The Singareni Collieries Company Limited
(A Government Company)
MANUGURU AREA

Ref.No. MNG/ENV/01/2024-25/72 Date:10.07.2024

TO
THE MEMBER SECRETARY,
TSPCB, PLOT NO. A-3,
INDUSTRIAL ESTATE,
PARYAVARANA BHAVAN,
SANATHNAGAR,
HYDERABAD.

Dear Sir,

Sub: Environmental Statement in respect of Mines of SCCL, Manuguru area for the financial year 2023-24 in Form-V (Rule No. 14 of the Environment (Protection) Rules 1986 – Reg

*****

Please find enclosed herewith the Environmental Statement Form-V in respect of Mines (Prakasham Khani Opencast Coal mine(Amalgamation of Manuguru OC-II Exp & Manuguru OC IV Ext), MNGOCP, KPUG) of Singareni Collieries Company Limited, Manuguru area for the Financial Year 2023-24 prescribed under rule 14 of the Environmental (Protection) Rules 1986.

Thanking you Sir,

Yours faithfully,

10.7.2024

General Manager,
SCCL, Manuguru.

GENERAL MANAGER
MANUGURU

Copy to:

1. THE JOINT CHIEF ENVIRONMENT,
   NO.6-3-1219, BLOCK – C,W – 19
   BEGUMPET, UMA NAGAR,
   NEAR COUNTRY CLUB,
   HYDERABAD - 500 016.
2. ENVIRONMENT ENGENEER,
   TELANGANA STATE POLLUTION CONTROL BOARD,
   RO, KOTHAGUDEM, HANUMAN BASTI,
   BESIDE MRO-OFFICE,
   BHADRADRI KOTHAGUDEM.
3. GENERAL MANAGER (ENV), CORPORATE

THE SINGARENI COLLIERIES COMPANY LIMITED

(A GOVERNMENT COMPANY)

Environment Dept.- Manuguru Area

U10102TS1920SGC000571

BHADRADRI-KOTHAGUDEM- DIST

TELANGANA STATE-507117

Mail: gm_mng@scclmines .com,
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ENVIRONMENT STATEMENT OF MANUGURU AREA FOR THE FINANCIAL YEAR ENDING 31 MARCH 2024

Mines:-

1. Expansion of Prakasham Khani opencast coal mine(Amalgamation of Manuguru OC-II Expansion & Manuguru OC IV Extension)
2. Expansion of Manuguru Opencast Coal Mining Project
3. Kondapuram Underground Coal Mine Project

From:
General Manager,
The Singareni collieries company Ltd,
Bhadradri-Kothagudem Dist
Telangana state-507117

ENVIRONMENT STATEMENT OF MINES IN MANUGURU AREA FOR THE FINANCIAL YEAR ENDING 31 MARCH 2024

1. *INTRODUCTION*:

1.1 The Singareni Collieries Company Limited (SCCL) is a Government Company owned jointly by the Government of Telangana State and Government of India. The Company turned around marvel of Indian coal mining Industry with history of over 139 years is involved in Coal Mining activities in the Godavari Valley Coal Fields spread over in the districts of Khammam, Bhadradri-Kothagudem, Peddapalli, Jaya shanker, Mancherial, Komarambheem Asifabad dist, The SCCL also extending coal mining operations in the Orissa state. The SCCL is the major source of Coal in the Southern India catering to the Industrial energy requirements besides other medium and small-scale industries. Coal mining operations by SCCL have generated employment opportunities in the backward districts of Khammam, Kothagudem-Bhadradri,Peddapalli, Jaya shanker, Manchiral, Komarambheem asifabad dist, leading to development of communications, infrastructure and other services such as approach roads, Railways, Telecom services, Schools, Banks, Post Office were created. Now Manuguru town developed as a municipality in Kothagudem-Bhadradri dist of Telangana State. The Company has achieved 70.02 MT of coal production in 2023 -24, and poised for achieving 78.00MT by 2024-25. The company proposed to open new mines/projects adopting new technologies such as continuous Miners, Long Wall in deep U/g mines. Now the company operating 18 opencast mines and 22 underground mines is being geared up by increased usage of IT and serviced by high equipped workshops, stores & coal Handling Plants, adopting the best operational & maintenance systems. SCCL is planned to start its mining operation outside Telangana state.

1 .2 PERFORMANCE OF SCCL AT A GLANCE

PERFORMANCE OF SCCL AT A GLANCE

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Coal Production (Mill.Tons)	52.54	60.38	61.34	62.01	64.40	64.02	50.58	65.02	67.14	70.02
Coal despatches (Mill.Tons)	52.66	58.68	60.84	64.62	67.67	62.45	48.51	65.52	66.69	69.86
Productivity(overall OMS)(T)	4.20	4.74	4.75	4.88	6.23	6.39	5.62	6.10	5.33	5.42
OB Removal(Mill.Cu.Mtr)	262.82	310.76	315.00	392.75	377.15	353.43	322.00	383.3	410.11	420.32
Manpower (as on 31st March of that financial year ending)	58,837	58,491	56,282	54,043	48,942	46,021	43,895	43,672	42,733	41,837

1.3 Manuguru area is a part of Kothagudem Region of SCCL under the administrative control of General Manager. The coal production of Manuguru area for the year 2023-24 is 126.91 LTonnes which is 18.12 % of SCCL total Production (700.21 L.Tonnes). The No. of persons employed in this Manuguru area is 2553

2. ***LOCATION***:

2.1 The mines in Manuguru area are spread over 28 Square Kms. and located under Manuguru Revenue Mandal of Khammam District Bound by north latitudes 17^0 54' to 17^0 59'.

2.2 Manuguru town is situated 340 Kms away from Hyderabad and 65 Kms away from district head quarters, Kothagudem-Bhadradri. It is connected by network of roads and railway link also.

3. CLIMATE:

The climate of Manuguru is of sub tropical with hot summer, cold winter and moderate rainfall during monsoon

iv.WIND SPEED AND DIRECTION: The maximum wind speed recorded was 10.3 mt/s.
Calm condition prevailed for 16.26%.
Predominant wind direction :- South-South East (S-SE).
followed by South (S)

S.No.	Description	2022 -23		2023-24	
i	Rainfall	1344.3 mm		1092.4 mm	
ii	Temperature	MAX	MIN	MAX	MIN
	Monsoon	19.0	38.0	46.4	19.3
	Winter	15.4	38.6	43.2	7.2
	Summer	21.4	42.9	39.4	15.9
	premonsoon	19.0	45.0	44.4	21.9
iii	Relative Humidity	Min:- 5.9, Max:- 99.8, Mean:- 52.85		Min:- 6.6, Max:- 99.9, Mean:- 55.05	

v.TOPOGRAPHY: The area is surrounded by hillocks. The average MSL of the area is 150 Mt.

4.0 A BRIEF NOTE OF MANUGURU AREA MINING ACTIVITIES AND PROCESS INVOLVED:

1. Operation Mines

There is two Opencast Mines i.e Manuguru Opencast Coal Mining Project, Exp of Prakasham Khani opencast coal mine (Amalgamation of Manuguru OC-II Expansion and Manuguru OC-IV Extension) for 10.45 MTPA.

Kondapuram underground coal mine project is under development stage, getting production of coal. The construction work for preparation to main entries from surface area 10.8 Ha is completed.

2.Service sectors

i. Coal dispatch point:

One CHP having 10 millon capacity coal dispatch provision through the mode of Railway with free wagon loading system, road likage and aerial rope to Heavy water plant.

ii. Occupational health survey

One 50 bedded hospital with IME & PME centre provided well qualified doctors in occupational health surveillance as per ILO Norms.

iii.Explosives

One SMS plant with capacity of 20,000 tonnes /annum provided for the area.

iv. Training centre

One Mine vocational centre also provided for give Basic and refresher training for employees on safety and skills improvement.

v. Post Project Environmental Monitoring

All environmental monitoring studies are carried out by Environmental Protection Training and Reasearch Institute (EPTRI), a CPCB recognized and NABL accredited state laboratory.

A key plan showing the location of mines and allied activities is enclosed as **Annexure – IV**

3. Method of underground Mining technology

The coal extraction from mine does not involve any chemical process or burning of fuel. From underground mine; coal is extracted by blasting, using explosive and for lifting the blasted coal at face using mechanical loaders/ by machines (in machine mining) then on to running belt conveyors. The loaded coal on belt conveyor is transported from underground to surface through network of belt conveyors and dumped into storage bunkers. The coal is then dispatched from these bunkers to different customers by the trucks and to KCHP then to mode of Rail wagons / Aerial rope way or by truck via road mode. The de-coaled area in underground mine is filled with sand by means of hydraulic method of stowing. Presently Kondapuram underground mine is in development in stage, hence no need arise for filling of de-coaled area.

4. Method of Opencast Mine

In opencast Mines, the overlaying strata called as "overburden" is dozed for leveling after that wagon drills are deployed for drilling holes, the holes are being blasted in a sequential manner then it is formed as benches. The formation of benches parameters according to deployment of loading machine parameters mean while coal layers are being exposed. The exposed coal layer is extracted by deploying surface miner and coal is being blasted as like over burden bench as a strip in sequential manner, then the coal/OB is loaded by using Shovels into dumpers this machinery called as HEMM (Heavy earth moving machinery). The OB loaded in dumpers carried out to specified dumping yard (internal or external). The coal is transported to coal screening/Handling plant after crushing operation to below 100 mm size by using belt conveyor. The final dispatch is done from the CHP's after grading accordingly quality (GCV based) through trucks/wagons to various customers. The Main customer is power houses, Heavy Water Plant, cement industries Similarly waste material is dumped in dump yard/backfilled areas. In Opencast Mines more water is collected in monsoon due to large catchments area. In all seasons the water discharged from mine is reused for dust suppression fire fighting, HEMM washing and plantations. Only during monsoon season the excess water is discharged through settling pond/tanks or siltation ponds (to avoid sedimentation) into nearby vagus/ Nallahs which are connected to local irrigation tanks which is main source of incoming water. Hence nearby village farmers are mostly depend on this water to grown their crops. The effluent generated with mining operations, mine discharge water and ground water quality was monitored regularly with 3rd party Govt. agency, EPTRI(NABET ACC. LAB) and having reorganization from MoEF&CC.
The result received after analysis was found within safe limits.

4.1.Salient features of Manuguru area mines :

S.No	Details of mines	Underground Mines	Opencast mines	
1	Name of the mine	***Konadapuram U.G. mine***	***Prakasham Khani Opencast coal mine***	***Manuguru opencast coal mine project***
2	Year of Commencement	Mine is working under development stage 11.07.2015	It is a amalgamation of Manuguru OC-II Expansion and Manuguru OC-IV extension. EC obtained on 12.02.2021	Coal Dispatch started from15.03.2017, Quarry operation started on 11.12.2016 and enhanced production to 2.1 MTPA from 18.02.2022
3	Land used for the mine	477.03 Ha	2402.40 Ha	668.42Ha
4	Coal Production capacity	0.51MTPA	10.45 MT peak	2.1MTPA

4.2- Mine wise Production details

	Coal Target for the year 2023-2024		
MINE	Target	Actual	%Achv
PKOC	9750000	9750000	106.5
MNG OC	2100000	2100000	100
KONDAPURAM UG MINE	100000	141098	141
Total	11950000	11648821	106

4.6 Environment permissions of the Mines & Department

Mine	Environment clearance	Consent for Establishment	Consent for Operations
Prakasham Khani Opencast coal mine project	1.J-11015/78/2013/IA/II(M) Dt: 12.02.2021 Capacity: 9.75 MTPA 2.Lr.No.J-11015/78/2013-IA.II(M) Dtd 06.03.2024 EC for 10.45 MTPA	Order No.01/TSPCB/CFE/KGM/RO-KGM/HO/2024 Dtd:07.03.2024.	Consent Order No.20235058039 Dt 07.03.2024 Valid up to 31.06.2025
Manuguru Opencast project	1.No.J-11015/905/2007-IA.II(M) Dtd 24th Oct 2008 2.No.J-11015/905/2007-IA.II(M)Pt. Dtd 6th Dec 2019 3.F No.J-11015/905/2007-IA-II(M) Dt:18.02.2022.	Order No. 01/TSPCB/CFE/RO-KGM/HO/2020 Dt: 27.04.2022	Consent Order No.220523650142 Dt: 25.06.2022 Valid up to 31.10.2026
Kondapuram UG	1.MoEF Lr.no.J-	1.Order	Consent Order

Mine	11015/328/20081a.II(M Dtd 5th March 2010	No.54/PCB/CFE/RO-KTM/HO/2009-1238 Dtd 09.08.2010	No.210523172043 Dt 24.09.2021 Valid up to 30.06.2026
Area Hospital			i.Consent order No.68-KGM/TSPCB/ZOH/HCF/CFO/2023-428 Dt: 10.08.2023 Valid upto May 31,2033
Work shop & stores			Consent order no.209-KGM/TSPCB/ZOH/TS-iPASS /CFO/2022-274 Dt :14.07.2022 Valid upto: Mar 31st 2032
SMS Plant			Consent order no.29-KGM/TSPCB/ZOH/TS-iPASS/CFO/2023-139 Date 15.05.2023 valid Mar 31st 2028

5.0 Environmental protection measures in Manuguru:

Since coal mining and particular opencast mining is associated with environmental degradation of various environmental parameters like air, water, land, noise, socio economics etc., SCCL has been taking suitable control measures to protect the environment in SCCL mining areas/colonies. The mitigation measures are being taken in Manuguru mining area described below:-

5.1 Air Pollution and Management: Air pollution causes in mining area due to generation of exhaust fumes, spontaneous heating of coal in yards and coal benches, dump heaps and dust in coal mining operation and process.

a) Generation of exhaust fumes:-

Mining activities cause a little amount of Air Pollution by way of particulate matter, exhaust fumes containing small amount of CO2, NOX, CO, SO2, Hydrocarbons etc., the various sources for air pollutants are:

(i) HEMM
(ii) Drilling, blasting and screening operations
(iii) Spontaneous heating etc.

(Spontaneous heating is an auto oxidation phenomenon due to which coal catches fire by itself.)

Control Measures for prevent exhaust fumes generation:

The following control measures are adopted to prevent generation fumes:

(i) Coal extraction is completed within the **incubation period**
(ii) Periodic **tuning of engines** and **emission checks**
(iii) Using right quality **of fuel**
(iv) Using the right strength and type of explosive in conjunction with a proper blast design pattern and also adapting control blasting techniques with **delay action non-electrical detonators (NONEL).**
(v) Spreading dolomite powder below ground to prevent auto oxidation of spontaneous heating

(vi) 16,878 no. of **LPG cylinders** supplied to employees at free of cost to discourage use of coal as domestic fuel .

(vii) Covering dump yards by **sub soil/top soil** where shale is dumped in dump yards to prevent fire in dump yards due to shale dumping.

b) Causes of Dust generation & emission in Mines

i. Blasting operations carried out in Coal & OB benches in open cast mines & underground mines.
ii. Coal and over burden transportation systems like belt conveyors & movement of vehicles, dumping operation in dump yards & coal stack yards
iii. Coal handling plant & loading operations

I) DUST CONTROL MEASURES INSIDE OPENCAST MINES:

The following control measures are adopted to prevent generation Dust:

i) Effective dust suppression system like mist and dry fog at all transfer points, coal faces, CHP, Crushers etc.
ii) Water spraying on haul roads in OCPs.
iii) Green belt development along the projects periphery, along roads, community plantation in all colonies etc.
iv) Transport of coal by lorries is permitted only with tarpaulin covering on body prevent spillage of coal on road.
(v) Drilling Blast holes only with wet drilling arrangement.
vi) Water spraying with sensor activation arrangement, near coal intake and crushing Points.
vii) Cleaning of road from check post point to KCHP by manual sweeping of coal dust spillage coal on roads.
vii) Wetting of coal before loading was doing with water tankers and water spraying arrangement.
viii) Black topping of all permanent haul roads and coal transport roads and CC roads construction from OC-IV ext Jn to KCHP is completed.
ix) Mechanical sweeping equipment is deployed on hire basis to clear the dust on approach roads to MNGOCP from SMS plant.

II) Dust Control special arrangement

- Water spraying on haul roads and coal transport routes is being done to keep the road surface wet and to reduce the dust rising due to movement of vehicles and wind.
- All drill machines have been provided with dust collectors, dust disposal arrangement and wet drilling arrangement.
- Road leading to project and KCHP was black topped.
- Plantation has been undertaken for dust control along the roads and also along mine boundary.
- Speed of vehicles is controlled to minimize dust generation.
- Control blasting technique is being adopted with delay action non-electrical detonators to control ground vibrations, noise, dust and also gases emissions.
- Mist spray and dry fog dust suppression system is provided and maintained in CHP at all transfer points, crusher plant and loading/un loading points etc,.
- 2.No.s Dust fighters also commissioned to control dust at KCHP
- Mechanical sweeping machine is deployed to clean the dust on approaching road to MNGOCP project .

c)AAQ Monitoring

CAAQMS station also established for Exp of Prakasham Khani opencast coal mine (Amalgamation of Manuguru OC-II Expansion and Manuguru OC-IV Extension) and MNGOCP .

CAAQMS data is uploading to TSPCB. And also regular AAQ monitoring work is being carried out with 3rd part agency EPTRI, Hyderabad recognized by CPCB NABET accreditation Lab.
A detailed AAQ analysis reports are enclosed as **Annexure-I**

5.2 Soil Control Measures:

a) Flood protection bund (dimensions bottom width -**10m-12m**, top width - **4m-5m and height 8 to 10 m**) was maintained against Gorrepetavagu for dip side of the Quarry in PKOC (Amalgamation of Manuguru OC-II Expansion and Manuguru OC-IV Extension).

b) 2 Nos. of Crib structures are being constructed in the gullies formed on the slopes of OB dumps for prevention of soil erosion.

c) Rock toe wall about 7.35 KM around the external dump of Exp of Prakasham Khani opencast coal mine (Amalgamation of Manuguru OC-II Expansion and Manuguru OC-IV Extension) is constructed along with garland drains and siltation ponds to prevent the silt from dump slopes to come out nearby nallahs.

d) Desilting of Vippala singaram & nallah from Rail Way Bridge also completed.

5.3) WATER POLLUTION CONTROL MEASURES:

a)Surface Water Management/pollution control measures:

(i) Filter beds, settling ponds for proper treatment of water and recycled water used for dust suppression, cleaning and plantation.
(ii) Workshops effluent, about 48 KLD is also treated through ETPs (150Mt^3) and the discharging is very negligible. The treated water is being used for plantation and also recycled for reused for washing of HEMM.
(iii) The domestic effluent from townships is treated by STP(Cap.1.5MLD) the let out treated water using for nearby agricultural filled(about 78 Ha).
(iv) Godavari river water supplying for domestic use for Manuguru colony areas after treatment and also supplying clean drinking water to workmen in industrial area by maintaining R.O Plants of 500Ltrs/250 Ltrs. Capacity and supplying to mines surrounding villages.
V) A regular monitoring of water and effluents work is doing with 3rd part agency EPTRI, Hyderabad recognized by CPCB NABET accreditation Lab. A detailed water and effluent analysis reports are enclosed as **Annexure-II**

b) Mine Water Pollution Control measures:

1) Water used for domestic supply is being treated and chlorinated before distribution.
2) Sewage collection lines and the septic tanks with soak pits are provided in mine office premises which are in different location scattered in mine area
3) Settling tanks are being used for removal of suspended solids etc. from the mine discharge water.
4) Miscellaneous plantation is being done on the slopes of the dumps to control soil erosion.
5). ETP is provided in Base workshop & KCHP for treating the vehicle wash effluent for removal of suspended solids and oil and grease.
6) The underground discharge water treated in abandoned opencast sump area and recycled for water spraying, Cleaning and plantation. On during rainy season the excess clean water from this sump is let out into nearby water bodies.
7) One settling pond with three rock fill dams completed construction near Area work shop beside railway under bridge for treating water by settling silt present if any.

5.4 Source of Noise Pollution:

(i) Heavy earth moving machinery.
(ii) Surface exhaust fan (for below ground mines)
(iii) Coal Handling Plant
(iv) Blasting in surface quarries etc.

(v) A regular monitoring of noise being carried out is doing with 3rd part agency EPTRI, Hyderabad recognized by CPCB NABET accreditation Lab. A detailed water and effluent analysis reports are enclosed as **Annexure-III**

Control Measures taken:

(i) Engine tuning
(ii) Proper muffler and engine beds
(iii) Sound proof A/C cabins
(iv) Air over pressure due to blasting is minimized by
  a) Adopting proper drill hole pattern
  b) By using delay action non-electrical detonators (NONELS)
  c) Down the hole detonator
  d) Selecting appropriate time for blasting
(v) Noise levels at CHP and transfer points are controlled by reducing the height of drop and providing rubber lining inside the chutes
(vi) Green belt all along the project periphery, avenue plantation along roads and community plantation in residential areas.

5.5 Solid Waste Management:

Coal extraction in Mines is either opencast or underground methods.

In case of OCPs the land profile is disturbed to a maximum extent since the OB excavated for exposing coal seam is stacked as external dumps wherever it is not feasible for backfilling.

However in case of underground mines the extent of land disturbances is minimal, ie land subsidence only.

The land management measures are being followed at Manuguru area as follows:

(i) The de-coaled area in opencast mines is backfilled to the maximum extent possible and afforestation done after spreading the preserved topsoil.
(ii) Land will be used to the minimum extent possible for external overburden dumps.
(iii) Plantation is carried out on permanent external dumps. Temporary plantation is carried out in vacant areas for provide secured habitation for surrounding creatures.
(iv) Top soil will be preserved and re-utilized by spreading over external and internal dumps etc.
(v) At bottom of the quarry floor area some part is used for collection of seepage and catchment area water, after settling the water is planned to pump out for use different requirement, such as water spraying on roads, washing of HEMM, domestic purpose etc. The excess water is let out into nallah nearby leading to village tanks, in which water is useful for irrigation& fisheries growth.
(vi) The Subsidence area will be reclaimed by filling with Opencast over burden and plantation will be taken on such stabilized subsidence areas. In Manuguru area subsidence has not occurred in any of the mines so far.
(vii) Total reclaimed area is progressively plantation works taken place permanently.

5.6 Plantation Details:

Extensive plantation has been done in SCCL mining areas covering vacant land, office buildings, mine complexes, subsidence areas, mining colonies, avenue plantation along road.

Plantation in Manuguru coal mining area is being carried out since 1989 at various location such as on overburden dumps, backfilled areas, in and around the mine premises, colony areas and along internal roads and also R&B roads etc.Miyawaki plantation 1 ha done in MNGOCP.

5.7 The expenditure spent on plantation in Mine area surrounding resident areas and villages is Rs.43.47 Lakhs for the year 2023-24.

Socio-economic Measures in Manuguru area:

- Free supply of drinking water for Manuguru town about 8.67 Lakh gallons of water per day
- Wide publicity is being given at mines and departments to undergo Family Planning operations. Management is providing Rs.220/- for the person in addition to the 6 days special leave with pay to the employees who are undergoing family planning operations in the colliery hospitals. Weekly vaccination for polio, triple antigen, measles, BCG is given regularly at the dispensaries.Covid vaccines are administred to all the employees in the company.

- All company quarters are provided with safe drinking water drawn from Godavari River and water is supplied after filtration and chlorination. R.O. Plants were provided with capacity 500/250 ltrs/hour each at mines & units for safe drinking water.

- Air condition provision is given to all workers at free of cost.

- Primary and higher education institutions managed by company have been established Playgrounds, recreation clubs library, swimming pool and physical fitness centre is being provided & maintained for the employees & their families.

- Plastic Free SCCL "program has been taken up to ban the utilization of carry bags, glasses, cups and plates etc., in the mine premises and colonies, to control environmental pollution and also health hazards. Distributed jute bags to the drivers and causal labour.

- All quarters are provided with sanitary facilities. Sanitary department of company is doing regular maintenance. Special measures are taken for well water chlorination. Fogging is done as a special measure in the colonies for preventing malaria and Dengue fever.

- Occupational health check-up was done for employees including contract labour.

- Health awareness programs conducted regularly at mines and villages.

- Free training in tailoring for ladies of Vippala singaram village,pilot colony& Mallaram colony for house wife and children of nearby residents in villages of mines area.
- Internal roads and broken roof sheets and walls repair works has done in Gandhi Nagar area.
- Under Swatch Pakhwada & Swach-Hi- Seva Programme organized in mines & departments and also following programs Taken up

  a. Garbage cleaning & plantation at SCCL school surroundings & all department offices
  b.500 No of Plants freely distributed for Santhosh nagar residencies of Manuguru
  c.Health camp conducted with area hospital staff to check up satya sai deaf dumb and Bala velugu school children's and residencies of Santhosh Nagar.
  d. Conducted Essay writing competitions among the employees of General Manager office campus on the topic " importance of clean environment in our surroundings".
  e. Created awareness on seasonal diseases:- through publicity & propaganda by pasting posters and wall writings in public places

e. Fogging in colonies other areas to avoid mosquitoes production

- Freely supplied Fruit bearing plants, flower plants and shady plants 44,444 No.s to employees of SCCL, PDF's & PAF's , R&R centers and surrounding villagers for Plantation in Manuguru residential areas. And 1,32,650 Plants planted in Manuguru area for the year 2023-24.

The CSR Expenditure details are as follows:

SHAPE Expenditure (Rs. Lakhs)													
Sl. No	Description	2003-04	200-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	Total
1	Road & Infrastructure	370.80	11.48	0.00	0.00	0.00	53.21	0.00	0.00	118.45	0.00	0.00	553.94
2	Drainage & Sanitation	0.00	38.46	31.09	0.00	0.00	34.70	0.00	0.00	0.00	0.00	0.00	104.25
3	Education	47.20	4.45	0.00	0.00	0.00	3.50	0.00	0.00	47.57	0.00	0.00	102.72
4	Drinking Water supply	0.00	0.00	0.00	0.00	0.00	28.88	0.00	0.00	5.09	0.00	0.00	33.97
5	Others	0.00	2.99	41.69	0.00	0.00	19.52	0.00	0.00	15.00	0.00	0.00	79.20
	Total	**418.00**	**57.38**	**72.78**	**0.00**	**0.00**	**139.81**	**0.00**	**0.00**	**186.11**	**0.00**	**0.00**	**874.08**

CSR Expenditure (Rs. Lakhs)												
Sl. No	Description	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
1	Road & Infrastructure	0.00	34.85	0.00	62.76	131.2	186	0.00	167.00	61.18	0.00	642.99
2	Drainage & Sanitation	2.33	2.77	0.00	12.17	0.92	3.28	0.00	36.46	0	0.00	57.93
3	Education	0.00	0.00	0.00	0.00	0.00	6.87	12.25	0.00	0	0.00	19.12
4	Drinking Water supply	8.68	1.71	6.06	0.00	0.00	0.00	0.00	0.00	0	0.00	16.45
5	Others	0.6	8.24	11.72	0.00	0.00	3.03	5.91	3.5	57.23	0.00	90.23
	Total	**11.61**	**47.57**	**17.78**	**74.93**	**132.12**	**199.18**	**18.16**	**206.96**	**118.41**	**0.00**	**826.72**

Total an amount of Rs.**1700.8 Lakhs** spent towards SHAPE and CSR activities in Manuguru area from 2003-2024 (up to 31.03.2024).

Environmental Statement – "Form-V" Prescribed under rule 14 of the Environment (Protection) rules, 1986 of Expansion of Prakasham Khani Opencast coal mine (Amalgamation of Manuguru OC-II Expansion & Manuguru OC-IV Extension) for the year 2023-24

PART – A

A brief note of Expansion of Prakasham Khani Opencast coal mine (Amalgamation of Manuguru OC-II Expansion & Manuguru OC-IV Extension):

The project is Amalgamation of Manuguru OC-II Expansion and Manuguru OC-IV Extension and named as Prakasham Khani Opencast Coal Mine (Amalgamation of Manuguru OC-II Expansion & Manuguru OC-IV Extension) with rated capacity of 10.45 MTPA within ML area of 2402.40 Ha containing forest land 2214.84Ha , Non forest land is 162.062 Ha and agricultural land is 25.498 Ha.

The method of mining is opencast by mechanization with controlled blasting and using shovel dumper combination, Surface miner is also deployed for extraction of coal. Mineral transportation is planned for 26,712 TPD of coal.

1	Name and address of the Owner / Occupier of the Industry Operation or process	:	Sri T Laximipathi Goud Project officer The Singareni Collieries Co.Ltd. Manuguru, Bhadradri-Kothagudem Dist, Telangana state-507117.
2	Industry category	:	PRIMARY.(Coal Mining)

3.Production Details Prakasham Khani OC Mine (Amalgamation of Manuguru OC-II Expansion & Manuguru OC-IV Extension):

Year	Coal production MT				OB removal(in MCu.m)			
	EC	Prog.	Actual	Prog.	FR/EMP	Prog.	Actual	Prog
2019-20	9.75	9.75	8.00	8.00	61.97	61.97	53.28	53.28
2020-21	9.75	19.50	7.47	15.47	76.28	138.25	41.40	94.68
2021-22	9.75	29.25	9.75	25.22	76.26	214.51	57.41	152.094
2022-23	9.75	39.00	9.75	34.97	80.05	294.56	64.46	216.554
2023-24	10.45	49.45	10.45	45.42	75.97	370.53	64.13	280.68

4	**Year of establishment a) Expansion of Prakasham Khani OC Mine (Amalgamation of Manuguru OC-II Expansion & Manuguru OC-IV Extension)** established in the year –	On 12th Feburary2021, EC obtained for Amalgamation of MNGOC-II & MNGOC-IV And on 6th March 2024 **Expansion of Prakasham Khani OC Mine (Amalgamation of Manuguru OC-II Expansion & Manuguru OC-IV Extension) for increase in production capacity from 9.75 MTPA to 10.45 MTPA**
5	Date of last Environment Statement submitted	vide Ltr No.MNG/ENV/01/2023-24/602 Dt 28.08.2023
6	Men on roll	**Departmental – 1339** **Off loading – VPR - 472** **DIMPL- 541** **Total PKOC - 2352**

PART – B :

WATER AND RAW MATERIAL CONSUMPTION:

a) Water

In Opencast Mines more water is collected in monsoon due to large catchments area. The natural seepage water and rain water is stocked in bottom most selected area called it as "sump" where, water treated automatically by settlement of solid particles. From these sumps controlled dewatering is in progress as per the water requirement and necessity of bottom coal bench exposure. In all seasons the water discharged from mine is reused for dust suppression, fire fighting, HEMM washing and watering plants. The excess water is discharged through settling pond/tanks (for retention of suspended solids) into nearby streams/ Nallahs which are connected to irrigation tanks.

Water discharge from mine depends upon the specific aquifer, potential source of discharge, extent of mine working and other factors rather than on the output of coal from the mine.

Water Pollution Source and Control:

The water pollution sources are discharge water from mines, over burden dump yards of opencast mines and small amount of used water from base workshop. The opencast discharge water is consumed for water spraying around the mine for dust suppression, washing of HEMM and vehicles and fire fighting. For treating water from HEMM washing ETP is provided with oil and grease trap arrangement, and also another ETP is being used for treatment of KCHP outlet water. The excess water seepage in monsoon season is discharged through settling ponds for proper treatment then into nearby Lothu Vagu, which is connected to irrigation tank. Gorrepeta vagu is present towards dip direction of OC-II &IV area. The water from external dump site and west side of OC-II quarry dump flows out towards these water course after proper treatment through settling ponds constructed around it.

The samples collected from mine discharge shows that all the parameters are within the prescribed limits given in consent orders issued for concerned under section 25 of Water (Prevention and control of pollution Act,1974 to Prakasham Khani Opencast Coal Mine (Amalgamation of Manuguru OC-II Expansion & Manuguru OC-IV Extension)in Manuguru area belongs SCCL

The analysis data of mine discharge and treated workshop effluent is furnished as **Annexure –II**

Control measures taken to reduce Water pollution:

Industrial waste water properly collected at sumps in the mine. The accumulated water after settling of suspended solids in the sump is being pumped out and utilized for mine requirements like dust suppression, HEMM washing, plantation etc.

Water utilized for HEMM washing and workshop is being sent to ETP provided with Oil & Grease trap arrangement for treatment and the treated water is being reused for HEMM washing and plantation.

The effluent discharge (mine waste water, workshop effluent) is being monitored at every fort night by EPTRI and results are within the limits of prescribed standards.

The excess water is being treated in settling ponds and summer storage tanks for removal of suspended solids before let-off to nearby village tanks

Garland drains of about 36.25 km length with is provided in and around the Quarry including mine workings, external dumps, coal yard etc. and toe wall of 7.25 km length is constructed around the external dump yard.

13 no. of settling ponds are connected with the garland drains to prevent flow of sediments in run off before let-off to nearby water tank, from where the water is used for agriculture purpose by local farmers

Water consumption details

Sl. No.	Source	Water consumption as per CFO conditions (KLD)	Ave. Actual consumption Year 2023-24 (KLD)
1.	Dust suppression	6100	4608
2.	Washing of HEMM	300	110
3.	Domestic &others	150	70
4.	Plantation	460	60
	Total	**7010 KLD**	**4848 KLD**

WATER CONSUMPTION: 2023-2024

Consumption of water for PKOC Mine (Amalgamation of Manuguru OC-II Expansion & Manuguru OC-IV Extension) furnished hereunder:

a)	Domestic Purpose	38,500 KLA	Cooking , Drinking and water in mines & Plantation
b)	Industrial Purpose	16,51,300 KLA	Dust suppression, fire fighting & washing of HEMM

B) Other Raw materials

1) In opencast mines, HEMM (shovels, dumpers, dozers, drills, rope shovels and other supporting equipment) used for extraction of overburden and coal.
2) Pumps used for dewatering of sumps
3) Belt conveyors etc. for transportation of coal from quarry to CHP.
4) Timber and steel is used for support packing tools for HEMM repairs in workshops
5) Sand, Cement, Bricks/fly ash bricks, Masonry stone is used for construction of Check dams, rock fill dams and rock toe walls
6) Explosives are used for blasting coal/overburden.
7) Diesel oil is used for opencast machinery and trucks operation, lubricant oils are used for lubrication of machinery parts etc,

There is no significant impact due to use of raw material other than explosives, oils, lubricants on the surrounding environment except on resource conservation.

As there is no direct process involved in the mining, the raw material consumption varies from mine to mine depending upon the ecological conditions, geological conditions, extent of workings, method of workings etc., Hence there is no justification in comparing the raw material consumption with the coal output as it is very difficult to compare by taking all the above factors into consideration. In the below table shows raw material consumption in PKOC

RAW MATERIAL CONSUMPTION:

S.No.	Raw material	Consumption in Kgs,			
		2020-21	2021-22	2022-23	2023-24
01.	a. Explosives (UG Mines) (P-5) KGs.	NA	NA	NA	
	b. Explosives (OC Mine) KGs.	918750	2888611	35162890	39866630
	c. SME	16741999	10452570	28267 Tonnes	23823 T
	d. Detonators (Nos.)	28957	22500	20100	23700
	e. Fuse (mtrs)	474801	363800	173820	134940
	f. Nonels (Nos.)	10418892	8010530	9248620	10113420
02.	Diesel Oil (ltrs)	19000653	17561589	61390633	91565259
03.	Lubrication Oil and Gear Oil				231290
04.	Transformer Oil (ltrs)				
05.	Paints of different types				
06.	Timber all types (cmt)				
07.	Cement(bags)				
08.	Drill bits and Drill rods(Nos.)				
09.	Rails(MT.)				
10.	Girders (MT)				
11.	Roof Bolts and Nuts (nos)				
12.	Channels (MT)				
13.	Sand used for stowing(cmt)				
14.	Electric Power Consumer (units)	MNGOC-II-15851646	22797976 KVAH	27965101 KVAH	12300982

	a) Industrial power b) Domestic power	MNGOC-IV - 7601255			KVAH

PART – C :

Pollution discharged to environment/unit of output

I. AIR POLLUTION SOURCE AND CONTROL:

a) Air pollution source

The sources of air pollution in the area are fugitive in nature like coal/Over burden transportation Vehicles and other diesel HEMM and its dumping operation, coal handling operation, blasting and coal crushing operations.

b) Control measures taken to reduce air pollution :

Water sprinkling system is provided to control fugitive emissions from crushing operation, conveyor system, haulage roads, transfer points , loading and unloading points etc. 12X28 Kilo Liters, 1x80KL departmental water sprinklers and 16 number of 20KL OB off-loading contractors water sprinklers are being deployed regularly for dust suppression on haul roads, approach roads etc. Dust guns/cannons are using to suppress the dust near the crusher hopper area and coal yard .So far 585. ha of plantation is done in the project. Procurement of Mechanical Sweeping Machine on hire basis for cleaning of approach road to the project will be done shortly. In addition to the above, Fixed point water sprinklers also provided to suppress the dust.

Water Pollution Source and Control:

The water pollution sources are discharge water from mines, over burden dump yards of opencast mines and small amount of used water from base workshop and coal screening plant. The opencast discharge water is totally consumed for water spraying around the mine for dust suppression, washing of HEMM and vehicles and fire fighting. For treating water of HEMM washing is being provided ETP with oil and grease trap arrangement, and also another ETP is being for treatment of KCHP water. The excess water seeps in monsoon season is discharged through settling ponds for proper treatment then into nearby Lothu Vagu, which is connected to irrigation tank. Gorrepeta vagu & Gadidhala vagu is also present in side of dip direction of OC-II &IV area. The water from external dump site and west side of OC-II quarry dump flows out towards these water courses after proper treatment through rock filled dam constructed around it.

S.No	**Water discharge particulars**	
1	Average mine discharge(other than monsoon season)	1900KLD
2	Average mine discharge in monsoon season	2500KLD

3	Av.Let out water in to water course in monsoon season	1540 KLD
4	Ave.Let out water in to water course (Other than monsoon season)	1200 KLD

The samples collected from mine discharge shows that all the parameters are within the prescribed limits given in consent orders issued for concerned under section 25 of Water (Prevention and control of pollution Act,1974 to the PKOC mine in Manuguru area belongs SCCL

The analysis data of mine discharge and treated workshops effluent is furnished as **Annexure –II**

Control measures taken to reduce Water pollution:

Industrial waste water properly collected at sumps in the mine. The accumulated water after settling of suspended solids in the sump is being pumped out and utilized for mine requirements like dust suppression, HEMM washing, plantation etc.

Water utilized for HEMM washing and workshops is being sent to ETP provided with Oil & Grease trap arrangement for treatment and the treated water is being reused for HEMM washing and plantation.

The effluent discharge (mine waste water, workshop effluent) is being monitored at every fort night by EPTRI and results are within the limits of prescribed standards.

The excess water is being treated in settling ponds and summer storage tanks for removal of suspended solids before let-off to nearby village tanks

Garland drains of about 36.25 km length with is provided in and around the Quarry including mine workings, external dumps, coal yard etc. and toe wall of 8.35 km length is constructed around the external dump yard.

14 no.s of settling ponds are connected with the garland drains to prevent flow of sediments in run off before let-off to nearby water tank, from where the water is used for agriculture purpose by local farmers

PART - D:

HAZARDOUS WASTE: as specified under Hazardous Wastes (Management & Handling Rules,1989).

The Coal mines are categorized under RED NON HAZARDOUS CATEGORY as mining process does not involve generation of any hazardous waste. However, the workshops and stores where hazardous waste is generated/handled, the hazardous wastes like used oil, lead acid batteries, e-waste, empty oil containers are being handled and disposed off to TSPCB authorized agencies through area stores in accordance with hazardous waste management and handling rules 1989. Also authorizations obtained for workshops and stores for handling and disposal of hazardous waste.

The details of hazardous waste generated from PKOC (Amalgamation of Manuguru OC-II Expansion & Manuguru OC-IV Extension) mine is given below:- Used oils – 1102 **barrels** ,Batteries-**152-180Ah, 94-150Ah** empty oil barrels-**672**

PART - E:

SOLID WASTE :

Solid waste generated are mainly the rejects separated from coal like stone pieces, shale pieces etc., at the coal screening plants, scrap iron of various types generated at the area work shop and mines. Overburden (stone and soil) is generated from opencast mine.

OVERBURDEN FROM OC MINE:

To uncover and to extract coal from opencast mine, the waste material overlying coal seam, consisting of sandstone and soil called overburden. The overburden thus removed is initially dumped outside the mine and after extracting coal the material is refilled back in the de-coaled area to further reclaim the degraded land with plantation.

Details of overburden is given in part-A

REJECTS(STONE, CLAY & Shale):

Rejects separated from coal consist of stone pieces, shale and clay material. These rejects are picked out manually by labour from coal while coal is conveyed over slow moving conveyer belt at the coal screening plant. The rejects are being disposed off in low laying areas/near by OB dumps.

OLD IRON SCRAP AND PVC BELTS:

The rejected/worn-out, old iron scrap, broken and surveyed off machinery which cannot be reused or recycled at the mine/area level are stacked at scrap yard. Finally it will be disposed through tender process to authorized agencies. Worn-out conveyor belt is reused in underground mines for ventilation regulation. The belt is also used as wipers and cushioning the chute plates along the conveyor belt.

WASTE TIMBER PIECES:

Waste timber pieces generated at open cast mine level is very less quantity, it is dumped along with other domestic waste in dump yard at specified location.

SOLID WASTE GENERATED & RECYCLED/SOLID/DISPOSED OFF:

I. From Process: waste generated		2023-24
a)	i. OB generated from OC mines ii. Rejects picked out from coal at coal screening plant & coal washery	64.13 Mm^3

b)	Qty. recycled or reused Within the unit i) O.B. back filling ii) Rejects	 54.96Mm^3 - Nil
c)	Solid	

*Disposed - off: All the rejects (Stone shale and clay are being dumped for filling up low lying areas)

II.Iron scrap generated in Workshop and Mines		2020-21	2021-22	2022-23	2023-24
a)	Qty. Recycled or reused within the unit				
b)	Qty. sold				
c)	Qty. disposed off				
III.Qty. of waste Timber generated at mine					
a)	Qty. Recycled or reused within the unit				
b)	Qty. sold				
c)	Qty. disposed off				

PART-F

CHARTACTERISATION OF SOLID AND LIQUID WASTES AND DISPOSAL PRACTICE:

No hazardous waste is generated at any stage during process of coal extraction. Solid non hazardous category waste materials are mostly generated at coal screening plant. They are picked and separated from coal to avoid heap fires and transported in trucks and dumped at mine overburden dump and covered with overburden.

The overburden material generated from opencast mines is refilled back into voids created by coal extraction and over this consolidated dumped material multi species of saplings are planted in phased manner to reclaim the de-coaled areas.

The hazardous waste category of Liquid waste such as waste oils from HEMM and transmission oils are disposed off to authorized agencies(by TSPCB) annual reports are being submitted regularly regarding old/used oils, empty oil barrels after detoxification and old batteries from OC stores which having separate consent for auotherisation from TSPCB.

PART - G

IMPACT OF POLLUTION CONTROL MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION:

1.85% of mine discharge from opencast mines is conserved for water spraying (for dust suppression) on haul roads and dumping yards, HEMM washing and remaining portion of water is let out for plantation. Only during monsoon season, the additional quantity of water

collected due to catchments area of the mines, is discharged into nearby Lothu vagu and Gorrepeta vagu after proper treatment.

2. To control dust pollution generated due to mine sources such as haul roads and other roads on which material is transported by truck, water spraying is being done to suppress the air borne dust. Plantation is being done on either side of roads as green belt to mitigate the dust pollution. Dry fog and mist water spraying dust control system is being adopted at crushers, chutes, transfer points and tail end drums etc., in the CHP.

3 Wet drilling provisions are available and maintained in all the drilling machines to control dust emission during drilling operation. Controlled blasting techniques are being adopted with delay non-electrical detonators (NONEL) for controlling ground vibrations, air over pressure and also dust.

4. Plantation of various species (Sissoo, Ficus, Bamboo, Usiri, Chinduga, Acacia, Neem, Babul, Eucalyptus etc.,) bedsides fruit bearing plants (Mango, Guava, Sapota etc.,) are being taken up on overburden waste dump/refilling dumps and in colonies, offices, along the road etc., as part development of green cover, and to mitigate air borne dust, noise.

5. Air, water and Noise quality monitoring is being done in and around the work zone environment of Manuguru area to ascertain the quality of pollution parameters and to take effective steps. All this monitoring work is carried out by 3rd party Govt. agency EPTRI (NABET).

6. Further energy conservation measures include a provision of high tension transmission lines & high voltage equipment.
   a. Use of energy efficient Metal Halide Lamp and also CFL bulbs for illumination.
   b. Periodical Maintenance/tuning of vehicles to reduce fuel requirement and exhaust emission. The HSD Oil consumption rate 2023-24 is 0.7lit/m3
   c. Replacement of incandescent bulbs with energy efficient Compact Fluorescent Lamps (CFL) & LED lights.
   d. Continuous monitoring of capacitor bank switches to maintained power factors efficiently.
   e. Re-organisation of domestic power lines, and closing of PK I Incline underground mine
   f. Control pumping at intake well at Godavari River.

IMPACT OF POLLUTION CONTROL MEASURES ON COST OF PRODUCTION DURING 2023-24

S.No	Detail report of amount spent item wise(In lakhs)	PKOC Mine (Amalgamation of Manuguru OC-II Expansion & Manuguru OC-IV Extension)
1	Air Pollution (p&C)	Rs : 1687 L
2.	Water (P&C)	Rs: 159 L
3.	Land Development	----
4.	plantation	Rs: 58 L

5	Plant &Machinery for Environment protection	Rs. 233.4 L
6.	Consultancy Payments/Scientific Studies	---
7.	OB dumps/subsidence stabilization	Rs.363.7 L
8.	Others	Rs. 12.4 L
9.	Noise and blast vibrations	Rs : 78.6 L
Total amount spent for pollution control		**2592.2 in lakhs rupees**

PART-H

ADDITIONAL MEASURES/INVESTMENT PROPOSED FOR ENVIRONMENT PROTECTION:

1. Water sprinkling system is provided to control fugitive emissions from crushing operation, conveyor system, haulage roads, transfer points , loading and unloading points etc. 12X28 Kilo Liters, 1x80KL departmental water sprinklers and 16 number of 20KL OB off-loading contractors water sprinklers are being deployed regularly for dust suppression on haul roads, approach roads etc. Dust guns/cannons are using to suppress the dust near the crusher hopper area and coal yard .So far 585. ha of plantation is done in the project. Procurement of Mechanical Sweeping Machine on hire basis for cleaning of approach road to the project will be done shortly.

2. All drill machines are being provided with Wet drilling arrangement.

3. Town ship is located far away from mining operation to reduce impact of pollution. Large scale of plantation taken up in township with useful fruit bearing plantation and shady plantation in all vacant areas and all along roads. All overburden dumping sites are covering with grass seeds and plantation to prevent raising of dust from dump heaps

4. Modification of coal handling plant has been done to reduce No. of belts, No. of crossing points/transfer points thereby reducing the number of dust generation points or air borne dust. Further, coal screening plant has relocated near to coal extraction area of opencast mines, so as to reduce hauling distance of coal, conservation of diesel and HEMM life. Further In pit crushers are installed for reducing dust pollution and also vehicular emissions by avoiding the transportation of coal by dumpers.

5. Blasting practicing in opencast mining with controlled blasting techniques, Like use of Nonels i.e shock tube technology to reduce ground vibration from blasting and to reduce high generation of dust associated with fly rocks.

6. ' Condition Monitoring Cell ' was introduced in workshops of opencast projects to closely monitor operation and maintenance practices/condition of HEMM, in order to reduce emission of dust and gaseous pollutants from these machines.

7. Transportation of coal dispatch by railway wagons has been increased by reducing coal transport by trucks to reduce dust pollution not only on the roads but around township area.

8 Paper waste and plastic waste generated in the colonies and offices are being collected by ITC, Bhadrachalam Paper Board Ltd. for recycling.

9. Health monitoring of the employees.

- Periodical Medical checkup is being done to identify effects of coal dust on employees and to ascertain cases of occupational diseases. PME is done once in five years for each employee and compensation is being paid to effected persons as per Mines Act & rules. Occupational health check up also conducting regularly to the persons who attain an age of 45 years and above every three years.
- Periodical health camps awareness programs conducting in surrounding villages creating proper health maintenance among them.

Detailed report furnished in annexure-

PART – I

ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT

- 7.45 KM Rock Toe Wall is maintained for PKOC-II & PKOC-IV external dump to prevent run away top soil.
- ETP is constructed near Base workshop for washing HEMM and its capacity is 3.0Lakh cubic meters settling ponds.
- To treat colony sewage a STP of 1.5 MLD (Sewage Treatment Plant) has been maintaining with outsourced agency. The treated water is being used for gardening and plantation and also given to agriculture fields. The STP is kept working from 20.04.2005
- Encouraged employees to purchase solar lamps by installment payment through monthly recovery via pay sheet.
- Dust canons are provided to suppress the dust . No.of dust canons :02
- CAAQMS is established to monitoring air quality and uploading data to TSPCB web site.

Project Officer,
Exp of Prakasham Khani Open cast coal mine,
Manuguru Area, SCCL.

Agent
Prakasham Khani Opencast
Manuguru

ANNEXURE-I

Table 3.2

Ambient Air Quality at PKOC Site Office (CA1)

Area	**:**	Manuguru	**Area Code**	**:**	CA1
Period of Monitoring	**:**	April, 2023 to March,2024	**Nature of Area**	**:**	Buffer Zone
Sampling Duration	**:**	24 hrs	**Units**	**:**	µg/m^3

Sl. No.	Date of Sampling	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_2 (µg/m^3)
Coal mine standards, GSR 742(E), Dated 25.09.2000		**250**	**_**	**120**	**120**
1.	09.04.2023	181	45.2	11.3	16.1
2.	25.04.2023	175	44.3	11.2	16.4
3.	09.05.2023	202	52.2	11.7	17.3
4.	25.05.2023	195	49.2	13.1	22.2
5.	09.06.2023	182	51.8	12.2	19.3
6.	25.06.2023	178	45.3	12.5	18.3
7.	10.07.2023	169	45.3	11.3	16.1
8.	24.07.2023	145	39.3	10.4	16.3
9.	10.08.2023	158	44.1	11.5	15.8
10.	24.08.2023	161	45.2	11.3	17.8
11.	08.09.2023	171	46.2	12.1	17.3
12.	25.09.2023	169	47.3	12.3	17.5
13.	09.10.2023	162	45.3	11.6	16.8
14.	25.10.2023	172	45.8	12.1	17.1
15.	09.11.2023	159	43.2	11.3	16.9
16.	25.11.2023	168	43.5	11.6	16.5
17.	09.12.2023	172	44.2	12.3	17.2
18.	25.12.2023	169	43.3	11.9	16.9
19.	09.01.2024	175	42.8	12.5	16.7
20.	25.01.2024	171	48.6	12.1	16.9
21.	09.02.2024	168	46.2	12.6	17.1
22.	24.02.2024	172	48.3	12.4	17.5
23.	09.03.2024	181	51.2	12.8	16.8
24.	26.03.2024	195	51.6	13.1	18.3
	Min	**145.00**	**39.30**	**10.40**	**15.80**
	Max	**202.00**	**52.20**	**13.10**	**22.20**
	Average	**171.55**	**45.75**	**11.88**	**17.27**
	98 Percentile	**199.06**	**52.03**	**12.89**	**20.98**

Table 3.3

Ambient Air Quality at Kondapur CHP (CA2)

Area	**:**	Manuguru	**Area Code**	**:**	CA2
Period of Monitoring	**:**	April, 2023 to March,2024	**Nature of Area**	**:**	Buffer Zone
Sampling Duration	**:**	24 hrs	**Units**	**:**	$\mu g/m^3$

Sl. No.	Date of Sampling	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		**250**	**-**	**120**	**120**
1.	09.04.2023	175	43.5	11.6	16.4
2.	25.04.2023	181	45.1	11.4	16.6
3.	09.05.2023	209	53.4	12.2	19.6
4.	25.05.2023	210	51.3	12.6	20.5
5.	09.06.2023	212	54.6	13.4	20.2
6.	25.06.2023	185	48.7	12.9	19.5
7.	10.07.2023	176	46.8	12.5	17.4
8.	24.07.2023	151	40.4	11.1	17.9
9.	10.08.2023	176	45.8	12.6	16.8
10.	24.08.2023	179	48.3	12.0	19.4
11.	08.09.2023	182	48.3	12.8	19.7
12.	25.09.2023	177	48.2	12.5	18.3
13.	09.10.2023	179	46.2	12.1	17.5
14.	25.10.2023	181	47.3	11.8	16.5
15.	09.11.2023	165	44.8	12.3	17.5
16.	25.11.2023	171	44.6	12.2	17.2
17.	09.12.2023	179	45.4	12.5	18.1
18.	25.12.2023	181	46.4	12.2	17.8
19.	09.01.2024	177	45.2	12.8	17.5
20.	25.01.2024	175	49.2	12.5	17.6
21.	09.02.2024	181	52.3	12.8	17.9
22.	24.02.2024	183	56.2	13.1	18.6
23.	09.03.2024	205	55.6	13.9	19.1
24.	26.03.2024	221	62.8	14.2	19.1
	Min	**151.00**	**40.40**	**11.10**	**16.40**
	Max	**212.00**	**56.20**	**13.40**	**20.50**
	Average	**181.14**	**47.82**	**12.36**	**18.11**
	98 Percentile	**211.16**	**55.53**	**13.27**	**20.37**

Table 3.4

Ambient Air Quality at. Area Workshop-132KV Sub Station (CA3)

Area	**:**	Manuguru	**Area Code**	**:**	CA3
Period of Monitoring	**:**	April, 2023 to March,2024	**Nature of Area**	**:**	Core Zone
Sampling Duration	**:**	24 hrs	**Units**	**:**	µg/m^3

Sl. No.	**Date of Sampling**	**PM_{10} (µg/m^3)**	**$PM_{2.5}$ (µg/m^3)**	**SO_2 (µg/m^3)**	**NO_2 (µg/m^3)**
Coal mine standards, GSR 742(E), Dated 25.09.2000		**250**	**-**	**120**	**120**
1.	09.04.2023	157	41.6	10.8	15.6
2.	25.04.2023	161	42.2	10.5	15.8
3.	09.05.2023	178	46.3	11.5	16.6
4.	25.05.2023	181	48.5	11.5	17.2
5.	09.06.2023	168	45.5	11.8	16.8
6.	25.06.2023	149	41.6	11.5	16.2
7.	10.07.2023	148	42.7	10.4	15.8
8.	24.07.2023	136	38.5	10.5	15.1
9.	10.08.2023	159	42.5	10.6	15.5
10.	24.08.2023	155	42.5	11.3	16.0
11.	08.09.2023	151	45.2	11.8	15.5
12.	25.09.2023	149	38.9	11.1	16.3
13.	09.10.2023	155	44.1	11.3	16.1
14.	25.10.2023	162	45.1	11.2	15.9
15.	09.11.2023	158	42.9	11.7	16.1
16.	25.11.2023	153	42.5	11.5	16.3
17.	09.12.2023	155	41.2	11.7	15.9
18.	25.12.2023	157	42.2	11.8	16.1
19.	09.01.2024	149	39.5	11.3	15.8
20.	25.01.2024	151	43.5	11.2	15.5
21.	09.02.2024	155	42.8	11.5	15.8
22.	24.02.2024	158	41.3	11.2	16.1
23.	09.03.2024	161	48.2	11.5	16.5
24.	26.03.2024	165	48.8	12.1	16.2
	Min	**136.00**	**38.50**	**10.40**	**15.10**
	Max	**181.00**	**48.50**	**11.80**	**17.20**
	Average	**156.59**	**42.78**	**11.26**	**16.00**
	98 Percentile	**179.74**	**47.58**	**11.80**	**17.03**

Table 3.5

Ambient Air Quality at Field Substation (CA4)

Area	**:**	Manuguru	**Area Code**	**:**	CA4
Period of Monitoring	**:**	April, 2023 to March,2024	**Nature of Area**	**:**	Core Zone
Sampling Duration	**:**	24 hrs	**Units**	**:**	$\mu g/m^3$

Sl. No.	**Date of Sampling**	**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		**250**	**-**	**120**	**120**
1.	09.04.2023	168	42.2	10.9	15.5
2.	25.04.2023	173	43.5	10.7	15.7
3.	09.05.2023	181	48.6	11.7	16.3
4.	25.05.2023	178	46.1	12.5	21.5
5.	09.06.2023	191	47.6	11.9	16.5
6.	25.06.2023	165	44.2	12.1	15.9
7.	10.07.2023	162	43.5	10.7	16.1
8.	24.07.2023	141	39.1	10.6	15.7
9.	10.08.2023	171	45.2	11.3	16.3
10.	24.08.2023	169	44.2	11.2	15.9
11.	08.09.2023	159	45.6	10.7	16.8
12.	25.09.2023	162	45.1	10.9	15.9
13.	09.10.2023	158	44.5	10.6	15.6
14.	25.10.2023	147	41.2	10.8	15.5
15.	09.11.2023	139	36.7	10.7	15.8
16.	25.11.2023	129	36.8	10.9	15.5
17.	09.12.2023	141	38.6	11.1	15.7
18.	25.12.2023	138	37.7	11.3	15.4
19.	09.01.2024	135	35.1	10.9	15.6
20.	25.01.2024	139	39.6	10.6	15.8
21.	09.02.2024	141	40.3	10.8	15.7
22.	24.02.2024	161	43.4	10.6	15.9
23.	09.03.2024	165	48.6	10.8	16.2
24.	26.03.2024	155	45.2	10.9	15.9
	Min	**129.00**	**35.10**	**10.60**	**15.40**
	Max	**191.00**	**48.60**	**12.50**	**21.50**
	Average	**156.73**	**42.22**	**11.07**	**16.12**
	98 Percentile	**186.80**	**48.18**	**12.33**	**19.53**

Table 3.6

Ambient Air Quality at Pagaderu Village (BA1)

Area	**:**	Manuguru	**Area Code**	**:**	BA1
Period of Monitoring	**:**	April, 2023 to March,2024	**Nature of Area**	**:**	Buffer Zone
Sampling Duration	**:**	24 hrs	**Units**	**:**	$\mu g/m^3$

S.No.	Date of Sampling	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
NAAQ Standards, CPCB, Dated 18.11.2009		**100**	**60**	**80**	**80**
1.	10.04.2023	51	20.3	8.9	14.4
2.	26.04.2023	55	20.4	9.1	14.6
3.	10.05.2023	62	21.5	10.4	14.9
4.	26.05.2023	65	21.3	10.6	14.7
5.	10.06.2023	56	21.7	10.2	14.6
6.	26.06.2023	53	21.3	9.8	14.4
7.	11.07.2023	51	20.3	9.6	14.4
8.	25.07.2023	48	19.5	10.0	14.6
9.	11.08.2023	53	20.5	9.4	14.6
10.	25.08.2023	55	21.1	10.1	14.7
11.	09.09.2023	56	21.3	9.9	14.3
12.	26.09.2023	58	21.4	9.5	14.6
13.	10.10.2023	55	21.2	9.3	14.3
14.	26.10.2023	58	21.8	9.7	14.5
15.	10.11.2023	56	20.9	9.5	14.9
16.	26.11.2023	59	21.1	9.8	14.6
17.	10.12.2023	61	21.8	9.6	14.5
18.	26.12.2023	63	21.5	9.4	14.4
19.	10.01.2024	65	22.1	9.1	14.2
20.	26.01.2024	62	21.2	9.5	14.6
21.	10.02.2024	64	21.8	9.3	14.4
22.	26.02.2024	65	21.5	9.7	14.7
23.	10.03.2024	62	22.3	9.5	14.6
24.	27.03.2024	65	22.7	9.8	14.8
	Min	**48.00**	**19.50**	**8.90**	**14.20**
	Max	**65.00**	**22.10**	**10.60**	**14.90**
	Average	**57.77**	**21.16**	**9.65**	**14.54**
	98 Percentile	**65.00**	**21.97**	**10.52**	**14.90**

Table 3.7

Ambient Air Quality at Besthagudem Village (BA4)

Area	**:**	Manuguru	**Area Code**	**:**	BA4
Period of Monitoring	**:**	April, 2023 to March,2024	**Nature of Area**	**:**	Buffer Zone
Sampling Duration	**:**	24 hrs	**Units**	**:**	$\mu g/m^3$

Sl.No.	Date of Sampling	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
NAAQ Standards, CPCB, Dated 18.11.2009		**100**	**60**	**80**	**80**
1.	10.04.2023	61	22.3	9.5	14.3
2.	26.04.2023	63	21.3	9.6	14.9
3.	10.05.2023	75	22.7	10.8	15.0
4.	26.05.2023	78	23.2	11.0	15.2
5.	10.06.2023	78	23.4	10.6	15.4
6.	26.06.2023	63	22.7	10.5	15.1
7.	11.07.2023	75	23.1	10.2	15.1
8.	25.07.2023	58	21.4	9.9	14.6
9.	11.08.2023	69	23.7	10.5	14.9
10.	25.08.2023	67	22.5	10.1	14.8
11.	09.09.2023	65	22.7	10.6	15.4
12.	26.09.2023	61	22.2	10.4	15.2
13.	10.10.2023	67	22.6	10.1	15.3
14.	26.10.2023	64	22.5	10.3	15.4
15.	10.11.2023	66	22.7	10.5	15.5
16.	26.11.2023	65	21.4	10.2	15.2
17.	10.12.2023	68	22.1	10.6	15.5
18.	26.12.2023	71	22.8	10.4	15.6
19.	10.01.2024	73	23.2	10.1	15.5
20.	26.01.2024	75	22.5	10.3	15.3
21.	10.02.2024	69	22.4	10.1	14.9
22.	26.02.2024	68	22.1	10.6	15.1
23.	10.03.2024	67	23.1	10.4	15.3
24.	27.03.2024	65	21.8	10.5	15.4
	Min	**58.00**	**21.30**	**9.50**	**14.30**
	Max	**78.00**	**23.70**	**11.00**	**15.60**
	Average	**68.14**	**22.52**	**10.31**	**15.15**
	98 Percentile	**78.00**	**23.57**	**10.92**	**15.56**

Table 3.8

Ambient Air Quality at Gandhi Nagar (BA5)

Area	**:**	Manuguru	**Area Code**	**:**	BA5
Period of Monitoring	**:**	April, 2023 to March,2024	**Nature of Area**	**:**	Buffer Zone
Sampling Duration	**:**	24 hrs	**Units**	**:**	µg/m^3

S.No.	Date of Sampling	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_2 (µg/m^3)
NAAQ Standards, CPCB, Dated 18.11.2009		**100**	**60**	**80**	**80**
1.	10.04.2023	67	22.5	10.1	14.6
2.	26.04.2023	66	21.5	10.5	15.3
3.	10.05.2023	82	23.6	10.9	15.1
4.	26.05.2023	76	22.4	11.1	15.3
5.	10.06.2023	86	24.2	10.7	15.6
6.	26.06.2023	75	23.4	10.9	15.2
7.	11.07.2023	77	23.9	10.5	15.3
8.	25.07.2023	61	22.1	10.8	14.9
9.	11.08.2023	75	23.4	10.4	15.1
10.	25.08.2023	78	23.2	10.9	15.2
11.	09.09.2023	71	23.4	10.8	15.7
12.	26.09.2023	75	23.5	10.7	15.5
13.	10.10.2023	78	23.2	10.5	15.4
14.	26.10.2023	73	23.1	10.6	14.7
15.	10.11.2023	71	23.4	10.2	14.8
16.	26.11.2023	74	22.3	10.5	14.6
17.	10.12.2023	75	22.5	10.8	14.7
18.	26.12.2023	72	22.9	10.5	14.8
19.	10.01.2024	75	23.4	10.6	14.5
20.	26.01.2024	72	22.3	10.4	14.4
21.	10.02.2024	70	23.1	10.2	14.6
22.	26.02.2024	71	23.4	9.7	14.9
23.	10.03.2024	75	23.8	9.9	14.5
24.	27.03.2024	77	22.5	10.1	14.8
	Min	**61.00**	**21.50**	**9.70**	**14.40**
	Max	**86.00**	**24.20**	**11.10**	**15.70**
	Average	**73.64**	**23.03**	**10.56**	**15.01**
	98 Percentile	**84.32**	**24.07**	**11.02**	**15.66**

Table 3.9

Ambient Air Quality at Kunavaram Village (BA6)

Area	**:**	Manuguru	**Area Code**	**:**	BA6
Period of Monitoring	**:**	April, 2023 to March,2024	**Nature of Area**	**:**	Buffer Zone
Sampling Duration	**:**	24 hrs	**Units**	**:**	$\mu g/m^3$

S.No.	Date of Sampling	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
NAAQ Standards, CPCB, Dated 18.11.2009		**100**	**60**	**80**	**80**
1.	10.04.2023	59	21.1	9.3	14.7
2.	26.04.2023	57	20.6	9.5	14.5
3.	10.05.2023	61	21.7	10.6	14.9
4.	26.05.2023	64	21.3	10.3	14.6
5.	10.06.2023	66	22.8	10.4	14.7
6.	26.06.2023	58	22.2	10.6	14.4
7.	11.07.2023	56	21.8	9.7	14.5
8.	25.07.2023	53	21.2	10.1	14.7
9.	11.08.2023	55	22.1	9.6	14.6
10.	25.08.2023	57	20.8	10.4	14.5
11.	13.09.2023	58	21.5	10.5	15.1
12.	26.09.2023	56	21.1	10.3	15.3
13.	10.10.2023	52	20.5	10.2	15
14.	26.10.2023	58	22.6	10.4	14.9
15.	10.11.2023	55	21.1	10.1	15
16.	26.11.2023	57	20.8	10.4	15.1
17.	10.12.2023	58	20.6	10.2	15.3
18.	26.12.2023	65	21.6	9.9	15.2
19.	10.01.2024	62	21.2	9.5	14.9
20.	30.01.2024	66	21.8	9.8	15.1
21.	14.02.2024	63	21.7	9.6	15.3
22.	29.02.2024	65	21.9	10.2	14.4
23.	10.03.2024	63	21.5	9.5	14.7
24.	27.03.2024	59	20.9	10.3	14.5
	Min	**52.00**	**20.50**	**9.30**	**14.40**
	Max	**66.00**	**22.80**	**10.60**	**15.30**
	Average	**59.14**	**21.45**	**10.07**	**14.85**
	98 Percentile	**66.00**	**22.72**	**10.60**	**15.30**

Table 3.9

Ambient Air Quality at Ramanujavaram Village (BA7)

Area	**:**	Manuguru	**Area Code**	**:**	BA7
Period of Monitoring	**:**	April, 2023 to March,2024	**Nature of Area**	**:**	Buffer Zone
Sampling Duration	**:**	24 hrs	**Units**	**:**	µg/m^3

S.No.	Date of Sampling	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	SO_2 (µg/m^3)	NO_2 (µg/m^3)
NAAQ Standards, CPCB, Dated 18.11.2009		**100**	**60**	**80**	**80**
1.	10.04.2023	53	20.5	8.9	14.4
2.	26.04.2023	51	20.4	9.1	14.2
3.	10.05.2023	56	20.2	10.2	14.6
4.	26.05.2023	58	20.5	10.5	14.1
5.	10.06.2023	53	21.3	9.8	14.3
6.	26.06.2023	51	21.1	9.4	14.1
7.	11.07.2023	52	21.5	9.6	14.6
8.	25.07.2023	46	19.6	9.9	15
9.	11.08.2023	54	20.9	9.3	14.4
10.	25.08.2023	51	20.1	9.6	14.6
11.	09.09.2023	53	20.8	10.4	14.9
12.	26.09.2023	55	20.9	10.5	14.5
13.	10.10.2023	54	20.8	10.3	14.8
14.	26.10.2023	56	21.5	9.9	14.6
15.	10.11.2023	53	20.8	9.8	14.8
16.	26.11.2023	52	20.1	9.7	15.2
17.	10.12.2023	55	21.1	9.7	15.1
18.	26.12.2023	54	20.8	9.6	14.8
19.	10.01.2024	55	20.6	9.8	14.7
20.	26.01.2024	58	20.9	9.5	14.6
21.	10.02.2024	57	20.8	9.3	14.8
22.	26.02.2024	56	20.5	9.4	14.5
23.	10.03.2024	77	24.1	9.6	14.6
24.	27.03.202	79	23.3	9.4	14.3
	Min	**46.00**	**19.60**	**8.90**	**14.10**
	Max	**58.00**	**21.50**	**10.50**	**15.20**
	Average	**53.77**	**20.71**	**9.74**	**14.62**
	98 Percentile	**58.00**	**21.50**	**10.50**	**15.16**

Table 3.10 (a) Summary of Ambient Air Quality data monitoring at PKOC Mine, Manuguru area – Core Zone (April, 2023- March, 2024)

Location code	Name of the location	PM_{10} (µg/m^3)				$PM_{2.5}$ (µg/m^3)				SO_2 (µg/m^3)				NO_2 (µg/m^3)			
Coal mine standards, GSR 742(E), Dated 25.09.2000		**250**				*****				**120**				**120**			
Core Zone		**Min**	**Max**	**Avg**	**98 Percentile**	**Min**	**Max**	**Avg**	**98 Percentile**	**Min**	**Max**	**Avg**	**98 Percentile**	**Min**	**Max**	**Avg**	**98 Percentile**
CA1	PKOC site Office	145	202	171.55	199.06	39.30	52.20	45.75	52.03	10.40	13.10	11.88	12.89	15.80	22.20	17.27	20.98
CA2	Kondapur CHP	151	212	181.14	211.16	40.40	56.20	47.82	55.53	11.10	13.40	12.36	13.27	16.40	20.50	18.11	20.37
CA3	132KV Substation	136	181	156.59	179.74	38.50	48.50	42.78	47.58	10.40	11.80	11.26	11.80	15.10	17.20	16.00	17.03
CA4	PKOC field substation	129	191	156.73	186.80	35.10	48.60	42.22	48.18	10.60	12.50	11.07	12.33	15.40	21.50	16.12	19.53

Table 3.10 (b) Summary of Ambient Air Quality data monitoring at PKOC Mine, Manuguru area – Buffer Zone

Location code	Name of the location	PM_{10} (µg/m^3)				$PM_{2.5}$ (µg/m^3)				SO_2 (µg/m^3)				NO_2 (µg/m^3)			
NAAQ Standards, CPCB, Dated: 18.11.2009		**100**				**60**				**80**				**80**			
Buffer Zone		**Min**	**Max**	**Avg**	**98 Percentile**	**Min**	**Max**	**Avg**	**98 Percentile**	**Min**	**Max**	**Avg.**	**98 Percentile**	**Min**	**Max**	**Avg.**	**98 Percentile**
BA1	Pagaderu Village	48.00	65.00	57.77	65.00	19.50	22.10	21.16	21.97	8.90	10.60	9.65	10.52	14.20	14.90	14.54	14.90
BA4	Bestagudem village	58.00	78.00	68.14	78.00	21.30	23.70	22.52	23.57	9.50	11.00	10.31	10.92	14.30	15.60	15.15	15.56
BA5	Gandhi Nagar	61.00	86.00	73.64	84.32	21.50	24.20	23.03	24.07	9.70	11.10	10.56	11.02	14.40	15.70	15.01	15.66
BA6	Kunavaram village	52.00	66.00	59.14	66.00	20.50	22.80	21.45	22.72	9.30	10.60	10.07	10.60	14.40	15.30	14.85	15.30
BA7	Ramanujavaram village	46.00	58.00	53.77	58.00	19.60	21.50	20.71	21.50	8.90	10.50	9.74	10.50	14.10	15.20	14.62	15.16

ANNEXURE-II

(1) Project Name : Post Project Environmental Monitoring in SCCL Mining areas

(2) Area : Manuguru

(3) Sampling Location & Code : PKOC Mine Discharge (EW1)

(4) Nature of the Component : Effluents

(5) Period of Monitoring : April, 2023 to March,2024

Table 5.2
Characteristics of Effluents - PKOC Mine Discharge (EW1)

Sl .No.	Date of Sampling	pH	TSS at 105^0C	TDS at 180^0C	COD	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 to 9.0	100	--	250	30	10
1.	14.04.2023	7.5	14	573	20	3.0	<1
2.	30.04.2023	7.8	18	657	25	3.4	<1
3.	14.05.2023	7.9	22	694	27	3.6	<1
4.	30.05.2023	7.9	20	713	30	3.2	<1
5.	15.06.2023	7.8	18	678	24	3.4	<1
6.	30.06.2023	7.5	14	607	22	3.2	<1
7.	15.07.2023	7.6	16	591	20	3.0	<1
8.	30.07.2023	7.4	14	486	19	2.8	<1
9.	15.08.2023	7.8	12	551	21	3.0	<1
10.	30.08.2023	7.6	16	569	20	3.0	<1
11.	15.09.2023	7.4	19	575	23	3.4	<1
12.	16.09.2023	7.4	22	567	21	3.2	<1
13.	15.10.2023	7.2	24	594	22	2.4	<1
14.	30.10.2023	7.2	28	634	20	3.0	<1
15.	15.11.2023	7.4	22	564	24	3.6	<1
16.	30.11.2023	7.1	19	694	21	3.0	<1
17.	15.12.2023	6.9	22	725	20	3.0	<1
18.	30.12.2023	7.1	19	704	22	3.2	<1
19.	12.01.2024	7.4	15	683	21	3.0	<1
20.	30.01.2024	7.9	10	546	19	2.8	<1
21.	15.02.2024	7.8	12	579	22	3.2	<1
22.	25.02.2024	7.7	15	604	24	3.4	<1
23.	15.03.2024	7.9	19	672	23	3.6	<1
24.	31.03.2024	7.6	23	679	26	3.8	<1

(1)	Project Name	:	Post Project Environmental Monitoring in SCCL Mining areas
(2)	Area	:	Manuguru
(3)	Sampling Location & Code	:	PKOC OB Dump Surface Runoff/Settling tank Outlet (EW2)
(4)	Nature of the Component	:	Effluents
(5)	Period of Monitoring	:	April, 2023 to March,2024

Table 5.4
Characteristics of Effluents - PKOC OB Dump Surface Runoff/ Settling tank Outlet (EW2)

Sl.No.	Date of Sampling	pH	TSS at 105^0C	TDS at 180^0C	COD	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 to 9.0**	**100**	**--**	**250**	**30**	**10**
1.	14.04.2023	7.7	19	592	19	2.8	<1
2.	30.04.2023	7.8	16	673	23	3.0	<1
3.	14.05.2023	7.9	26	632	29	3.8	<1
4.	30.05.2023	7.8	29	741	34	3.4	<1
5.	15.06.2023	7.6	16	668	27	3.6	<1
6.	30.06.2023	7.4	12	596	24	3.4	<1
7.	15.07.2023	7.4	18	556	18	2.8	<1
8.	30.07.2023	7.5	11	432	16	2.0	<1
9.	15.08.2023	7.2	9	574	17	2.8	<1
10.	30.08.2023	7.6	21	584	22	3.2	<1
11.	15.09.2023	7.3	17	568	20	3.0	<1
12.	16.09.2023	7.2	20	562	17	2.6	<1
13.	15.10.2023	7.6	13	588	24	3.4	3.1
14.	30.10.2023	7.3	19	671	22	3.0	3.3
15.	15.11.2023	7.2	16	623	20	3.0	3.0
16.	30.11.2023	7.4	21	478	18	2.8	2.7
17.	15.12.2023	7.2	25	646	24	3.6	<1
18.	30.12.2023	7.4	15	682	19	2.8	<1
19.	12.01.2024	7.6	21	649	23	2.4	<1
20.	30.01.2024	7.9	14	538	21	3.0	<1
21.	15.02.2024	7.6	16	546	20	3.0	<1
22.	25.02.2024	7.5	21	539	22	3.2	<1
23.	15.03.2024	8.0	24	655	20	3.0	<1
24.	31.03.2024	7.7	21	662	28	3.8	<1

(1) Project Name : Post Project Environmental Monitoring in SCCL Mining areas

(2) Area : Manuguru

(3) Sampling Location & Code : PKOC ETP Outlet (EW3)

(4) Nature of the Component : Effluents

(5) Period of Monitoring : April, 2023 to March,2024

Table 5.3
Characteristics of Effluents - PKOC ETP Outlet (EW3)

S.No.	Date of Sampling	pH	TSS at 105^0C	TDS at 180^0C	COD	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 to 9.0	100	--	250	30	10
1.	14.04.2023	7.3	12	601	22	3.2	3.6
2.	30.04.2023	7.6	12	654	27	3.8	4.8
3.	14.05.2023	8.1	24	672	31	4.0	4.6
4.	30.05.2023	8.1	36	732	33	3.2	4.7
5.	15.06.2023	7.9	22	702	29	4.0	2.3
6.	30.06.2023	7.6	17	656	21	3.0	2.1
7.	15.07.2023	7.2	24	536	15	2.0	2.0
8.	30.07.2023	6.9	16	412	14	2.0	3.5
9.	15.08.2023	7.4	7	515	19	2.6	3.1
10.	30.08.2023	7.4	14	592	18	2.8	3.4
11.	15.09.2023	7.1	10	582	22	3.2	3.1
12.	16.09.2023	7.3	17	573	20	3.0	2.9
13.	15.10.2023	7.6	13	588	24	3.4	3.1
14.	30.10.2023	7.3	19	671	22	3.0	3.3
15.	15.11.2023	7.2	16	623	20	3.0	3.0
16.	30.11.2023	7.4	21	478	18	2.8	2.7
17.	15.12.2023	7.1	24	542	21	3.0	2.4
18.	30.12.2023	7.5	21	596	23	3.4	1.9
19.	12.01.2024	7.4	19	575	25	3.6	2.7
20.	30.01.2024	8.1	17	589	24	3.4	2.6
21.	15.02.2024	8.0	11	614	26	3.6	2.2
22.	25.02.2024	7.8	26	629	25	3.6	2.0
23.	15.03.2024	7.9	31	678	26	3.8	2.7
24.	31.03.2024	7.6	37	682	27	3.6	2.9

PKOC Water Quality Monitoring reports for the period (Apr'2023 – Sept'2023)

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

l.No	Parameters	Unit	Test Method	CPCB Water Quality Criteria					RESULT			
									SW-1 Gorripeta Vagu U/S		SW-2 Gorripeta Vagu D/S	
				Class A	Class B	Class C	Class D	Class E	1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
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	7.1	8.0	7.2	8.0
2	Electrical Conductivity	µmhos/ cm	2510-B	-	-	-	-	2250 µmhos/cm	1054	350	1323	780
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	-	6.1	5.5	6.8	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	-	-	2.6	3.0	2.5	3.2
5	Total Coliforms	MPN/ 100mL	9221B	50 or less	500 or less	5000 or less	-	-	240	220	240	240
6	Free Ammonia (as N)	mg/L	4500-NH_3 –F	-	-	-	1.2 mg/L or less	-	BDL	BDL	BDL	BDL
7	Boron as B	mg/L	3120-B	-	-	-	-	Less than 2 mg/L	0.17	0.07	0.28	0.10
8	SAR	-	-	-	-	-	-	Less than 26	0.84	1.24	2.78	0.86

l.No	Parameters	Unit	Test Method	CPCB Water Quality Criteria					RESULT			
									SW-3 Samithi Singaram Cheruvu		SW-6 Pollibothula Kunta	
				Class A	Class B	Class C	Class D	Class E	1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
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	7.6	7.1	7.5	7.9
2	Electrical Conductivity	µmhos/ cm	2510-B	-	-	-	-	2250 µmhos/cm	844	415	815	805
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	-	5.6	5.6	6.2	5.2
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	-	-	3.0	2.8	3.1	4.0
5	Total Coliforms	MPN/ 100mL	9221B	50 or less	500 or less	5000 or less	-	-	280	170	350	350
6	Free Ammonia (as N)	mg/L	4500-NH_3 –F	-	-	-	1.2 mg/L or less	-	BDL	BDL	BDL	BDL
7	Boron as B	mg/L	3120-B	-	-	-	-	Less than 2 mg/L	0.11	0.06	0.17	0.07
8	SAR	-	-	-	-	-	-	Less than 26	2.49	0.76	1.59	0.61

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 Gorripeta Vagu U/S		SW-2 Gorripeta Vagu D/S	
				1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1.	Colour	Hazen	2120. B	10	5	5	5
2.	Odour	TON	2150. B	No odour observed	No odour observed	No odour observed	No odour observed
3.	Temperature	ºC	2550. B	25.1	25.2	25.0	25.2
4.	Turbidity	NTU	2130. B	6.3	3.4	5.2	3.2
5.	Total Dissolved Solids at 180º C	mg/L	2540.C	615	206	780	463
6.	Total Suspended Solids at 105º C	mg/L	2540. D	28	21	10	26
7.	Chemical Oxygen Demand	mg/L	5220. D	20	16	16	24
8.	Chlorides as Cl^-	mg/L	4500-Cl^-.B	38	34	189	51
9.	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-} .E	170	21	156	49
10.	Fluoride as F^-	mg/L	4500-F^-.C	1.13	0.36	1.2	0.58
11.	Calcium as Ca	mg/L	3500-Ca.B	97	20	85	73
12.	Magnesium as Mg	mg/L	3500-Mg.B	74	15	72	65
13.	Sodium as Na	mg/L	3500-Na.B	45	30	144	42
14.	Potassium as K	mg/L	3500-K.B	42	3.3	5.3	2.6
15.	Nitrites as NO_2	mg/L	4500-NO_2^-.B	BDL	BDL	BDL	BDL
16.	Nitrates as NO_3	mg/L	4500-NO_3^-.B	29	1.3	13	2.3
17.	Total Phosphates	mg/L	4500-P-D	0.20	0.07	0.106	0.61
18.	Ammonical Nitrogen as NH_3-N	mg/L	4500-NH_3 –C	BDL	BDL	BDL	BDL
19.	Phenolic compounds as C_6H_5OH	mg/L	5530-D	BDL	BDL	BDL	BDL
20.	Oil & Grease	mg/L	5520. B	<1	<1	<1	<1
21.	Carbonates as CO_3	mg/L	2320. B	Nil	Nil	Nil	Nil
22.	Bi-carbonates as HCO_3	mg/L	2320. B	188	120	179	280
23.	Fecal Coliforms	MPN/100mL	9221 E	49	11	33	23
24.	Zinc as Zn	mg/L	3120. B	0.12	0.08	0.24	0.05
25.	Iron as Fe	mg/L	3120. B	0.49	0.52	0.55	0.29
26.	Arsenic as As	mg/L	3120. B	BDL	BDL	BDL	BDL
27.	Lead as Pb	mg/L	3120. B	BDL	BDL	BDL	BDL
28.	Cadmium as Cd	mg/L	3120. B	BDL	BDL	BDL	BDL
29.	Total Chromium as Cr	mg/L	3120. B	BDL	BDL	BDL	BDL
30.	Nickel as Ni	mg/L	3120. B	BDL	BDL	BDL	BDL
31.	Copper as Cu	mg/L	3120-B	BDL	BDL	BDL	BDL

S. No	Parameters	Unit	Test Method	SW-1 Gorripeta Vagu U/S		SW-2 Gorripeta Vagu D/S	
				1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
32.	Selenium as Se	mg/L	3120-B	BDL	BDL	BDL	BDL

S. No	Parameters	Unit	Test Method	SW-3 Samithi Singaram Cheruvu		SW-6 Pollibothula Kunta	
				1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1.	Colour	Hazen	2120. B	5	5	5	5
2.	Odour	TON	2150. B	No odour observed	No odour observed	No odour observed	No odour observed
3.	Temperature	ºC	2550. B	25.0	25.3	25.0	25.1
4.	Turbidity	NTU	2130. B	3.7	5.3	0.12	3.8
5.	Total Dissolved Solids at 180° C	mg/L	2540.C	495	244	488	470
6.	Total Suspended Solids at 105° C	mg/L	2540. D	34	35	12	22
7.	Chemical Oxygen Demand	mg/L	5220. D	20	12	24	24
8.	Chlorides as Cl^-	mg/L	4500-Cl^-.B	97	47	58	65
9.	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-}.E	71	26	70	69
10.	Fluoride as F^-	mg/L	4500-F^-.C	1.1	0.3	0.83	0.39
11.	Calcium as Ca	mg/L	3500-Ca.B	56	30	52	77
12.	Magnesium as Mg	mg/L	3500-Mg.B	42	24	41	66
13.	Sodium as Na	mg/L	3500-Na.B	101	23	63	30
14.	Potassium as K	mg/L	3500-K.B	6	5.1	5.4	4.2
15.	Nitrites as NO_2	mg/L	4500-NO_2^-.B	5.2	0.38	BDL	0.14
16.	Nitrates as NO_3	mg/L	4500-NO_3^-.B	1.3	1.3	0.7	1.6
17.	Total Phosphates	mg/L	4500-P-D	0.006	0.02	0.024	0.08
18.	Ammonical Nitrogen as NH_3-N	mg/L	4500-NH_3–C	BDL	BDL	BDL	BDL
19.	Phenolic compounds as C_6H_5OH	mg/L	5530-D	BDL	BDL	BDL	BDL
20.	Oil & Grease	mg/L	5520. B	<1	<1	<1	<1
21.	Carbonates as CO_3	mg/L	2320. B	Nil	Nil	Nil	Nil
22.	Bi-carbonates as HCO_3	mg/L	2320. B	185	130	315	245
23.	Fecal Coliforms	MPN/100mL	9221 E	46	6.8	34	46

S. No	Parameters	Unit	Test Method	SW-3 Samithi Singaram Cheruvu		SW-6 Pollibothula Kunta	
				1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
24.	Zinc as Zn	mg/L	3120. B	0.21	0.07	0.15	0.09
25.	Iron as Fe	mg/L	3120. B	0.64	0.35	0.61	0.45
26.	Arsenic as As	mg/L	3120. B	BDL	BDL	BDL	BDL
27.	Lead as Pb	mg/L	3120. B	BDL	BDL	BDL	BDL
28.	Cadmium as Cd	mg/L	3120. B	BDL	BDL	BDL	BDL
29.	Total Chromium as Cr	mg/L	3120. B	BDL	BDL	BDL	BDL
30.	Nickel as Ni	mg/L	3120. B	BDL	BDL	BDL	BDL
31.	Copper as Cu	mg/L	3120-B	BDL	BDL	BDL	BDL
32.	Selenium as Se	mg/L	3120-B	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 the absence of alternate source	RESULT			
						GW-1 Gandhinagar Open Well		GW-2 Bestagudem Bore Well	
						1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1.	Colour	Hazen	2120. B	5	15	5	5	<5	<5
2.	Odour	TON	2150. B	Agreeable	Agreeable	Agree.	Agree.	Agree.	Agree.

3.	pH	-	4500-H^+B	6.5 to 8.5	No relaxation	7.5	7.7	7.3	7.1
4.	Taste	FTN	2160. B	Agreeable	Agreeable	Agree.	Agree.	Agree.	Agree.
5.	Turbidity	NTU	2130. B	1	5	0.13	0.4	0.19	0.6
6.	Total Dissolved Solids at 180° C	mg/L	2540.C	500	2000	533	429	827	838

S. No.	**Parameters**	**Unit**	**Test Method**	**IS: 10500 Requirement (Acceptable Limit)**	**IS: 10500 Permissible Limit in the absence of alternate source**	**RESULT**			
						GW-1 Gandhinagar Open Well		**GW-2 Bestagudem Bore Well**	
						1st Quarter	**2nd Quarter**	**1st Quarter**	**2nd Quarter**
1.	Calcium as Ca	mg/L	3500-Ca.B	75	200	25	44	72	91
2.	Magnesium as Mg	mg/L	3500-Mg.B	30	100	21	34	57	76
3.	Chlorides as Cl-	mg/L	4500-Cl-.B	250	1000	52	49	95	92
4.	Sulphates as SO42-	mg/L	4500-SO42- .E	200	400	50	51	56	72
5.	Fluoride as F-	mg/L	4500-F-.C	1.0	1.5	0.96	0.76	0.71	0.81
6.	Nitrates as NO3	mg/L	4500-NO3-.B	45	No relaxation	3	6.5	1	3.5
7.	Total Alkalinity as CaCO3	mg/L	2320. B	200	600	410	335	530	580
8.	Total Hardness as CaCO3	mg/L	2340. C	200	600	170	248	412	540
9.	Sulphide as H_2S	mg/L	4500-S2-F&D	0.05	No relaxation	BDL	BDL	BDL	BDL

10.	Total Ammonia-N	mg/L	IS 3025 (Part 34)	0.5	No relaxation	BDL	BDL	BDL	BDL
11.	Phenolic compounds as C6H5OH	mg/L	5530-D	0.001	0.002	BDL	BDL	BDL	BDL
12.	Residual free chlorine	mg/L	4500-Cl-.B	0.2	1.0	BDL	BDL	BDL	BDL
13.	Mineral oil	mg/L	IS:3025 (part 39)	0.5	No relaxation	absent	absent	absent	absent
14.	Anionic Detergents (as MBAS)	mg/L	IS:13428:2005K	0.2	1.0	<0.2	<0.2	<0.2	<0.2
15.	Aluminium as Al	mg/L	3120-B	0.03	0.2	BDL	BDL	0.08	0.08
16.	Barium as Ba	mg/L	3120. B	0.7	No relaxation	0.14	0.21	0.26	0.17
17.	Boron as B	mg/L	3120-B	0.5	2.4	0.13	0.06	0.08	0.09
18.	Iron as Fe	mg/L	3120-B	1.0	No relaxation	0.55	0.38	0.38	0.45
19.	Zinc as Zn	mg/L	3120-B	5	15	0.20	0.09	0.16	0.13
20.	Copper as Cu	mg/L	3120-B	0.05	1.5	BDL	BDL	BDL	BDL
21.	Manganese as Mn	mg/L	3120-B	0.1	0.3	BDL	BDL	BDL	BDL
22.	Selenium as Se	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL
23.	Silver as Ag	mg/L	3120. B	0.1	No relaxation	BDL	BDL	BDL	BDL

S-No	**Parameters**	**Unit**	**Test Method**	**IS: 10500 Requirement (Acceptable Limit)**	**IS: 10500 Permissible Limit in the absence of alternate source**	**RESULT**			
						GW-1 Gandhinagar Open Well		**GW-2 Bestagudem Bore Well**	
						1st Quarter	**2nd Quarter**	**1st Quarter**	**2nd Quarter**
1.	Cadmium as Cd	mg/L	3120-B	0.003	No relaxation	BDL	BDL	BDL	BDL
2.	Cyanide as CN-	mg/L	4500-CN-.F	0.05	No relaxation	BDL	BDL	BDL	BDL
3.	Lead as Pb	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL
4.	Molybdenum as Mo	mg/L	3120. B	0.07	No relaxation	BDL	BDL	BDL	BDL
5.	Nickel as Ni	mg/L	3120-B	0.02	No relaxation	BDL	BDL	BDL	BDL
6.	Total Arsenic as As	mg/L	3120-B	0.01	0.05	BDL	BDL	BDL	BDL
7.	Total Chromium as Cr	mg/L	3120-B	0.05	No relaxation	BDL	BDL	BDL	BDL
8.	Mercury as Hg	µg/L	3500-Hg.B	0.001	No relaxation	BDL	BDL	BDL	BDL
9.	**Pesticides:** α–BHC, β-BHC, γ-BHC,	µg/L	6630. D	Absent	0.001	ND	ND	ND	ND

	δ-BHC, o, p-DDT, p, p' –DDT, Endosulfan, β- Endosulfan, Aldrin, Dieldrin								
	2,4-D, Carboryl (Carbonate) Malathion Methyl Parathion Anilophos, Chloropyriphos	Qualitative analysis	6630. D	Absent	0.001	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

S. No.	**Parameters**	**Unit**	**Test Method**	**IS: 10500 Requirement (Acceptable Limit)**	**IS: 10500 Permissible Limit in the absence of alternate source**	**RESULT**			
						GW-1 Gandhinagar Open Well		**GW-2 Bestagudem Bore Well**	
						1st Quarter	**2nd Quarter**	**1st Quarter**	**2nd Quarter**
1	Total Coliforms	MPN/100 mL	9221B	-	-	<1.8	<1.8	<1.8	<1.8
2	Fecal Coliforms	MPN/100 mL	9221 E	-	-	<1.8	<1.8	<1.8	<1.8

PKOC Water Quality Monitoring reports for the period (Oct'2023 – Mar'2024)

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

Sl.No	Parameters	Unit	Test Method	CPCB Water Quality Criteria					RESULT			
				Class A	Class B	Class C	Class D	Class E	SW-1 Gorripeta Vagu U/S		SW-2 Gorripeta Vagu D/S	
									1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
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	8.2	8.1	8.0	7.3
2	Electrical Conductivity	µmhos /cm	2510-B	-	-	-	-	2250 µmhos/cm	625	645	810	700
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	-	5.3	5.7	5.6	5.3
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	-	-	2.8	3.2	1.2	3.4
5	Total Coliforms	MPN/ 100mL	9221 B	50 or less	500 or less	5000 or less	-	-	540	280	170	350
6	Free	mg/L	4500-NH_3–F	-	-	-	1.2	-	BDL	BDL	BDL	BDL

	Ammonia (as N)						mg/L or less					
7	Boron as B	mg/L	3120-B	-	-	-	-	Less than 2 mg/L	0.09	0.08	0.12	0.06
8	SAR	-	-	-	-	-	-	Less than 26	1.44	1.84	0.68	1.00

Sl.No	**Parameters**	**Unit**	**Test Method**	**CPCB Water Quality Criteria**					**RESULT**			
									SW-3 Samithi Singaram Cheruvu		**SW-6** Pollibothula Kunta	
				Class A	**Class B**	**Class C**	**Class D**	**Class E**	1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
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	7.7	7.6	7.7	7.8
2	Electrical Conductivity	µmhos /cm	2510-B	-	-	-	-	2250 µmhos/cm	281	792	3830	1320
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	-	5.2	5.6	5.8	5.1
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	-	-	1.4	3.0	2.5	3.6
5	Total Coliforms	MPN/ 100mL	9221 B	50 or less	500 or less	5000 or less	-	-	70	220	240	220
6	Free Ammonia (as N)	mg/L	4500-NH_3 –F	-	-	-	1.2 mg/L or less	-	BDL	BDL	BDL	BDL
7	Boron as B	mg/L	3120-B	-	-	-	-	Less than 2 mg/L	0.07	0.12	0.15	0.13
8	SAR	-	-	-	-	-	-	Less than 26	0.61	0.86	14.07	4.22

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 Gorripeta Vagu U/S		SW-2 Gorripeta Vagu D/S	
				1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1	Colour	Hazen	2120. B	10	5	5	10
2	Odour	TON	2150. B	No odour observed	No odour observed	No odour observed	No odour observed
3	Temperature	ºC	2550. B	25.6	25.3	25.5	25.6
4	Turbidity	NTU	2130. B	28.8	11.2	1.75	8.6
5	Total Dissolved Solids at 180º C	mg/L	2540.C	370	378	480	412
6	Total Suspended Solids at 105º C	mg/L	2540. D	28	21	16	16
7	Chemical Oxygen Demand	mg/L	5220. D	20	20	4	20
8	Calcium as Ca	mg/L	3500-Ca.B	30	34	65	42
9	Magnesium as Mg	mg/L	3500-Mg.B	21	25	50	34
10	Sodium as Na	mg/L	3500-Na.B	42	58	30	36
11	Potassium as K	mg/L	3500-K.B	17	2.7	24	3.4
12	Chlorides as Cl^-	mg/L	4500-Cl^-.B	56	63	41	45
13	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-}.E	35	59	59	91
14	Fluoride as F^-	mg/L	4500-F^-.C	0.74	0.55	0.95	0.5
15	Nitrates as NO_3	mg/L	4500-NO_3^-.B	1.09	0.1	22.04	22
16	Nitrites as NO_2	mg/L	4500-NO_2^-.B	BDL	BDL	0.16	0.5
17	Total Phosphates	mg/L	4500-P-D	BDL	0.1	0.06	0.12
18	Ammonical Nitrogen as NH_3-N	mg/L	4500-NH_3-C	BDL	BDL	BDL	BDL
19	Phenolic compounds as C_6H_5OH	mg/L	5530-D	BDL	BDL	BDL	BDL
20	Oil & Grease	mg/L	5520. B	<1	<1	<1	<1

S. No	Parameters	Unit	Test Method	SW-1 Gorripeta Vagu U/S		SW-2 Gorripeta Vagu D/S	
				1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
21	Carbonates as CO_3	mg/L	2320. B	Nil	Nil	Nil	Nil
22	Bi-carbonates as HCO_3	mg/L	2320. B	265	210	298	215
23	Fecal Coliforms	MPN/100mL	9221 E	94	33	13	46
24	Zinc as Zn	mg/L	3120. B	0.13	0.15	0.1	0.09
25	Iron as Fe	mg/L	3120. B	0.63	0.39	0.77	0.55
26	Arsenic as As	mg/L	3120. B	BDL	BDL	BDL	BDL
27	Lead as Pb	mg/L	3120. B	BDL	BDL	BDL	BDL
28	Cadmium as Cd	mg/L	3120. B	BDL	BDL	BDL	BDL
29	Total Chromium as Cr	mg/L	3120. B	BDL	BDL	BDL	BDL
30	Nickel as Ni	mg/L	3120. B	BDL	BDL	BDL	BDL
31	Copper as Cu	mg/L	3120-B	BDL	BDL	BDL	BDL
32	Selenium as Se	mg/L	3120-B	BDL	BDL	BDL	BDL

S. No	Parameters	Unit	Test Method	SW-3 Samithi Singaram Cheruvu		SW-6 Pollibothula Kunta	
				1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1	Colour	Hazen	2120. B	5	10	10	5
2	Odour	TON	2150. B	No odour observed	No odour observed	No odour observed	No odour observed
3	Temperature	ºC	2550. B	25.7	25.5	25.6	25.2
4	Turbidity	NTU	2130. B	3.84	9.3	2.5	7.4
5	Total Dissolved Solids at 180º C	mg/L	2540.C	165	465	2290	773
6	Total Suspended Solids at 105º C	mg/L	2540. D	18	18	18	16
7	Chemical Oxygen Demand	mg/L	5220. D	4	16	8	20
8	Calcium as Ca	mg/L	3500-Ca.B	24	55	67	56
9	Magnesium as Mg	mg/L	3500-Mg.B	10	42	54	39
10	Sodium as Na	mg/L	3500-Na.B	14	35	638	168
11	Potassium as K	mg/L	3500-K.B	2.4	5.8	6.4	2.8
12	Chlorides as Cl^-	mg/L	4500-Cl^-.B	24	53	767	180
13	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-}.E	19	48	97	62

S. No	Parameters	Unit	Test Method	SW-3 Samithi Singaram Cheruvu		SW-6 Pollibothula Kunta	
				1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
14	Fluoride as F^-	mg/L	4500-F^-.C	0.32	0.8	2.3	0.3
15	Nitrates as NO_3	mg/L	4500-NO_3^-.B	1.09	24	0.66	0.8
16	Nitrites as NO_2	mg/L	4500-NO_2^-.B	0.16	BDL	BDL	BDL
17	Total Phosphates	mg/L	4500-P-D	0.03	0.2	BDL	0.19
18	Ammonical Nitrogen as NH_3-N	mg/L	4500-NH_3-C	BDL	BDL	BDL	BDL
19	Phenolic compounds as C_6H_5OH	mg/L	5530-D	BDL	BDL	BDL	BDL
20	Oil & Grease	mg/L	5520. B	<1	<1	<1	<1
21	Carbonates as CO_3	mg/L	2320. B	Nil	Nil	Nil	Nil
22	Bi-carbonates as HCO_3	mg/L	2320. B	100	320	930	425
23	Fecal Coliforms	MPN/100mL	9221 E	7.8	33	46	33
24	Zinc as Zn	mg/L	3120. B	0.08	0.12	0.11	0.22
25	Iron as Fe	mg/L	3120. B	0.59	0.48	0.46	0.53
26	Arsenic as As	mg/L	3120. B	BDL	BDL	BDL	BDL
27	Lead as Pb	mg/L	3120. B	BDL	BDL	BDL	BDL
28	Cadmium as Cd	mg/L	3120. B	BDL	BDL	BDL	BDL
29	Total Chromium as Cr	mg/L	3120. B	BDL	BDL	BDL	BDL
30	Nickel as Ni	mg/L	3120. B	BDL	BDL	BDL	BDL
31	Copper as Cu	mg/L	3120-B	BDL	BDL	BDL	BDL
32	Selenium as Se	mg/L	3120-B	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

Sl. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT			
						GW-1 Gandhinagar Open Well		**GW-2** Bestagudem Bore Well	
						1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
.	Colour	Hazen	2120. B	5	15	5	<5	<5	5
.	Odour	TON	2150. B	Agreeable	Agreeable	Agree.	Agree.	Agree.	Agree.
.	pH	-	4500-H^+B	6.5 to 8.5	No relaxation	7.9	8.5	7.1	8.3
.	Taste	FTN	2160. B	Agreeable	Agreeable	Agree.	Agree.	Agree.	Agree.
.	Turbidity	NTU	2130. B	1	5	0.68	0.64	0.96	0.32
.	Total Dissolved Solids at 180^o C	mg/L	2540.C	500	2000	548	505	815	855

Table 4.4.2 General Parameters Concerning Substances Undesirable in Excessive Amounts

Sl.	Parameters	Unit	Test	IS: 10500	IS: 10500	RESULT

No.			Method	Requirement (Acceptable Limit)	Permissible Limit in absence of alternate source	**GW-1** Gandhinagar Open Well		**GW-2** Bestagudem Bore Well	
						1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1.	Calcium as Ca	mg/L	3500-Ca.B	75	200	60	54	98	86
2.	Magnesium as Mg	mg/L	3500-Mg.B	30	100	55	40	80	70
3.	Chlorides as Cl-	mg/L	4500-Cl-.B	250	1000	58	65	119	118
4.	Sulphates as SO42-	mg/L	4500-SO42- .E	200	400	46	37	57	84
5.	Fluoride as F-	mg/L	4500-F-.C	1.0	1.5	1.3	1.04	0.7	1.2
6.	Nitrates as NO3	mg/L	4500-NO3-.B	45	No relaxation	1.05	1.2	0.4	1.4
7.	Total Alkalinity as CaCO3	mg/L	2320. B	200	600	450	370	590	596
8.	Total Hardness as CaCO3	mg/L	2340. C	200	600	376	300	574	503
9.	Sulphide as H_2S	mg/L	4500-S2-F&D	0.05	No relaxation	BDL	BDL	BDL	BDL
10.	Total Ammonia-N	mg/L	IS 3025 (Part 34)	0.5	No relaxation	BDL	BDL	BDL	BDL
11.	Phenolic compounds as C6H5OH	mg/L	5530-D	0.001	0.002	BDL	BDL	BDL	BDL
12.	Residual free chlorine	mg/L	4500-Cl-.B	0.2	1.0	BDL	BDL	BDL	BDL
13.	Mineral oil	mg/L	IS:3025 (part 39)	0.5	No relaxation	absent	absent	absent	absent
14.	Anionic Detergents (as MBAS)	mg/L	IS:13428:2005K	0.2	1.0	<0.2	<0.2	<0.2	<0.2
15.	Aluminium as Al	mg/L	3120-B	0.03	0.2	0.07	0.07	0.09	0.09
16.	Barium as Ba	mg/L	3120. B	0.7	No relaxation	0.21	0.19	0.18	0.3
17.	Boron as B	mg/L	3120-B	0.5	2.4	0.14	0.16	0.13	0.08
18.	Iron as Fe	mg/L	3120-B	1.0	No relaxation	0.49	0.51	0.35	0.47
19.	Zinc as Zn	mg/L	3120-B	5	15	0.11	0.13	0.23	0.08
20.	Copper as Cu	mg/L	3120-B	0.05	1.5	BDL	BDL	BDL	BDL
21.	Manganese as Mn	mg/L	3120-B	0.1	0.3	BDL	BDL	BDL	BDL
22.	Selenium as Se	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL
23.	Silver as Ag	mg/L	3120. B	0.1	No relaxation	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 Gandhinagar Open Well	**GW-2** Bestagudem Bore Well

						1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1.	Cadmium as Cd	mg/L	3120-B	0.003	No relaxation	BDL	BDL	BDL	BDL
2.	Cyanide as CN-	mg/L	4500-CN-.F	0.05	No relaxation	BDL	BDL	BDL	BDL
3.	Lead as Pb	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL
4.	Molybdenum as Mo	mg/L	3120. B	0.07	No relaxation	BDL	BDL	BDL	BDL
5.	Nickel as Ni	mg/L	3120-B	0.02	No relaxation	BDL	BDL	BDL	BDL
6.	Total Arsenic as As	mg/L	3120-B	0.01	0.05	BDL	BDL	BDL	BDL
7.	Total Chromium as Cr	mg/L	3120-B	0.05	No relaxation	BDL	BDL	BDL	BDL
8.	Mercury as Hg	µg/L	3500-Hg.B	0.001	No relaxation	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
	2,4-D, Carboryl (Carbonate) Malathion Methyl Parathion Anilophos, Chloropyriphos	Qualitative Analysis	6630. D	Absent	0.001	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

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 Gandhinagar Open Well		GW-2 Bestagudem Bore Well	
						1st Quarter	2nd Quarter	1st Quarter	2nd Quarter

1	Total Coliforms	MPN/100 mL	9221 B	-	-	<1.8	<1.8	<1.8	<1.8
2	Fecal Coliforms	MPN/100 mL	9221 E	-	-	<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-III

Table 6.2 Noise Levels of PKOC Mine, Manuguru Area (April, 2023- March, 2024)

Code	Monitoring stations	Standard limits of Noise		April 1st Fortnight		April 2nd Fortnight		May 1st Fortnight		May 2nd Fortnight		June 1st Fortnight		June 2nd Fortnight	
				Noise levels in dB (A)											
		Day time	Night time	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night
	Core Zone														
CN1	PKOC Base Workshop	**75**	**70**	67.6	56.8	69.2	57.8	69.3	58.5	67.8	58.3	68.3	55.4	68.3	56.8
CN2	Kondapur CHP	**75**	**70**	64.8	54.9	67.5	55.4	68.5	56.2	65.2	54.7	67.9	57.2	65.7	55.4
	Buffer Zone														
BN1	Ramanujavaram Village	**55**	**45**	38.2	32.5	39.8	36.7	40.2	34.2	40.2	37.3	40.8	35.2	40.5	38.2
BN2	Gandhinagar	**55**	**45**	42.4	35.4	41.5	37.2	45.3	35.8	41.7	37.8	44.9	36.1	43.2	36.7

Code	Monitoring stations	Standard limits of Noise		July 1st Fortnight		July 2nd Fortnight		August 1st Fortnight		August 2nd Fortnight		September 1st Fortnight		September 2nd Fortnight	
				Noise levels in dB (A)											
		Day time	Night time	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night
	Core Zone														
CN1	PKOC Base Workshop	**75**	**70**	67.6	54.3	68.2	56.3	69.9	56.5	68.2	58.3	65.2	46.5	65.7	56.2
CN2	Kondapur CHP	**75**	**70**	68.9	55.8	66.8	54.6	67.6	54.8	65.9	55.2	68.1	49.6	62.8	55.7
	Buffer Zone														
BN1	Ramanujavaram Village	**55**	**45**	40.5	35.7	40.2	36.2	40.8	35.9	40.2	35.4	39.8	32.8	40.5	33.5
BN2	Gandhinagar	**55**	**45**	42.8	37.3	41.8	38.3	43.2	38.3	42.3	37.5	41.3	35.3	41.7	35.6

Code	Monitoring stations	Standard limits of Noise		October 1st Fortnight		October 2nd Fortnight		November 1st Fortnight		November 2nd Fortnight		December 1st Fortnight		December 2nd Fortnight	
				Noise levels in dB (A)											
		Day time	Night time	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night
	Core Zone														
CN1	PKOC Base Workshop	**75**	**70**	65.7	50.1	67.2	56.3	67.8	51.5	68.1	57.2	65.8	52.2	65.8	55.7
CN2	Kondapur CHP	**75**	**70**	66.2	52.1	66.4	54.8	69.2	52.7	67.5	55.3	67.2	53.8	67.1	54.3
	Buffer Zone														
BN1	Ramanujavaram Village	**55**	**45**	37.8	32.6	41.3	35.7	38.3	32.7	42.2	35.5	38.7	34.2	41.5	35.8
BN2	Gandhinagar	**55**	**45**	40.6	34.2	43.5	36.2	41.5	35.8	43.9	38.1	42.2	36.3	44.2	37.3

Code	Monitoring stations	Standard limits of Noise		January 1st Fortnight		January 2nd Fortnight		February 1st Fortnight		February 2nd Fortnight		March 1st Fortnight		March 2nd Fortnight	
				Noise levels in dB (A)											
		Day time	Night time	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night
	Core Zone														
CN1	PKOC Base Workshop	**75**	**70**	65.7	53.4	65.3	55.4	65.6	52.3	68.3	54.1	65.4	52.6	64.7	56.1
CN2	Kondapur CHP	**75**	**70**	65.3	52.9	64.9	54.3	67.2	51.8	69.2	52.3	63.8	52.3	63.6	53.8
	Buffer Zone														
BN1	Ramanujavaram Village	**55**	**45**	39.2	34.5	41.5	35.9	37.9	32.8	38.2	31.8	39.7	33.9	39.6	34.5
BN2	Gandhinagar	**55**	**45**	43.4	37.2	42.3	35.7	42.1	36.3	43.5	37.2	43.9	36.7	42.5	34.9

ANNEXURE – IV

REVENUE EXPENDIRE MEASURE OF PKOC DURING THE YEAR 2023-24

Sl.No	Particulars	Revenue Expenditure in Rupees
1.	Air Pollution (Prevention & Control)	188358000
2.	Water Pollution(Prevention& Control)	17511200
3.	Land Development	0
4.	Plantation	0
5.	P & M for Environment protection	25464000
6.	Consultancy Payments/Scientific	0
7.	OB dumps/subsidence stabilisation	40080000
8.	Others	1370900
9.	Noise & Blast vibrations	8866000
	Total	**281650100**

* Capital Expenditure Spent as on 31.03.2024 is Rs.874,15,14,517.30