2000 & NAAQS, Dated 18.11.2009.	**250**	**-**	**120**	**120**
1	09.04.2024	208	35.4	17.7	23.5
2	29.04.2024	214	49.5	19.2	25.4
3	14.05.2024	187	45.0	19.4	26.1
4	29.05.2024	203	48.2	21.4	26.8
5	07.06.2024	199	72.8	9.8	13.9
6	24.06.2024	208	69.8	10.4	13.4
7	01.07.2024	111	39.3	9.8	13.8
8	24.07.2024	108	34.4	9.6	13.4
9	06.08.2024	114	44.3	10.1	13.9
10	24.08.2024	119	39.3	10.0	13.7
11	05.09.2024	100	44.9	9.7	12.0
12	19.09.2024	103	36.3	9.8	12.1
13	07.10.2024	129	59.6	11.2	16.3
14	21.10.2024	164	45.8	9.7	14.4
15	07.11.2024	146	64.7	8.1	12.9
16	26.11.2024	176	55.5	8.3	13.4
17	05.12.2024	156	61.8	9.7	16.2
18	26.12.2024	171	58.9	10.4	14.2
19	11.01.2025	105	39.9	9.7	12.0
20	21.01.2025	103	36.5	9.8	12.1
21	05.02.2025	123	34.4	10.2	12.7
22	19..02.2025	136	39.3	11.7	13.4
23	05.03.2025	120	29.5	11.1	13.6
24	21.03.2025	131	31.2	10.6	13.2
	Min	**100**	**29.5**	**8.1**	**12**
	Max	**214**	**72.8**	**21.4**	**26.8**
	Aver	**147.3**	**48.6**	**11.3**	**15.3**
	98 per	**211.2**	**71.4**	**20.5**	**26.5**

5. MULAKALAPALLI VILLAGE (BUFFER ZONE)

S.No	Location name & code date of sampling	Parameter			
	Mulakalapalli Village (BA-1)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
	Coal mine standards, GSR 742(E),Dated 25.09.2000 & NAAQS, Dated 18.11.2009.	100	60	80	80
1	10.04.2024	83	35.5	15.0	21.1
2	30.04.2024	81	34.4	13.2	19.6
3	15.05.2024	75	43.0	14.1	20.3
4	30.05.2024	71	36.2	16.9	22.4
5	07.06.2024	72	38.6	8.1	12.2
6	24.06.2024	75	39.4	8.8	12.5
7	03.07.2024	53	32.1	8.7	12.0
8	24.07.2024	52	26.8	8.7	8.6
9	08.08.2024	55	33.4	9.1	12.5
10	24.08.2024	59	38.9	9.8	12.6
11	07.09.2024	60	33.4	9.8	12.5
12	21.09.2024	61	33.4	9.8	12.7
13	07.10.2024	55	29.2	8.1	14.4
14	21.10.2024	75	38.4	8.7	11.9
15	07.11.2024	77	37.4	8.3	12.0
16	26.11.2024	76	33.2	9.3	13.0
17	05.12.2024	75	39.5	10.1	13.0
18	26.12.2024	71	38.7	8.8	12.7
19	13.01.2025	63	27.8	9.8	12.5
20	16.01.2025	71	37.5	10.6	13.6
21	06.02.2025	57	26.4	11.0	11.7
22	20.02.2025	63	31.7	12.5	11.6
23	06.03.2025	57	30.6	9.1	12.1
24	22.03.2025	55	33.4	11.0	13.2
	Min	**52**	**26.4**	**8.1**	**8.6**
	Max	**83**	**43**	**16.9**	**22.4**
	Aver	**66.3**	**34.5**	**10.4**	**13.8**
	98 per	**82.1**	**41.4**	**16.0**	**21.8**

6. JULAPALLI VILLAGE (BUFFER ZONE)

S.No	Location name & code date of sampling	Parameter			
	Julapalli Village (BA-2)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
	Coal mine standards, GSR 742(E),Dated 25.09.2000 & NAAQS, Dated 18.11.2009.	100	60	80	80
1	09.04.2024	76	37.7	13.7	19.4
2	29.04.2024	72	36.1	12.1	17.4
3	14.05.2024	78	48.4	13.4	19.8
4	29.05.2024	74	44.8	14.4	20.2
5	07.06.2024	79	41.7	7.2	12.8
6	24.06.2024	80	42.5	9.1	12.8
7	03.07.2024	62	33	8.8	11.2
8	24.07.2024	58	27.5	8.3	11
9	08.08.2024	64	34.4	9.1	11.3
10	24.08.2024	68	40.1	9.3	11.3
11	07.09.2024	66	40.1	9.2	11.4
12	21.09.2024	70	40.1	9.5	11.4
13	07.10.2024	75	34.5	7.7	14.1
14	21.10.2024	71	37.4	8.3	11.6
15	07.11.2024	81	45.2	8.7	13.9
16	26.11.2024	72	40.6	7.8	13.6
17	05.12.2024	69	36.8	9.3	15.3
18	26.12.2024	73	39.4	9.8	13.3
19	13.01.2025	67	28.7	9.2	11.4
20	23.01.2025	65	28.7	9.5	11.4
21	06.02.2025	68	27.9	10.5	12.3
22	20.02.2025	72	33.5	11.9	12.4
23	06.03.2025	66	27.9	10.6	11.7
24	22.03.2025	73	34.4	9.7	10.4
	Min	58	27.5	7.2	10.4
	Max	81	48.4	14.4	20.2
	Aver	70.8	36.7	9.9	13.4
	98 per	80.5	46.9	14.1	20.0

7. PANNUR VILLAGE (Buffer Zone)

S.No	Location name & code date of sampling	parameter			
	Pannur Village (BA-3)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
	Coal mine standards, GSR 742(E),Dated 25.09.2000 & NAAQS, Dated 18.11.2009.	100	60	80	80
1	08.04.2024	89	45	12.5	17.7
2	27.04.2024	83	39.8	14.3	20.2
3	11.05.2024	81	41.1	12.5	17.3
4	28.05.2024	86	47	15.7	21.5
5	08.06.2024	82	43.2	8	13
6	25.06.2024	62	34.7	8.7	13
7	03.07.2024	51	36.8	8.3	11.9
8	23.07.2024	49	31.6	8.1	11.8
9	08.08.2024	53	38.1	8.5	12.2
10	23.08.2024	60	43.8	9	12.1
11	07.09.2024	55	38.1	8.6	12.2
12	21.09.2024	61	42.4	9.1	12.2
13	08.10.2024	77	38.9	10.5	13.1
14	22.10.2024	65	36.4	9.2	13.6
15	08.11.2024	86	46.8	10.5	12.7
16	27.11.2024	66	35.4	8.6	11.4
17	06.12.2024	62	34.6	9.7	13.0
18	27.12.2024	62	34.6	9.5	12.4
19	15.012025	59	32.7	8.6	12.2
20	23.01.2025	57	31.8	9.1	12.2
21	07.02.2025	54	31.6	9.0	12.9
22	21.02.2025	65	31.6	8.5	13.0
23	07.03.2025	58	31.6	9.6	12.6
24	21.03.2025	66	26.5	8.6	11.8
	Min	49	26.5	8	11.4
	Max	89	47	15.7	21.5
	Aver	66.2	37.3	9.8	13.6
	98 per	87.6	46.9	15.1	20.9

9.NAGARAM VILLAGE (BUFFER ZONE)

S.No	Location name & code date of sampling	parameter			
	Nagaram Village (BA-7)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
	Coal mine standards, GSR 742(E),Dated 25.09.2000 & NAAQS, Dated 18.11.2009.	100	60	80	80
1	08.04.2024	85	38.9	9	14.4
2	27.04.2024	79	32.8	12.7	17.9
3	11.05.2024	77	51.9	10.2	15.4
4	28.05.2024	81	40.3	12.2	18.8
5	10.06.2024	74	38.4	8.8	11.5
6	26.06.2024	86	43.3	8.1	12.2
7	04.07.2024	62	30.8	7.8	11.2
8	22.07.2024	58	25.6	7.7	11.1
9	09.08.2024	65	32	8.3	11.6
10	22.08.2024	66	37.3	8.6	11.7
11	09.09.2024	66	31.6	8.5	11.7
12	23.09.2024	67	42.6	8.8	11.8
13	09.10.2024	73	37.9	8.6	11.0
14	23.10.2024	79	41.2	10.5	13.1
15	09.11.2024	79	41.2	9.6	13.9
16	28.11.2024	72	40.2	8.8	13.4
17	07.12.2024	72	39.5	8.2	12.0
18	28.12.2024	74	40.8	8.1	13.3
19	15.01.2025	58	31.6	9.1	11.7
20	24.01.2025	60	32.0	8.8	11.8
21	07.02.2025	59	26.3	9.6	12.5
22	21.02.2025	61	31.6	10.0	11.9
23	07.03.2025	62	31.3	9.1	11.8
24	21.03.2025	66	26.5	8.6	11.8
Min		58	25.6	7.7	11
Max		86	51.9	12.7	18.8
Average		70.0	36.1	9.2	12.8
Percentile		85.5	47.9	12.5	18.4

ANNEXURE-II

ANALYSIS OF WATER QUALITY MOINITORING REPORTS OF OC-I FOR THE YEAR APRIL 2024 TO MARCH 2025

1. RG OC – I Exp. Mine Discharge (EW1).

S. No	Location name & code date of sampling	Parameters					
	OCP –I Expansion Mine Discharge (EW-1)	pH (at 25^0 C)	Total Suspended Solids at 105^0 C	Total Dissolved Solids at 180^{0}C	Chemical Oxygen Demand	BOD	Oil&Grease
	Unit	--	mg/L	mg/L	mg/L	mg/l	mg/L
	Test Method	4500-H$^+$B	2540-D	2540-C	5220-D	IS 3025	5520-B
	MoEF GSR 742(E) and GSR 801(E) Effluent Standards for Coal mines.	5.5 to9.0	100	--	250	30	10
1	15.04.2024	7.1	29	891	35	6.8	<1
2	30.04.2024	7.3	37	764	28	5.6	<1
3	15.05.2024	8.1	21	820	20	2.1	<1
4	31.05.2024	7.1	32	914	32	5.1	1
5	14.06.2024	7.5	26	964	24	2.4	<1
6	29.06.2024	7.1	35	853	28	4.4	<1
7	03.07.2024	7.2	40	910	39	5.1	1
8	24.07.2024	7.7	29	1012	44	7.2	1.2
9	09.08.2024	7.1	38	985	35	5.4	<1
10	23.08.2024	7.4	41	892	27	4.4	<1
11	10.09.2024	7.4	34	953	32	6.3	<1
12	21.09.2024	7.9	26	813	39	6.5	1
13	15.10.2024	8.1	32	956	28	3.8	1.4
14	26.10.2024	7.7	29	843	32	4.4	<1
15	15.11.2024	7.6	36	1014	24	5.6	<1
16	26.11.2024	7.9	24	995	36	4.2	<1
17	13.12.2024	7.8	33	792	27	5.1	<1
18	31.12.2024	7.9	26	865	24	3.2	<1
19	15.01.2025	7.7	35	973	43	4.8	<1
20	31.01.025	7.9	28	796	44	5.2	<1
21	15.02.2025	7.5	32	944	32	4.1	<1
22	21.02.2025	8.1	20	812	40	5.5	<1
23	13.03.2025	7.6	28	768	35	3.6	<1
24	24.03.2025	7.4	39	890	28	4.2	<1
	Min	**7.1**	**20**	**764**	**20**	**2.1**	**1**
	Max	**8.1**	**41**	**1014**	**44**	**7.2**	**1.4**
	Average	**7.6**	**31.3**	**892.5**	**32.3**	**4.8**	**1.1**
	Percentile	**8.1**	**40.5**	**1013.1**	**44.0**	**7.0**	**1.4**

2. RG OC – I BWS ETP Outlet (EW2).

S.No	Location name & code date of sampling	Parameters					
	OCP –I BWS ETP OUT LET WATER (EW-2)	pH (at 25^0 C)	Total Suspended Solids at 105^0 C	Total Dissolved Solids at 180^{0}C	Chemical Oxygen Demand	BOD	Oil& Grease
	Unit	--	mg/L	mg/L	mg/L	mg/l	mg/L
	Test Method	4500-H$^+$B	2540-D	2540-C	5220-D	IS 3025	5520-B
	MoEF GSR 742(E) and GSR 801(E) Effluent Standards for Coal mines.	5.5 to9.0	100	--	250	30	10
1	15.04.2024	7.9	74	1024	63	14.4	2.6
2	30.04.2024	7.1	60	1264	72	17.4	1.2
3	15.05.2024	7.3	54	1155	56	14.4	1.8
4	31.05.2024	7.4	49	1091	60	13.4	2
5	14.06.2024	7.7	63	1251	52	15.2	2.4
6	29.06.2024	7.5	71	1163	64	14.2	3.2
7	03.07.2024	7.9	66	1341	47	12.4	3.6
8	24.07.2024	8.1	58	1275	68	14.4	2.8
9	09.08.2024	7.8	74	1058	55	13.1	2
10	23.08.2024	8.2	64	1145	49	12.4	1.2
11	10.09.2024	7.6	71	1477	80	16.2	2.4
12	21.09.2024	7.2	59	1248	75	14.2	2
13	15.10.2024	7.6	64	1135	68	15.3	2.2
14	26.10.2024	7.4	55	1052	60	12.3	2
15	15.11.2024	8.1	71	1248	72	16.8	2.6
16	26.11.2024	7.8	60	1123	64	16.4	2.6
17	13.12.2024	7.7	52	1086	55	11.2	2.4
18	31.12.2024	7.9	68	1269	67	16.5	2.8
19	15.01.2025	8.2	77	1145	75	15.4	3.4
20	31.01.2025	7.7	64	1371	80	14.4	2.6
21	15.02.2025	7.3	71	1255	68	16.4	3
22	21.02.2025	7.5	59	1364	56	13.3	<1
23	13.03.2025	7.4	66	1192	51	10.5	2
24	24.03.2025	7.9	74	1254	48	12.2	2.4
	Min	**7.1**	**49**	**1024**	**47**	**10.5**	**1.2**
	Max	**8.2**	**77**	**1477**	**80**	**17.4**	**3.6**
	Average	**7.7**	**64.3**	**1207.8**	**62.7**	**14.3**	**2.4**
	Percentile	**8.2**	**75.6**	**1428.2**	**80.0**	**17.1**	**3.5**

3. RG OC – I CHP Settling Tank Outlet (EW3).

S. No	Location name & code date of sampling	Parameters					
	OCP –I CHP Settling Tank Outlet . (EW-3)	pH (at 25° C)	Total Suspended Solids at 105° C	Total Dissolved Solids at 180°C	Chemical Oxygen Demand	BOD	Oil& Grease
	Unit	--	mg/L	mg/L	mg/L	mg/l	mg/L
	Test Method	4500-H*B	2540-D	2540-C	5220-D	IS 3025	5520-B
	MoEF GSR 742(E) and GSR 801(E) Effluent Standards for Coal mines.	5.5 to9.0	100	--	250	30	10
1	15.04.2024	7.3	43	1015	27	3.1	<1
2	30.04.2024	7.5	36	910	36	4.1	<1
3	15.05.2024	7.4	24	733	20	2.1	<1
4	31.05.2024	7.8	31	812	32	3.2	<1
5	14.06.2024	7.4	27	945	28	2.8	<1
6	29.06.2024	7.6	36	896	36	3.6	<1
7	03.07.2024	7.2	24	1022	23	2.4	<1
8	24.07.2024	7.8	31	996	40	10.2	<1
9	09.08.2024	7.7	38	839	31	3.2	<1
10	15.04.2024	7.3	43	1015	27	3.1	<1
11	10.09.2024	7.9	35	1023	36	3.6	<1
12	21.09.2024	7.7	22	864	43	4.4	<1
13	15.10.2024	7.1	30	654	32	3.5	<1
14	26.10.2024	7.6	24	597	40	4.2	<1
15	15.11.2024	7.9	39	614	36	5.1	<1
16	26.11.2024	7.3	20	764	28	3.2	<1
17	13.12.2024	7.5	35	653	31	3.4	<1
18	31.12.2024	7.8	26	582	23	3.2	1
19	15.01.2025	7.7	30	687	27	4.1	<1
20	31.01.2025	8.1	21	531	36	3.6	<1
21	15.02.2025	7.4	32	752	40	4.4	<1
22	21.02.2025	7.2	24	566	28	3.2	<1
23	13.03.2025	7.2	35	643	35	3.8	1
24	24.03.2025	7.4	44	815	24	2.8	<1
	Min	7.1	20	531	20	2.1	1
	Max	8.1	44	1023	43	10.2	1
	Average	7.5	31.3	788.7	31.6	3.8	1.0
	Percentile	8.0	43.5	1022.5	41.6	7.9	1.0

4. RG OC – I OB Dump Runoff / Settling Pond Outlet (EW4).

S. No	Location name & code date of sampling	Parameters					
	OCP –I OB DUMP Runoff/Settling Pond Outlet . (EW-4)	pH (at 25° C)	Total Suspended Solids at 105° C	Total Dissolved Solids at 180°C	Chemical Oxygen Demand	BOD	Oil& Grease
	Unit	--	mg/L	mg/L	mg/L	mg/l	mg/L
	Test Method	4500-H+B	2540-D	2540-C	5220-D	IS 3025	5520-B
	MoEF GSR 742(E) and GSR 801(E) Effluent Standards for Coal mines.	5.5 to9.0	100	--	250	30	10
1	15.04.2024	--	--	--	--	--	--
2	30.04.2024	--	--	--	--	--	--
3	15.05.2024	--	--	--	--	--	--
4	31.05.2024	--	--	--	--	--	--
5	14.06.2024	7.7	63	1251	52	15.2	2.4
6	29.06.2024	7.5	71	1163	64	14.2	3.2
7	03.07.2024	7.9	66	1341	47	12.4	3.6
8	24.07.2024	7.7	19	796	16	2.2	<1
9	09.08.2024	7.4	30	882	27	3.1	<1
10	23.08.2024	7.9	15	936	31	2.8	<1
11	10.09.2024	7.6	27	759	24	2.4	<1
12	21.09.2024	7.2	19	966	19	2.2	<1
13	15.10.2024	7.4	23	714	28	3.4	<1
14	26.10.2024	--	--	--	--	--	--
15	15.11.2024	--	--	--	--	--	--
16	26.11.2024	--	--	--	--	--	--
17	13.12.2024	--	--	--	--	--	--
18	31.12.2024	--	--	--	--	--	--
19	15.01.2025	--	--	--	--	--	--
20	31.01.2025	--	--	--	--	--	--
21	15.02.2025	--	--	--	--	--	--
22	21.02.2025	--	--	--	--	--	--
23	13.03.2025	--	--	--	--	--	--
24	24.03.2025	--	--	--	--	--	--
	Min	7.2	15	714	16	2.2	2.4
	Max	7.9	71	1341	64	15.2	3.6
	Average	7.6	37	978.7	34.2	6.4	3.1
	Percentile	7.9	70.2	1326.6	62.1	15	3.6

Table 4.3 Physico-Chemical and Bacteriological Characteristics of Surface Water

Table 4.3.1 Physico-Chemical and Bacteriological Characteristics of Surface Water as per CPCB Water Quality Criteria

S.No	Parameters	Unit	Test Method	CPCB Water Quality Criteria					RESULT											
				Class A	Class B	Class C	Class D	Class E	SW-1 Bokkalavagu Upstream at Mulkalapalli Village				SW-2 Bokkalavagu Downstream near Rachapalli Village				SW-3 Julapalli Village Tank			
									1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1	pH	-	4500-H+B	6.5-8.5	6.5-8.5	6.0–9.0	6.5-8.5	6.0-8.5	8.3	8.2	8.3	8.3	8.3	8.2	8.3	7.9	8.5	8.2	8.1	8.0
2	Electrical Conductivity	µmhos/cm	2510-B	-	-	-	-	2250 µmhos/cm	695	710	610	730	695	710	955	1435	1110	1105	1340	980
3	Dissolved Oxygen (DO)	mg/L	4500-O.C	6 mg/l or more	5 mg/l or more	4 mg/l or more	4 mg/l or more	-	5.5	5.3	6.4	5.7	5.5	5.3	6.8	5.6	5.5	6.1	6.1	5.8
4	Bio chemical Oxygen Demand (3 days 27° C)	mg/L	IS: 3025	2 mg/l or less	3 mg/l or less	3 mg/l or less	-	-	3.4	3.8	2.4	2.7	3.4	3.8	1.6	2.9	3.0	3.4	2.8	2.8
5	Total Coliforms	MPN/100mL	9221 B	50 or less	500 or less	5000 or less	-	-	220	350	220	240	220	350	240	220	220	350	350	280
6	Free Ammonia (as N)	mg/L	4500-NH_3-F	-	-	-	1.2 mg/L or less	-	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	Boron as B	mg/L	3120-B	-	-	-	-	Less than 2 mg/L	0.14	0.09	0.08	0.08	0.14	0.09	0.14	0.11	0.21	0.12	0.11	0.07
8	SAR	-	-	-	-	-	-	Less than 26	1.07	1.88	0.82	2.57	1.07	1.88	0.78	2.32	1.7	2.33	1.26	1.87

Table 4.3.2 Physico-Chemical Characteristics of Surface Water at Selected Locations in the Study Area

S. No	Parameters	Unit	Test Method	SW-1 Bokkalavagu Upstream at Mulkalapalli Village				SW-2 Bokkalavagu Downstream near Rachapalli Village				SW-3 Julapalli Village Tank			
				1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1.	Colour	Hazen	2120. B	5	10	5	5	10	15	20	20	5	15	10	15
2.	Odour	TON	2150. B	No odour observed	No odour observed	No odour observed	No odour observed	No odour observed	No odour observed	No odour observed	No odour observed	No odour observed	No odour observed	No odour observed	No odour observed
3.	Temperature	°C	2550. B	25.2	25.2	24	24.6	25.4	25.5	24	24.6	25.2	25.1	24	24.6
4.	Turbidity	NTU	2130. B	3.1	6.8	1.9	1.23	2.9	7.4	5.6	1.4	2.6	6.6	3.8	1.3
5.	Total Dissolved Solids at 180° C	mg/L	2540.C	408	420	362	436	686	850	570	860	653	650	797	585
6.	Total Suspended Solids at 105° C	mg/L	2540. D	20	22	13	18	24	30	10	22	14	18	16	24
7.	Chemical Oxygen Demand	mg/L	5220. D	16	24	24	36	28	32	16	40	24	30	28	32
8.	Chlorides as Cl^-	mg/L	4500-Cl^-.B	44	46	48	36	50	92	66	116	72	54	82	54
9.	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-}.E	38	22	32	24	36	64	58	41	58	49	76	47
10.	Fluoride as F^-	mg/L	4500-F^-.C	40	62	30	81	130	102	36	114	80	98	80	78
11.	Calcium as Ca	mg/L	3500-Ca.B	5	8.1	2.6	6	10	11.5	2.9	11.5	5.1	6.1	4.1	3.9
12.	Magnesium as Mg	mg/L	3500-Mg.B	54	72	35	62	151	180	42	174	106	137	143	80
13.	Sodium as Na	mg/L	3500-Na.B	41	68	36	34	117	163	141	154	65	110	128	102
14.	Potassium as K	mg/L	3500-K.B	1.2	1.8	1.1	1.5	1.3	2.5	2.2	1.65	1.2	1.4	1.2	0.88
15.	Nitrites as NO_2	mg/L	4500-NO_2^-.B	4.3	7	4.6	2	10	15	9.7	10	4.6	6.5	2.9	3
16.	Nitrates as NO_3	mg/L	4500-NO_3^-.B	BDL	BDL	BDL	BDL	0.019	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17.	Total Phosphates	mg/L	4500-P-D	BDL	BDL	BDL	BDL	0.37	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18.	Ammonical Nitrogen as NH_3-N	mg/L	4500-NH_3-C	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

S. No	Parameters	Unit	Test Method	SW-1 Bokkalavagu Upstream at Mulkalapalli Village				SW-2 Bokkalavagu Downstream near Rachapalli Village				SW-3 Julapalli Village Tank			
				1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
19.	Phenolic compounds as C_6H_5OH	mg/L	5530-D	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20.	Oil & Grease	mg/L	5520. B	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
21.	Carbonates as CO_3	mg/L	2320. B	35	Nil	Nil	30	50	Nil	Nil	20	55	Nil	Nil	20
22.	Bi-carbonates as HCO_3	mg/L	2320. B	290	210	280	300	285	350	340	380	420	300	450	345
23.	Fecal Coliforms	MPN/ 100mL	9221 E	23	33	21	22	49	140	23	21	33	43	32	20
24.	Zinc as Zn	mg/L	3120. B	0.22	0.17	0.21	0.15	0.17	0.08	0.09	0.09	0.28	0.21	0.16	0.17
25.	Iron as Fe	mg/L	3120. B	0.45	0.61	0.45	0.29	0.68	0.48	0.36	0.52	0.57	0.54	0.48	0.38
26.	Arsenic as As	mg/L	3120. B	**BDL**	**BDL**	BDL	BDL	**BDL**	**BDL**	BDL	BDL	**BDL**	**BDL**	BDL	BDL
27.	Lead as Pb	mg/L	3120. B	**BDL**	**BDL**	BDL	BDL	**BDL**	**BDL**	BDL	BDL	**BDL**	**BDL**	BDL	BDL
28.	Cadmium as Cd	mg/L	3120. B	**BDL**	**BDL**	BDL	BDL	**BDL**	**BDL**	BDL	BDL	**BDL**	**BDL**	BDL	BDL
29.	Total Chromium as Cr	mg/L	3120. B	BDL	BDL			BDL	BDL			BDL	BDL		
30.	Nickel as Ni	mg/L	3120. B	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
31.	Copper as Cu	mg/L	3120-B	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
32.	Selenium as Se	mg/L	3120-B	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Table 4.4 Physico-Chemical, Bacteriological Characteristics of Groundwater Collected within the Study Area

Table 4.4.1 Organoleptic and Physical Parameters

S. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in absence of alternate source	RESULT											
						GW-1 Mulkalapalli Village				GW-2 Julapalli Village Hand Pump				GW-5 Pannur Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1.	Colour	Hazen	2120. B	5	15	5	5	<5	5	5	5	<5	5	5	5	5	5
2.	Odour	TON	2150. B	Agreeable	Agreeable	Agree.	Agree.	Agree.	Agree.	Agree.	Agree,	Agree.	Agree.	Agree.	Agree.	Agree.	Agree.
3.	pH	-	4500-H+B	6.5 to 8.5	No relaxation	8.0	7.8	7.7	7.6	8.3	7.9	7.8	7.5	7.8	7.8	7.6	7.5
4.	Taste	FTN	2160. B	Agreeable	Agreeable	Agree.	Agree.	Agree.	Agree.	Agree.	Agree,	Agree.	Agree.	Agree.	Agree.	Agree.	Agree.
5.	Turbidity	NTU	2130. B	1	5	0.3	0.2	0.1	0.24	0.1	0.2	0.3	0.15	0.2	0.2	0.3	0.28
6.	Total Dissolved Solids at 180° C	mg/L	2540.C	500	2000	540	700	620	410	565	645	450	700	850	766	475	680

Table 4.4.2 General Parameters Concerning Substances Undesirable in Excessive Amounts

Sl. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in absence of alternate source	RESULT											
						GW-1 MulkalapalliVillage				GW-2 Julapalli Village Hand Pump				GW-5 Pannur Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1.	Calcium as Ca	mg/L	3500-Ca.B	75	200	65	92	65	92	68	82	68	82	75	90	50	48
2.	Magnesium as Mg	mg/L	3500-Mg.B	30	100	55	34	55	34	54	59	54	59	69	84	45	39
3.	Chlorides as Cl-	mg/L	4500-Cl-.B	250	1000	61	102	61	102	64	90	64	90	120	90	55	167
4.	Sulphates as SO42-	mg/L	4500-SO42- .E	200	400	56	80	56	80	60	40	60	40	120	93	88	60
5.	Fluoride as F-	mg/L	4500-F-.C	1.0	1.5	0.87	0.7	0.87	0.7	1.4	0.9	1.4	0.9	1.5	0.7	0.9	1
6.	Nitrates as NO3	mg/L	4500-NO3-.B	45	No relaxation	10	15	10	15	41	22	41	22	40	28	18	18
7.	Total Alkalinity as CaCO3	mg/L	2320. B	200	600	390	425	390	425	350	460	350	460	505	515	275	325
8.	Total Hardness as CaCO3	mg/L	2340. C	200	600	388	370	388	370	392	448	392	448	470	568	310	280
9.	Sulphide as H_2S	mg/L	4500-S2-F&D	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.	Total Ammonia-N	mg/L	IS 3025 (Part 34)	0.5	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.	Phenolic compounds as C6H5OH	mg/L	5530-D	0.001	0.002	BDL	BDL	84	40	BDL	BDL	55	36	BDL	BDL	BDL	BDL
12.	Residual free chlorine	mg/L	4500-Cl-.B	0.2	1.0	BDL	BDL	73	35	BDL	BDL	46	28	BDL	BDL	BDL	BDL
13.	Mineral oil	mg/L	IS:3025 (part 39)	0.5	No relaxation	absent	absent	57	52	absent	absent	74	195	absent	absent	absent	absent
14.	Anionic Detergents (as MBAS)	mg/L	IS:13428:2005K	0.2	1.0	<0.2	<0.2	65	41	<0.2	<0.2	59	57	<0.2	<0.2	<0.2	<0.2
15.	Aluminium as Al	mg/L	3120-B	0.03	0.2	BDL	BDL	0.95	0.75	0.08	BDL	0.7	0.88	BDL	0.07	0.06	0.07
16.	Barium as Ba	mg/L	3120. B	0.7	No	0.41	0.29	20	14	0.29	0.32	35	39	0.18	0.36	0.21	0.19

Sl. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in absence of alternate source	RESULT											
						GW-1 MulkalapalliVillage				GW-2 Julapalli Village Hand Pump				GW-5 Pannur Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
					relaxation												
17.	Boron as B	mg/L	3120-B	0.5	2.4	0.16	0.14	480	280	0.08	0.09	240	270	0.21	0.24	0.08	0.13
18.	Iron as Fe	mg/L	3120-B	1.0	No relaxation	0.52	0.84	510	244	0.38	0.56	327	205	0.52	0.49	0.52	0.55
19.	Zinc as Zn	mg/L	3120-B	5	15	0.15	0.22	BDL	BDL	0.24	0.17	BDL	BDL	0.22	0.2	0.13	0.15
20.	Copper as Cu	mg/L	3120-B	0.05	1.5	**BDL**	**BDL**	BDL	BDL	**BDL**	**BDL**	BDL	BDL	**BDL**	**BDL**	BDL	BDL
21.	Manganese as Mn	mg/L	3120-B	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.	Selenium as Se	mg/L	3120-B	0.01	No relaxation	**BDL**	**BDL**	BDL	BDL	**BDL**	**BDL**	BDL	BDL	**BDL**	**BDL**	BDL	BDL
23.	Silver as Ag	mg/L	3120. B	0.1	No relaxation	**BDL**	**BDL**	absent	absent	**BDL**	**BDL**	absent	absent	**BDL**	**BDL**	BDL	BDL

Table 4.4.3 Parameters Concerning Toxic Substances

Sl. No	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in absence of alternate source	RESULT											
						GW-1 Mulkalapalli Village				GW-2 Julapalli Village Hand Pump				GW-5 Pannur Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1.	Cadmium as Cd	mg/L	3120-B	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2.	Cyanide as CN-	mg/L	4500-CN F	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3.	Lead as Pb	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4.	Molybdenum as Mo	mg/L	3120. B	0.07	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5.	Nickel as Ni	mg/L	3120-B	0.02	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6.	Total Arsenic as As	mg/L	3120-B	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7.	Total Chromium as Cr	mg/L	3120-B	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8.	Mercury as Hg	µg/L	3500-Hg.B	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9.	Pesticides: α–BHC, β-BHC, γ-BHC, δ-BHC, o, p-DDT, p, p' –DDT, Endosulfan, β- Endosulfan, Aldrin, Dieldrin	µg/L	6630. D	Absent	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	2,4-D, Carboryl (Carbonate) Malathion Methyl Parathion Anilophos, Chlorpyriphos	Qualitative analysis	6630. D	Absent	0.001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10.	**Polyaromatic Hydrocarbons (PAH's):** Acenaphthene, Acenaphthylene, Anthracene, B(a)A, B(a)P, B(b)F, B(k)F, Pyrene, Dibenz (a,h) anthracene, Fluoranthene, Fluorene, Indeno (1,2,3-(d) Pyrene, Naphthalene, Phenanthrene, Pyrene, Methyl Naphthalene	µg/L	6440.C	--	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 4.4.4 Bacteriological Quality of Drinking water

Sl. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in absence of alternate source	RESULT											
						GW-1 Mulkalapalli Village				GW-2 Julapalli Village Hand Pump				GW-5 Pannur Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1.	Total Coliforms	MPN/ 100 mL	9221 B	-	-	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
2.	Fecal Coliforms	MPN/ 100 mL	9221 E	-	-	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8

NTU – Nephelometric Turbidity Unit; BDL – Below Detection Limit

Detection Limits of Aluminium (Al), Antimony (Sb), Arsenic (As), Barium (Ba), Boron (B), Cadmium (Cd), Chromium (Cr)/Total Chromium, Cobalt (Co), Copper (Cu), Iron (Fe), Lead (Pb), Magnesium (Mg), Manganese (Mn), Molybdenum (Mo), Nickel (Ni), Nickel (Ni), Selenium (Se), Silver (Ag), Vanadium (V), Zinc (Zn), Phenols is 0.01mg/l. Detection Limit of Mercury (Hg), Phosphates/Total Phosphates, Nitrites NO2, Free Ammonia, Total Ammonia is 0.02mg/l. Detection Limits of Potassium (K), Sodium (Na) is 0.03mg/l. Detection Limits of Cyanide (CN), Sulfide (S2), Hexavalent Chromium Cr+6 is 0.05mg/l. Detection Limits of Nitrates as NO3, Fluoride is 0.1mg/l. Detection Limits of Residual Free chlorine, Free Available chlorine, O&G is 1mg/l. Detection Limits of Sulfate SO_4^{-2}, Ammonical Nitrogen, Total Kjeldhl Nitrogen (TKN), COD, Total Nitrogen (TN) is 5mg/l. BOD-3mg/l. ND-Not Detected; Detection Limit: Pesticides– 0.1 ppm; PAHs – 1 ppm.

ANNEXURE-IV

NOISE MOINITORING REPORTS FOR THE PERIOD FROM APRIL 2024 TO MARCH 2025

1. **RG OC-I SITE OFFICE (COE ZONE).**

SL NO	LOCATION NAME & CODE DATE OF SAMPLING	STANDARD LIMIT OF NOISE	
	OC- I site office (CN-1)	Day time	Night time
		75	70
		Noise levels in dB(A)	
		Leq day	Leq night
1	10.04.2024	58.6	48.4
2	30.04.2024	55.6	47.2
3	15.05.2024	56.6	46.8
4	30.05.2024	58.5	48.4
5	08.06.2024	56.6	44.2
6	25.06.2024	54.2	45.8
7	01.07.2024	57.2	43.8
8	22.07.2024	56.0	42.8
9	06.08.2024	57.7	44.1
10	24.08.2024	56.5	43.8
11	05.09.2024	57.1	43.2
12	19.09.2024	55.2	44.0
13	08.10.2024	52.6	41.9
14	30.10.2024	57.7	45.2
15	08.11.2024	57.4	48.6
16	27.11.2024	52.5	47.5
17	06.12.2024	55.8	43.6
18	27.12.2024	58.5	41.5
19	13.01.2025	54.6	39.2
20	13.01.2025	54.6	39.2
21	06.02.2025	57.1	37.0
22	19.02.2025	54.6	35.4
23	06.03.2025	54.6	36.2
24	21.03.2025	52.1	40.4
	Min	**75**	**70**
	Max	**58.6**	**48.6**
	Average	**55.9**	**43.3**

2. RG OC-I CHP/ (CORE ZONE).

SL NO	LOCATION NAME & CODE DATE OF SAMPLING	STANDARD LIMIT OF NOISE	
	OC-I, CHP (CN-2)	Day time	Night time
		75	70
		Noise levels in dB(A)	
		Leq day	Leq night
1	10.04.2024	62.9	54.1
2	30.04.2024	64.8	52.1
3	15.05.2024	61.5	54.1
4	30.05.2024	60.2	52.1
5	08.06.2024	56.6	44.2
6	25.06.2024	49.4	41.9
7	01.07.2024	50.2	40.2
8	24.07.2024	48.9	39.3
9	06.08.2024	56.5	43.8
10	24.08.2024	51.4	40.9
11	05.09.2024	52.1	41.6
12	19.09.2024	51.0	43.7
13	19.10.2024	58.8	39.6
14	30.10.2024	59.0	48.3
15	08.11.2024	51.8	42.2
16	27.11.2024	59.9	42.9
17	06.12.2024	48.0	33.7
18	27.12.2024	53.3	44.8
19	13.01.2025	47.2	38.4
20	21.01.2025	47.2	41.6
21	06.02.2025	50.9	37.8
22	19.02.2025	53.4	37.3
23	06.03.2025	57.1	40.3
24	21.03.2025	58.3	39.2
	Min	**47.2**	**33.7**
	Max	**64.8**	**54.1**
	Average	**54.6**	**43.1**

3. MULKALAPALLY VILLAGE (BUFFER ZONE).

S.NO	LOCATION NAME & CODE DATE OF SAMPLING	STANDARD LIMIT OF NOISE	
	Mulkalapalli Village (BN-1)	Day time	Night time
		55	45
		Noise levels in dB(A)	
		Leq day	Leg Night
1	08.04.2024	48.3	36.4
2	27.04.2024	47.8	35.5
3	11.05.2024	46.8	34.8
4	28.05.2024	48.4	38.3
5	10.06.2024	47.5	34.4
6	26.06.2024	42.7	30.5
7	03.07.2024	46.9	34.7
8	24.07.2024	45.8	33.7
9	08.08.2024	47.6	35.1
10	24.08.2024	48.2	34.8
11	07.09.2024	48.0	34.7
12	21.09.2024	48.5	34.9
13	09.10.2024	48.3	41.8
14	28.10.2024	43.2	31.2
15	09.11.2024	41.6	38.6
16	28.11.2024	41.7	33.3
17	07.12.2024	46.7	36.8
18	28.12.2024	44.7	34.6
19	11.01.2025	43.4	33.0
20	23.01.2025	40.1	33.0
21	05.02.2025	44.5	31.4
22	20.02.2025	43.4	29.9
23	05.03.2025	41.2	32.5
24	20.03.2025	45.6	31.0
	Min	**40.1**	**29.9**
	Max	**48.5**	**41.8**
	Average	**45.5**	**34.4**

4. JULAPALLI VILLAGE (BUFFER ZONE).

Sl. No.	Location name & code & date of sampling	Standard limits of noise	
	Julapalli Village (BN-2)	Day time	Night time
		55	45
		Noise levels in dB(A)	
		Leq Day	Leq Night
1	08.04.2024	46.7	35.2
2	27.04.2024	45.1	34.7
3	11.05.2024	47.5	37.0
4	28.05.2024	46.1	35.7
5	10.06.2024	46.2	38.3
6	26.06.2024	44.6	38.3
7	03.07.2024	42.0	30.9
8	24.07.2024	42.0	29.9
9	08.08.2024	42.0	31.2
10	24.08.2024	42.0	31.1
11	07.09.2024	42.0	31.2
12	21.09.2024	42.0	31.2
13	09.10.2024	33.5	32.9
14	28.10.2024	49.9	35.7
15	09.11.2024	48.5	35.9
16	28.11.2024	39.8	36.5
17	07.12.2024	48.8	35.8
18	28.12.2024	42.1	36.2
19	15.01.2025	42.0	30.4
20	2301.2025	42.0	29.9
21	07.02.2025	38.2	24.9
22	21.02.2025	42.2	26.0
23	07.03.2025	42.2	25.4
24	22.03.2025	39.0	31.7
	Min	**33.5**	**24.9**
	Max	**49.9**	**38.3**
	Average	**43.2**	**32.8**