

एनएमडीसी



NMDC

# एन एम डी सी लिमिटेड NMDC Limited

(भारत सरकार का उद्यम) (A GOVT. OF INDIA ENTERPRISE)

पंजीकृत कार्यालय : 'खनिज भवन', 10-3-311/ए, कैसल हिल्स, मासाब टैंक, हैदराबाद - 500 028.

Regd. Office : 'Khanij Bhavan' 10-3-311/A, Castle Hills, Masab Tank, Hyderabad - 500 028.

नैगम पहचान संख्या / Corporate Identity Number : L13100AP1958 GOI 001674

ENV/BLD/DEP-14/11C&11B/SMPR/2017/ 680

28.06.2017

Addl. PCCF  
Ministry of Environment, Forests & Climate Change  
Regional Office (WCZ)  
Ground floor, East Wing  
New Secretariat Buildings  
Civil Lines  
Nagpur-440 001

Sub:- Six monthly progress report (October 2016 to March 2017) on compliance to the conditions stipulated in environmental clearance accorded to augmentation of screening plant and associated facilities at Bailadila Iron Ore Project, Deposit-14/11C&11B, Kirandul Complex of NMDC Ltd, South Bastar, Dantewada District, Chhattisgarh


Ref:- Environmental Clearance letter no. J-11015/320/2012-IA.II(M) dated 05.11.2013 received from MOEF, New Delhi

Sir,

With reference to the above, please find enclosed herewith six monthly progress report for the period October 2016 to March 2017 on compliance to the conditions stipulated in environmental clearance accorded to augmentation of Screening Plant and associated facilities at Bailadila Iron Ore Project, Deposit-14/11C&11B, Kirandul Complex of NMDC Ltd, South Bastar, Dantewada District, Chhattisgarh.. The report is also placed in NMDC web site at [www.nmdc.co.in](http://www.nmdc.co.in)

Thanking you

Yours faithfully

  
(M. Jayapal Reddy) 28/6/17  
Jt. General Manager(Env.)

Encl: As above

**TERMS & CONDITIONS  
OF  
ENVIRONMENTAL CLEARANCE OF DEPOSIT SP-III  
GRANTED BY MoEF, NEW DELHI**

Letter No. J-11015/320/2012-IA. II (M)

New Delhi, Dated 05.11.2013

**PERIOD: OCTOBER'2016 to MARCH'2017**

**A. SPECIFIC CONDITIONS**

Sl.No.	COMPLIANCE CONDITIONS	STATUS
i	The project proponent shall obtain Consent to Establish and Consent to Operate from the State Pollution Control Board, Chhattisgarh and effectively implement all the conditions stipulated therein.	<i>Application for obtaining the Consent to Establish had been submitted to Chhattisgarh Environment Conservation Board (CECB), Raipur on 06.09.2009. Consent to Establish is awaited from CECB, Raipur.</i>
ii	No working in the forest area shall be undertaken without obtaining the requisite prior forestry clearance, as may be applicable to this project.	<i>Ministry of Environment and Forests (MoEF &amp; CC), New Delhi accorded 2nd stage clearance on 10.04.2015.</i>
iii	Environmental clearance is subject to obtaining clearance under the Wildlife (Protection) Act, 1972 from the competent authority, as may be applicable to this project.	<i>Wild life conservation plan was approved by PCCF (Wildlife) vide letter no.Va.Pra./3445 Raipur dated 07.12.2013. Financial outlay of Rs.15.50 crores has been transferred to CAMPA account on 30.04.2014.</i>
iv	Ground water quality around the tailing dam shall be regularly monitored and data submitted to the Ministry/ CPCB/SPCB.	<i>Ground water level and quality monitoring have been carried out during season wise (4 seasons) through MoEF, approved laboratory (M/s Space Geo Tech, Bangalore.) at different locations. Regularly ground water report is being submitted to Regional Office, MOEF, Bhopal through head office of NMDC Limited, Hyderabad. These are in practice and shall be ensured in future also. The ground water level &amp; quality monitoring has been carried out for winter season (December 2016 to February 2017 at BIOM Kirandul Complex.</i> <ul style="list-style-type: none"> <li>• <i>The ground water levels varied from 0.00 to 19.69 meters.</i></li> <li>• <i>pH varied between 6.8 to 7.2.</i></li> <li>• <i>Total Dissolved Solids levels</i></li> </ul>

Sl.No.	COMPLIANCE CONDITIONS	STATUS
		<p><i>varied between 6 to 375 mg/l.</i></p> <ul style="list-style-type: none"> <li>• <i>Total Hardness levels varied between 4.00 to 280.00 mg/l.</i></li> <li>• <i>Alkalinity levels varied between 2.00 to 135.00 mg/l.</i></li> <li>• <i>Fluoride (F) levels varied between 0.12 to 0.56 mg/l.</i></li> <li>• <i>Fe levels varied between 0.20 to 2.82 mg/l.</i></li> </ul> <p><i>The higher levels of Fe were observed at fourteen (14) nos. of hand pumps.</i></p> <p><i>The higher levels Fe is due to the natural lateritic formation in the area. However the project is taking steps towards the installation of iron removal plants for hand pumps located in villages around the project.</i></p>
v	<p>Wildlife conservation plan shall be prepared in consultation with the office of the Chief Wildlife warden. The plan shall comprise of in-built monitoring mechanism with special emphasis to protection of Schedule I Species. The status of implementation shall be submitted to the Ministry. Further an authenticated list of flora/fauna separately for core and buffer zone indicating the schedule of fauna shall be submitted to the Ministry.</p>	<p><i>Wild life conservation plan was approved by PCCF (Wildlife) vide letter no.Va.Pra./3445 Raipur dated 07.12.2013. Financial outlay of Rs.15.50 crores has been transferred to CAMPA account on 30.04.2014.</i></p>
vi	<p>Measures shall be taken to control the dust emissions at loading unloading points of the ore.</p>	<p><i>Shall be complied.</i></p>
vii	<p>Green belt shall be raised around the Kirandul Complex and selection plants species shall be as per CPCB guidelines to control the fugitive dust emissions.</p>	<p><i>An area of 1214.96 ha. (Within and outside the lease areas) has been developed under greenbelt development. An amount of Rs. 710.3 lakhs has been spent for plantation of 14, 06, 002 no. of saplings in the above area. Also an amount of Rs. 5.49 crores has been released to Chhattisgarh Rajya Van Vikas Nigam Limited, Raipur for carrying out road side plantation over a length of 50 km under Harihar Chhattisgarh program for the FY 2015-16. An amount of Rs.25 Crore towards Chhattisgarh Harihar Kosh is approved</i></p>

Sl.No.	COMPLIANCE CONDITIONS	STATUS
		<i>for financial year 2016-17. Against Rs.25 Crore we have already paid Rs.15 Crore in three installments.</i>
viii	The rainwater harvesting shall be adopted in consultation with the Regional Director, Central Ground Water Board.	<i>Rainwater harvesting is being carried out into the ponds (4Nos.) for recharging of ground water. In addition to the above, 14 nos. of ponds and 51 nos. dabrees have been constructed in different villages.</i>
ix	As part of ambient air quality monitoring during operational phase of the project, the air samples shall also be analyzed for their mineralogical composition and records maintained.	<i>Shall be complied.</i>
x	The water recovery and spill way system shall be so designed that the natural water resources are not affected and that no sill water from the plant goes into the any other water body.	<i>Shall be complied.</i>
xi	The filter cake shall be disposed at the earmarked site, which shall be above highest water table and shall be lined to prevent any leaching from the filter cake disposal site into groundwater. Efforts shall also be made to gainfully utilize th filter cake so generated in an environmentally compatible manner.	<i>Shall be complied.</i>
xii	The beneficiated ore shall be transported to railway sidings only through closed conveyor.	<i>Shall be complied.</i>
xiii	Effective safeguard measures such as conditioning areas prone to air pollution and having high levels of particulate matter such as around crushing and screening plant. Loading and unloading pint and transfer points. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.	<i>Shall be complied.</i>
xiv	The project authority shall implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.	<i>Shall be complied.</i>

Sl.No.	COMPLIANCE CONDITIONS	STATUS
xv	<p>Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and installing new piezometers during the mining operation. The periodic [(at least four times in a year – pre – monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January; ones in each season)] shall be carried out in consultation with the State Ground Water Board/ Central Ground Water Authority and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional Office Bhopal, The Central Ground Water Authority and the Regional Director, Central Ground Water Board. If at any stage, it is observed that the groundwater table is getting depleted due to the mining activity, necessary corrective measures shall be carried out.</p>	<p><i>Ground water level and quality is regularly (once in a season throughout the year) monitored through MoEF, approved laboratory (M/s Space Geo Tech, Bangalore.) at 30 different locations around BIOM Kirandul Complex. Regularly ground water report is being submitted to Regional Office, MOEF, Bhopal through head office of NMDC Limited, Hyderabad. These are in practice and shall be ensured in future also.</i></p> <p><i>The ground water level &amp; quality monitoring has been carried out for winter season (December 2016 to February 2017 at BIOM Kirandul Complex.</i></p> <ul style="list-style-type: none"> <li>• <i>The ground water levels varied from 0.00 to 19.69 meters.</i></li> <li>• <i>pH varied between 6.8 to 7.2.</i></li> <li>• <i>Total Dissolved Solids levels varied between 6 to 375 mg/l.</i></li> <li>• <i>Total Hardness levels varied between 4.00 to 280.00 mg/l.</i></li> <li>• <i>Alkalinity levels varied between 2.00 to 135.00 mg/l.</i></li> <li>• <i>Fluoride (F) levels varied between 0.12 to 0.56 mg/l.</i></li> <li>• <i>Fe levels varied between 0.20 to 2.82 mg/l.</i></li> </ul> <p><i>The higher levels of Fe were observed at fourteen (14) nos. of hand pumps.</i></p> <p><i>The higher levels Fe is due to the natural lateritic formation in the area. However the project is taking steps towards the installation of iron removal plants for hand pumps located in villages around the project.</i></p>
xvi	<p>The water quality of Baitarni and Karo rivers, upstream and downstream of the projects shall be monitored regularly and records maintained. It shall be ensured that the quality of water in the Koyar river and Bachel, Kirandul and Malangir nallah is not affected</p>	<p><i>Baitarni &amp; Karo rivers do not flow in this region.</i></p> <p><i>However adequate measures will be taken in order to avoid the adverse effect on the quality of Koyar river, Bachel nallah, Kirandul nallah and Malangir</i></p>

Sl.No.	COMPLIANCE CONDITIONS	STATUS
	adversely due to this project.	<i>nallah due to this project.</i>
xvii	Plantation shall be raised in 38.436 ha including 7.5 m wide green belt in the safety zone around the mining lease, over burden dump(s), backfilled and reclaimed area, mine benches, around water body, roads etc. in consultation with the local DFO / Agriculture Department. The density of the trees shall be around 2500 plants per ha. Greenbelt shall be developed all along the plant area in a phased manner and shall be completed within first five years.	<i>Shall be complied.</i>
xviii	Pre-placement medical examination and periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For The purpose, schedule of health examination of the workers should be drawn and followed accordingly.	<i>Shall be complied.</i>
xix	The proponent should evolve, if not already having a well laid down Environmental Policy approved by its Board of Directors. It should interalia prescribe for standard operating process/ procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions. Hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the EC conditions should also be clearly spelt out. Details in this regard should be furnished.	<i>Corporate Environment Policy is already defined.</i>
xx	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	<i>Construction will be executed through contractors. Local labours will be engaged for construction. They have their own habitant and facilities.</i>

**B. GENERAL CONDITIONS:**

Sl.No.	COMPLIANCE CONDITIONS	STATUS
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Sl.No.	COMPLIANCE CONDITIONS	STATUS
i	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	<i>Shall be complied.</i>
ii	At least four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RSPM (Particulate matter with size less than 10 micron i.e., PM <sub>10</sub> ) and NO <sub>x</sub> monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board. The data so recorded should be regularly submitted to the Ministry including its Regional office located at Bhopal and the State Pollution Control Board / Central Pollution Control Board once in six months.	<i>Shall be complied.</i>
iii	Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.	<i>Shall be complied.</i>
iv	Industrial waste water should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 <sup>th</sup> May, 1993 and 31 <sup>st</sup> December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.	<i>Shall be complied.</i>
v	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.	<i>Shall be complied.</i>
vi	Occupational health surveillance program of the workers should be undertaken periodically to observe any contraction due to exposure to dust and take corrective measures, if needed.	<i>Shall be complied.</i>

Sl.No.	COMPLIANCE CONDITIONS	STATUS
vii	A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.	<i>A separate Environmental Management Dept. has been established with well qualified and experienced personnel under the control of Jt.GM (Production) through DGM (Mining) Training &amp; Safety/Environment. The organizational chart of environment department is enclosed as Annexure-I</i>
viii	The funds earmarked for environmental protection measures should be kept in separate account and should be reported to the Ministry and its Regional Office located at Bhopal.	<i>Shall be complied.</i>
ix	The project authorities should inform to the Regional Office located at Bhopal regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	<i>Shall be complied.</i>
x	The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by development work.	<i>Cooperation will be extended to officers of Regional Office of the Ministry during their inspection to the project.</i>
xi	The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the Ministry of Environment and Forests, its Regional Office and the State Pollution Control Board. The proponent shall upload the status of compliance of the environmental clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the Ministry of Environmental and Forests, Bhopal, the respective Zonal Officer of Central Pollution Control Board and the State Pollution Control Board.	<i>Shall be complied.</i>
xii	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parisad/ Municipal Corporation, Urban Local	<i>Submitted.</i>



Sl.No.	COMPLIANCE CONDITIONS	STATUS
	Body and the Local NGO, if any, from whom suggestion/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.	
xiii	The State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and the Collector's office/ Tehsildar's Office for 30 days.	
xiv	The environmental statement for each financial year ending 31 <sup>st</sup> March in Form-Vas is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Office of the Ministry of Environment and Forests, Bhopal by e-mail.	<i>Consent to establish is awaited from CECB, Raipur.</i>
xv	The project authorities should advertise at least in two local newspapers of the District or State in which the project is located and widely circulated, one of which shall be in the vernacular language of the informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a> and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhopal.	<i>Advertised in Bastar Impact, Dantewada and Dainik Bhaskar, Raipur on 17/11/2013.</i>

**Organizational Chart  
of  
Environment Department at BIOM, Kirandul Complex**

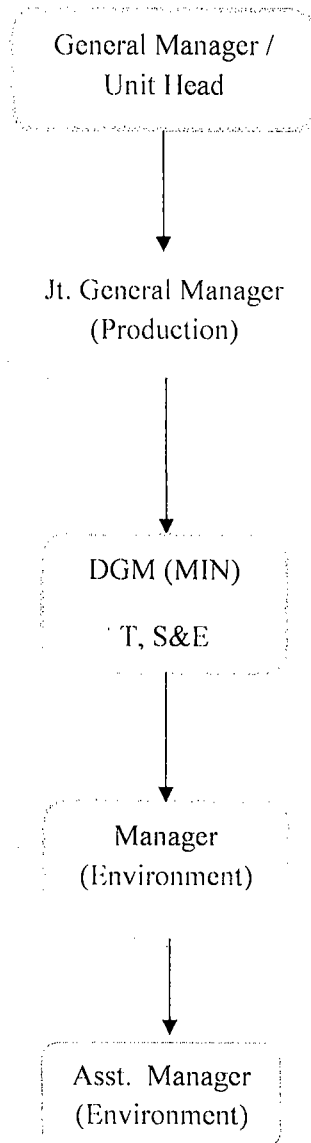


Table No.47: Water Quality Data

S. No.	Parameter	Unit	WQB14-8	GSR-422E Norms
Sampling Date			19.02.2017	
1	Colour	Hazen	4	-
2	Odour	-	Unobjectionable	-
3	Taste	-	Agreeable	-
4	Turbidity	NTU	6.0	-
5	pH	-	7.25	5.5-9.0
6	Total Hardness as CaCO <sub>3</sub>	mg/l	18	-
7	Calcium as Ca	mg/l	4.6	-
8	Magnesium as Mg	mg/l	0.75	-
9	Copper as Cu	mg/l	<0.001	3
10	Iron as Fe	mg/l	<0.01	3.0
11	Manganese as Mn	mg/l	<0.001	2.0
12	Chlorides as Cl	mg/l	14	1000
13	Sulphates as SO <sub>4</sub>	mg/l	6.0	1000
14	Nitrate as NO <sub>3</sub>	mg/l	Nil	10
15	Fluoride as F	mg/l	0.28	2
16	Phenols as C <sub>6</sub> H <sub>5</sub> OH	mg/l	<0.001	-
17	Mercury as Hg	mg/l	<0.001	0.01
18	Cadmium as Cd	mg/l	<0.001	2
19	Selenium as Se	mg/l	<0.001	0.05
20	Arsenic as	mg/l	<0.001	0.2
21	Cyanide as CN	mg/l	<0.001	0.2
22	Lead as Pb	mg/l	<0.001	0.1
23	Zinc as Zn	mg/l	<0.01	5
24	Chromium as Cr+6	mg/l	<0.001	0.1
25	Mineral Oil	mg/l	Nil	-
26	Residual Free chlorine	mg/l	0.19	-
27	Total coliforms	MPN/100ml	Absent	-
28	E-coli	MPN/100ml	Absent	-
29	Total Dissolved solids	mg/l	86	2100

WQB14 – 8 : Treated water at the water treatment Plant immediately after Disinfection at Kirandul

Table No. 48: Water Quality Data

S. No.	Parameter	Unit	WQB14-9	WQB14-10	IS: 10500-2012	
					Desirable	Undesirable
<b>Sampling Date</b>			<b>19.02.2017</b>	<b>19.02.2017</b>		
1	Colour	Hazen	5	6	5	15
2	Odour	-	Unobjectionable	Unobjectionab	Unobjectionable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	<2	<2	5	5
5	pH	-	7.2	7.5	6.5-8.5	No Relaxation
6	Total Hardness as CaCO <sub>3</sub>	mg/l	16	18	200	600
7	Calcium as Ca	mg/l	4.8	5.1	75	200
8	Magnesium as Mg	mg/l	0.74	0.98	30	100
9	Copper as Cu	mg/l	<0.001	<0.001	0.05	1.5
10	Iron as Fe	mg/l	<0.01	<0.01	0.3	0.3
11	Manganese as Mn	mg/l	<0.001	<0.001	0.1	0.3
12	Chlorides as Cl	mg/l	13	15	250	1000
13	Sulphates as SO <sub>4</sub>	mg/l	7	5	200	400
14	Nitrate as NO <sub>3</sub>	mg/l	Nil	Nil	45	No Relaxation
15	Fluoride as F	mg/l	0.16	0.24	1.0	1.5
16	Phenols as C <sub>6</sub> H <sub>5</sub> OH	mg/l	<0.001	<0.001	0.001	0.002
17	Mercury as Hg	mg/l	<0.001	<0.001	0.001	No Relaxation
18	Cadmium as Cd	mg/l	<0.001	<0.001	0.003	No Relaxation
19	Selenium as Se	mg/l	<0.001	<0.001	0.01	No Relaxation
20	Arsenic as	mg/l	<0.001	<0.001	0.01	0.05
21	Cyanide as CN	mg/l	<0.001	<0.001	0.05	No Relaxation
22	Lead as Pb	mg/l	<0.001	<0.001	0.01	No Relaxation
23	Zinc as Zn	mg/l	<0.01	<0.01	5	15
24	Chromium as Cr+6	mg/l	<0.001	<0.001	0.05	No Relaxation
25	Mineral Oil	mg/l	Nil	Nil	0.5	No Relaxation
26	Residual Free chlorine	mg/l	0.14	0.15	0.2	01
27	Total coliforms	MPN/100ml	Absent	Absent	Absent	27
28	E-coli	MPN/100ml	Absent	Absent	Absent	28
29	Total Dissolved solids	mg/l	68	60	500	2000

WQB14 – 9 : Potable Water at Kirandul Township, In any Residential quarter, Farthest from WTP

WQB14 – 10 : Potable water, Mine Canteen, Deposit – 14.

Table No. 45: Water Quality Data

S.N	Parameter	Unit	WQ-1	WQ-2	WQ-3	WQ-4	GSR: 422E Norms
	<b>Sampling Date</b>		<b>19.02.2017</b>	<b>19.02.2017</b>	<b>19.02.2017</b>	<b>19.02.2017</b>	
1	Color	Pt.-Co	14	17	13	20	-
2	Suspended Solids	mg/l	27	28	25	27	100
3	Particulate size of Suspended Solids	100% are passing	100% are passing	100% are passing	100% are passing	100% are passing	Shall pass 850 micron ISI sieve
4	Dissolved Solids (Inorganic)	mg/l	31	50	24	51	-
5	pH	-	6.10	7.04	6.07	6.79	5.5-9.0
6	Temperature	°C	27	26	26	27	5°C above
7	Oil & Grease	mg/l	Nil	Nil	Nil	Nil	10
8	Total residual chloride	mg/l	Nil	Nil	Nil	Nil	1.0
9	Ammonical nitrogen as N	mg/l	0.37	0.48	0.37	0.36	50
10	Total Kjeldahl nitrogen	mg/l	1.5	1.3	0.9	0.8	100
11	Free ammonia as NH <sub>3</sub>	mg/l	Nil	Nil	Nil	Nil	5.0
12	BOD (3 days at 27 °C)	mg/l	15	17	13	11	30
13	Chemical Oxygen Demand	mg/l	58	64	34	42	250
14	Arsenic as	mg/l	<0.001	<0.001	<0.001	<0.001	0.2
15	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	<0.001	0.01
16	Lead as Pb	mg/l	<0.001	<0.001	<0.001	<0.001	0.01
17	Cadmium as Cd	mg/l	<0.001	<0.001	<0.001	<0.001	2
18	Hexavalent chromium as Cr <sup>+6</sup>	mg/l	<0.001	<0.001	<0.001	<0.001	0.10
19	Total chromium	mg/l	<0.001	<0.001	<0.001	<0.001	2.0
20	Copper as Cu	mg/l	<0.001	<0.001	<0.001	<0.001	3
21	Zinc as Zn	mg/l	0.21	0.23	0.14	0.16	5
22	Selenium as Se	mg/l	<0.001	<0.001	<0.001	<0.001	0.05
23	Nickel as Ni	mg/l	<0.001	<0.001	<0.001	<0.001	3
24	Boron as B	mg/l	<0.001	<0.001	<0.001	<0.001	-
25	Percent Sodium	%	12.1	13.8	14.0	14.9	-
26	Residual Sodium carbonate	mg/l	Nil	Nil	Nil	Nil	-
27	Cyanide as CN	mg/l	Nil	Nil	Nil	Nil	0.2
28	Chloride as Cl	mg/l	32	43	21	25	-
29	Fluoride as F	mg/l	0.59	0.62	0.59	0.72	2
30	Dissolved Phosphates	mg/l	0.39	0.48	0.43	0.45	5.0
31	Sulphates as SO <sub>4</sub>	mg/l	15	21	13	14	-
32	Sulphides as S	mg/l	Nil	Nil	Nil	Nil	2
33	Phenolic Comp. as C <sub>6</sub> H <sub>5</sub> OH	mg/l	Nil	Nil	Nil	Nil	1.0
34	Manganese	mg/l	Nil	Nil	Nil	Nil	2.0
35	Iron as Fe	mg/l	0.23	0.38	0.54	0.36	3.0
36	Vanadium as V	mg/l	Nil	Nil	Nil	Nil	0.2
37	Nitrate Nitrogen	mg/l	0.37	0.25	0.24	0.28	10

WQB 14-1 : Discharge of spillway water from Kadampal tailing dam  
WQB 14-3: Effluent from Oxidation Pond

WQB 14-2 : Influent in to Oxidation Pond  
WQB14-4 : Influent to Service Center's Effluent Treatment Plant (ETP)

**Table No. 46: Water Quality Data**

Sl. No.	Parameter	Unit	WQB14-5	WQB14-6	WQB14-7	GSR-42 Norms
	Sampling Date		19.02.2017	19.02.2017	19.02.2017	
1	Color	Pt.-Co	42	23	22	-
2	Suspended Solids	mg/l	32	26	24	100
3	Particulate size of Suspended Solids	100% are passing	100% are passing	100% are passing	100% are passing	Shall pass 850 micron ISI sieve
4	Dissolved Solids (Inorganic)	mg/l	47	53	38	-
5	pH	-	6.34	6.72	7.15	5.5-9.0
6	Temperature	°C	26	25	27	5°C above
7	Oil & Grease	mg/l	Nil	Nil	Nil	10
8	Total residual chloride	mg/l	Nil	Nil	Nil	1.0
9	Ammonical nitrogen as N	mg/l	0.79	0.52	0.71	50
10	Total Kjeldahl nitrogen	mg/l	2.2	1.8	1.6	100
11	Free ammonia as NH <sub>3</sub>	mg/l	Nil	Nil	Nil	5.0
12	BOD (3 days at 27 °C)	mg/l	14	18	16	30
13	Chemical Oxygen Demand	mg/l	41	53	32	250
14	Arsenic as As	mg/l	<0.001	<0.001	<0.001	0.2
15	Mercury as Hg	mg/l	<0.001	<0.001	<0.001	0.01
16	Lead as Pb	mg/l	<0.001	<0.001	<0.001	0.01
17	Cadmium as Cd	mg/l	<0.001	<0.001	<0.001	2
18	Hexavalent chromium as Cr <sup>+6</sup>	mg/l	<0.001	<0.001	<0.001	0.10
19	Total chromium	mg/l	<0.001	<0.001	<0.001	2.0
20	Copper as Cu	mg/l	<0.001	<0.001	<0.001	3
21	Zinc as Zn	mg/l	0.23	0.21	0.25	5
22	Selenium as Se	mg/l	<0.001	<0.001	<0.001	0.05
23	Nickel as Ni	mg/l	<0.001	<0.001	<0.001	3
24	Boron as B	mg/l	<0.001	<0.001	<0.001	-
25	Percent Sodium	%	14.8	19.4	12.9	-
26	Residual Sodium carbonate	mg/l	Nil	Nil	Nil	-
27	Cyanide as CN	mg/l	Nil	Nil	Nil	0.2
28	Chloride as Cl	mg/l	24	36	32	-
29	Fluoride as F	mg/l	0.37	0.52	0.25	2
30	Dissolved Phosphates	mg/l	0.12	0.23	0.20	5.0
31	Sulphates as SO <sub>4</sub>	mg/l	14	11	16	-
32	Sulphides as S	mg/l	Nil	Nil	Nil	2
33	Phenolic Comp. as C <sub>6</sub> H <sub>5</sub> OH	mg/l	Nil	Nil	Nil	1.0
34	Manganese	mg/l	Nil	Nil	Nil	2.0
35	Iron as Fe	mg/l	0.35	0.23	0.19	3.0
36	Vanadium as V	mg/l	Nil	Nil	Nil	0.2
37	Nitrate Nitrogen	mg/l	0.34	0.37	0.32	10

WQB 14-5 : Effluent from Service Center's Effluent treatment Plant (ETP)

WQB 14-6 : Discharge from HEM Shop Loading Plant Kirandul

WQB 14-7 : Discharge Waste Water from Project Hospital

Table No. 18

Location: Ambedkar Bhawan (Near Loading plant) (AAQ-15)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	09/10-12-16	46	16	9.0	10.6	BDL
	21/22-12-16	38	15	9.0	11.5	BDL
January 2017	09/10-01-17	44	15	8.6	9.6	BDL
	24/25-01-17	36	14	8.2	10.4	BDL
February 2017	12/13-02-17	41	14	8.1	9.0	BDL
	21/22-02-17	35	13	8.0	9.8	BDL
Min.		35	13	8.0	9.0	BDL
Max.		46	16	9.0	11.5	BDL
Mean.		40.0	14.5	8.5	10.2	BDL

Note: CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )

Table No. 14

Location: Motor Room 203 (near Tunnel Mouth) (AAQ-11)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	12/13-12-16	58	22	10.6	15.1	BDL
	17/18-12-16	50	21	10.0	15.1	BDL
January 2017	14/15-01-17	55	21	9.8	14.3	BDL
	19/20-01-17	47	19	9.1	14.3	BDL
February 2017	13/14-02-17	54	20	9.1	13.2	BDL
	26/27-02-17	45	17	8.4	13.2	BDL
Min.		45	17	8.4	13.2	BDL
Max.		58	22	10.6	15.1	BDL
Mean.		51.5	20.0	9.5	14.2	BDL

Note: CO found to be Below Detectable Limit (CO < 114.5  $\mu\text{g}/\text{m}^3$ )

Table No. 15

Location: Proposed Crushing Plant – 11B (AAQ-12)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	13/14-12-16	60	24	11.4	14.2	BDL
	18/19-12-16	56	24	11.2	14.8	BDL
January 2017	15/16-01-17	57	22	10.7	13.4	BDL
	20/21-01-17	53	21	10.2	13.1	BDL
February 2017	09/10-02-17	55	21	9.3	12.7	BDL
	18/19-02-17	51	20	9.7	12.5	BDL
Min.		51	20	9.3	12.5	BDL
Max.		60	24	11.4	14.8	BDL
Mean.		55.3	22.0	10.4	13.5	BDL

Note: CO found to be Below Detectable Limit (CO < 114.5  $\mu\text{g}/\text{m}^3$ )



Table No. 16

Location: DLM Colony (AAQ-13)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	15/16-12-16	51	20	9.4	11.8	BDL
	19/20-12-16	44	20	10.3	12.6	BDL
January 2017	16/17-01-17	54	49	18	8.8	BDL
	21/22-01-17	41	19	9.5	11.7	BDL
February 2017	10/11-02-17	47	17	7.9	9.8	BDL
	19/20-02-17	39	18	9.0	10.9	BDL
Min.		39	17	7.9	8.8	BDL
Max.		54	49	18	12.6	BDL
Mean.		46.0	23.8	10.7	10.9	BDL

Note: CO found to be Below Detectable Limit (CO < 114.5  $\mu\text{g}/\text{m}^3$ )

Table No. 17

Location: Residential Quarters near Millennium Park (AAQ-14)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	08/09-12-16	48	19	8.2	11.1	BDL
	20/21-12-16	40	18	8.6	11.1	BDL
January 2017	01/02-01-17	46	17	7.8	10.4	BDL
	23/24-01-17	37	16	7.9	10.2	BDL
February 2017	11/12-02-17	44	15	7.1	9.2	BDL
	20/21-02-17	36	15	7.2	10.0	BDL
Min.		36	15	7.1	9.2	BDL
Max.		48	19	8.6	11.1	BDL
Mean.		41.8	16.7	7.8	10.3	BDL

Note: CO found to be Below Detectable Limit (CO < 114.5  $\mu\text{g}/\text{m}^3$ )

Table No. 10

Location: Kadampal Village (AAQ-7)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	08/09-12-16	48	19	8.0	10.8	BDL
	23/24-12-16	42	15	9.8	12.2	BDL
January 2017	08/09-01-17	46	18	7.7	9.5	BDL
	23/24-01-17	40	14	8.7	11.4	BDL
February 2017	09/10-02-17	45	16	7.1	9.1	BDL
	21/22-02-17	38	13	7.7	10.1	BDL
Min.		38	13	7.1	9.1	BDL
Max.		48	19	9.8	12.2	BDL
Mean.		43.2	15.8	8.2	10.5	BDL

Note: CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )

Table No. 11

Location: Near Malangir Pump House (AAQ-8)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	09/10-12-16	42	21	8.4	11.2	BDL
	24/25-12-16	52	20	10.2	13.0	BDL
January 2017	09/10-01-17	39	20	7.6	10.2	BDL
	24/25-01-17	50	19	9.4	12.2	BDL
February 2017	10/11-02-17	37	19	6.9	9.7	BDL
	23/24-02-17	49	18	8.2	11.3	BDL
Min.		37	18	6.9	9.7	BDL
Max.		52	21	10.2	13	BDL
Mean.		44.8	19.5	8.5	11.3	BDL

Note: CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )

Table No. 12

Location : Proposed Augmentation of SP-III (AAQ-9)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	10/11-12-16	39	20	9.0	11.4	BDL
	26/27-12-16	46	18	10.8	13.6	BDL
January 2017	10/11-01-17	37	18	8.8	10.7	BDL
	27/28-01-17	44	17	9.2	12.5	BDL
February 2017	11/12-02-17	35	17	8.1	9.9	BDL
	24/25-02-17	42	16	8.9	11.9	BDL
Min.		35	16	8.1	9.9	BDL
Max.		46	20	10.8	13.6	BDL
Mean.		40.5	17.7	9.1	11.7	BDL

Note: CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )

Table No. 13

Location: Proposed site for Crushing Plant-14 (AAQ-10)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	11/12-12-16	62	26	11.2	13.2	BDL
	27/28-12-16	58	22	10.4	14.7	BDL
January 2017	12/13-01-17	60	24	10.1	12.8	BDL
	28/29-01-17	55	20	9.7	13.2	BDL
February 2017	12/13-02-17	58	22	9.4	11.7	BDL
	25/26-02-17	53	19	9.1	12.1	BDL
Min.		53	19	9.1	11.7	BDL
Max.		62	26	11.2	14.7	BDL
Mean.		57.7	22.2	10.0	13.0	BDL

Note: CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )

**Table No. 6**

**Location:** Loading Plant near CSD Kirandul (AAQ-3)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	03/04-12-16	60	28	10.8	14.9	BDL
	18/19-12-16	64	30	10.8	14.9	BDL
January 2017	03/04-01-17	58	26	9.8	13.6	BDL
	17/18-01-17	61	28	9.5	13.7	BDL
February 2017	04/05-02-17	56	25	9.3	12.8	BDL
	17/18-02-17	59	26	9.1	12.3	BDL
<b>Min.</b>		<b>56</b>	<b>25</b>	<b>9.1</b>	<b>12.3</b>	<b>BDL</b>
<b>Max.</b>		<b>64</b>	<b>30</b>	<b>10.8</b>	<b>14.9</b>	<b>BDL</b>
<b>Mean.</b>		<b>59.7</b>	<b>27.2</b>	<b>9.9</b>	<b>13.7</b>	<b>BDL</b>

Note: CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )

**Table No. 7**

**Location:** Between Screening Plant I & II (AAQ-4)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	04/05-12-16	50	22	10.0	13.1	BDL
	19/20-12-16	58	26	10.0	13.6	BDL
January 2017	05/06-01-17	48	20	9.7	12.5	BDL
	19/20-01-17	55	23	9.2	12.4	BDL
February 2017	05/06-02-17	47	19	8.9	11.4	BDL
	18/19-02-17	53	21	9.0	11.9	BDL
<b>Min.</b>		<b>47</b>	<b>19</b>	<b>8.9</b>	<b>11.4</b>	<b>BDL</b>
<b>Max.</b>		<b>58</b>	<b>26</b>	<b>10</b>	<b>13.6</b>	<b>BDL</b>
<b>Mean.</b>		<b>51.8</b>	<b>21.8</b>	<b>9.5</b>	<b>12.5</b>	<b>BDL</b>

Note: CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )

Table No. 8

Location: Kodenaar Village (AAQ-5)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	05/06-12-16	44	20	8.6	11.4	BDL
	20/21-12-16	44	20	9.0	12.2	BDL
January 2017	06/07-01-17	42	18	7.8	10.4	BDL
	20/21-01-17	42	18	8.7	11.7	BDL
February 2017	06/07-02-17	40	17	7.2	9.8	BDL
	19/20-02-17	40	17	8.1	10.9	BDL
Min.		40	17	7.2	9.8	BDL
Max.		44	20	9	12.2	BDL
Mean.		42.0	18.3	8.2	11.1	BDL

Note: CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )

Table No. 9

Location: Perna Village (AAQ-6)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	06/07-12-16	40	18	7.2	9.6	BDL
	22/23-12-16	48	18	8.8	11.0	BDL
January 2017	07/08-01-17	38	16	6.8	8.8	BDL
	21/22-01-17	45	16	7.7	10.4	BDL
February 2017	07/08-02-17	36	15	6.2	8.3	BDL
	20/21-02-17	43	15	7.2	9.3	BDL
Min.		36	15	6.2	8.3	BDL
Max.		48	18	8.8	11	BDL
Mean.		41.7	16.3	7.3	9.6	BDL

Note: CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )

## Ambient Air Quality Data

**Table No. 4**

**Location:** Deposit – 14 Mine Office (AAQ-1)

**Season:** Winter 2016-17

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	01/02-12-16	62	30	12.8	14.4	BDL
	16/17-12-16	58	24	12.1	15.2	BDL
January 2017	01/02-01-17	60	28	11.5	13.7	BDL
	15/16-01-17	56	22	11.6	14.4	BDL
February 2017	02/03-02-17	58	27	10.9	12.9	BDL
	14/15-02-17	54	20	10.4	13.8	BDL
<b>Min.</b>		<b>54</b>	<b>20</b>	<b>10.4</b>	<b>12.9</b>	<b>BDL</b>
<b>Max.</b>		<b>62</b>	<b>30</b>	<b>12.8</b>	<b>15.2</b>	<b>BDL</b>
<b>Mean.</b>		<b>58</b>	<b>25</b>	<b>11.6</b>	<b>14.1</b>	<b>BDL</b>

**Note:** CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )

**Table No. 5**

**Location:** Deposit – 11C Mine Office (AAQ-2)

Month	Sampling Date	Parameters ( $\mu\text{g}/\text{m}^3$ )				
		PM 10	PM 2.5	SO <sub>2</sub>	NO <sub>x</sub>	CO
December 2016	02/03-12-16	56	22	10.2	15.2	BDL
	17/18-12-16	56	22	11.7	15.8	BDL
January 2017	02/03-01-17	54	20	9.8	14.8	BDL
	16/17-01-17	54	20	10.5	14.7	BDL
February 2017	03/04-02-17	52	19	9.1	13.2	BDL
	16/17-02-17	52	19	9.8	13.3	BDL
<b>Min.</b>		<b>52</b>	<b>19</b>	<b>9.1</b>	<b>13.2</b>	<b>BDL</b>
<b>Max.</b>		<b>56</b>	<b>22</b>	<b>11.7</b>	<b>15.8</b>	<b>BDL</b>
<b>Mean.</b>		<b>54</b>	<b>20</b>	<b>10.2</b>	<b>14.5</b>	<b>BDL</b>

**Note:** CO found to be Below Detectable Limit ( $\text{CO} < 114.5 \mu\text{g}/\text{m}^3$ )