Ambuja Cement

Ref: ACL/GP-IV-8/Washery-EC-Compliance /2021-22/438 Dtd:19.07.2021

To,

The MoEF & CC,
GoI, Regional Office, Western Region,
KendriyaParyavaranBhawan, Link Road No.3
E-5, Ravishnakar Nagar
Bhopal-462016 (M.P.)

Sub: Six monthlyEC Compliance Status Report for the period Jan 2021 to June 2021forPit head captive wet coal washery (1.8 MTPAin an area of 10.336 ha) locatedinGare Palma IV/8 Coal Block, located in Tehsil - Garghora (now Tehsil Tamnar), District - Raigarh, Chhattisgarh of M/s Ambuja Cements Limited - reg.

Ref: 1. MoEF file EC.No- J-11015/76/2010-IA.II (M) dated: 10th June, 2013

2. EC transferred to M/s Ambuja Cements Limited,MoEF&CCfile no. J-11015/76/2010-IA.II(M)dated1st April, 2019
3. EC Extended No. J-11015/76/2010-IA-II(M) dated 30th Sep, 2020

Dear Sir,

The MoEFF&CC issued Environmental Clearance for Pit head captive wet washery (1.8 MTPA in an area of 10.336 ha) located in Gare Palma IV/8 Coal Mines on 10th June, 2013 in the name of M/s. JayaswalNeco Ltd. (Prior allottee). Later on Gare Palma IV/8 Coal Block has been allocated to M/s Ambuja Cements Limited by the Nominated Authority, MoC, GoI, vide vesting order No. 104/28/2015/NA dated 22.04.2015 and Addendum No. 1 dated 19.06.2018. Execution of mining lease has been completed for the Coal Block and land acquisition for mining is under process. The EC forPit head captive wet washery (1.8 MTPA in an area of 10.336 ha) has been transferred in the name of M/s. AmbujaCements Ltd. on 1st April, 2019& Further extended for period of 03 years as per vide EC Extended No. J-11015/76/2010-IA-II(M) dated 30.09.2020 The washery yet not be established &commissioned due to delay in

AMBUJA CEMENTS LIMITED
Gare Palma IV/8 Coal Mine
SITE OFFICE : Village - Karwahi, Post. - Saraitola, Tahsil - Tamnar, Dist. - Raigarh (C.G.) 496 107
www. ambujacement.com, E-mail : garepalmacoalmine@ambujacement.com
Regd. Off. : PO. Ambujanagar, Taluka - Kodinar, Dist. Gir Somnath, Gujrat
CIN : L26942GJ1981PLC004717

land acquisition & also the non issuance of Transit permit for dspatch of coal from Mines toEUP at Bhatapara (CG)

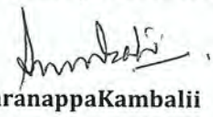
With reference to above subject, enclosed herewith six monthly Environment Clearance Compliance report for the period from Jan 2021 to June 2021 for the pit head captive wet coal washery.

This is for your kind information please.

Thanking You,

Yours faithfully,

For, Ambuja Cements Limited



SharanappaKambalii

Sr. Vice President (Coal Block- Gare Palma IV/8)

Encl: Six monthly EC Compliance Report for Pit head captive wet coal washery.

Copy to:

1. The MoEF&CC, ParyavaranBhavan,JorbaghRoad, New Delhi – 110003
2. MoEF,Regional Office (WCZ), Ground Floor, East Wing, New Secretariat Building Civil Lines, Nagpur-440001
3. The MS, Zonal Officer, CEC Board, Atal Nagar Naya Raipur (C.G.)
4. CPCB,Sahkar Bhawan,3rd Floor,North T.T. Nagar,Bhopal-462003
5. RO-CECB,TV tower Road, Raigarh (C.G.)

ENVIRONEMENT CLEARANCE COMPLIANCE STATUS REPORT

FOR PIT HEAD CAPTIVE WETCOAL WASHERY (1.8 MTPA IN AN AREA OF 10.336 HA) LOCATED IN

GARE PALMA IV/8 COAL MINE

M/s Ambuja Cement Ltd

EC No. J-11015/76/2010-IA.II (M) dated: 10th June, 2013

EC transferred to M/s ACL Vide-11015/76/2010-IA.II(M) dtd: 1/04/2019

EC Extended No. J-11015/76/2010-IA-II(M) dated: 30.09.2020

Ambuja

UNDERTAKING

Information provided in the Environmental Compliance Report for Pit head captive wet coal washery (1.8 MTPA in an area of 10.336 ha) located inGare Palma IV/8 Coal Mine, Raigarh(Chhattisgarh) is true to the best of my knowledge.

For, Ambuja Cements Limited

SharanappaKambalii

Sr. Vice President (Coal Block- Gare Palma IV/8)

1.0 INTRODUCTION

Ministry of Coal, Govt. of India through Nominated Authority conducted 2nd phase of e-auction of coal blocks during February, 2015 in which Ambuja Cements Limited (ACL) emerged as a successful bidder for Gare Palma IV/8 Coal Block with an extractable reserves of 45.85 MT & approved Mixed (Both underground & opencast) Mine plan capacity of 1.2 MTPA was listed under schedule III of the Coal Mines (Special Provision) Act, 2015 earmarked for un-regulated sector. Subsequently Coal Mine Development & production agreement was signed between ACL and Nominated Authority on 16th March, 2015 followed by issuance of Vesting Order by Nominated Authority on 22nd April, 2015 & corrigendum no. 1 to the vesting order with co-ordinate dated 14th December, 2015. The mining lease execution and registration of the lease agreement has been completed for an area of 474.703 Ha on 31st December, 2015. We have got the **Bhu-Prabesh**on 06/06/2018

The development operations started in the open cast coal mine Gare Palma IV/8 (Scheduled coal production capacity 0.70 MTPA from opencast) since 2nd April, 2018, it has been intimated to the CECB – Naya Raipur vide our letter no. ACL/GP-IV*8/Coal Mine/CTO-Develop/CECB/Raipur/01, Date: 27/03/2018. We have obtained the Consent to Operate for Coal Production vide letter no.**5670/TS/CECB/ 2018**dated on 15/10/ 2018from Chhattisgarh Environment Conservation Board. We have started the Coal Production from opencast mine from **22nd Oct' 2018.**

The Ministry of Environment, forest and climate change has transferred the EC of pit head captive wet coal washery of 1.8MTPA in the area of 10.336Ha located in Gare Palma IV/8 Coal mine to M/s Ambuja Cements Ltd on 1stapril 2019.

Pit Head Wet Coal washery EC has been extended for 3 years vide letter **No. J-11015/76/2010-IA-II(M) dated 30.09.2020 by MoEF&CC.**

We were unable to start the construction work for pit head captive wet coal washery, due to land issue & as well as non issuance of transit pass for coal dispatch, hence the coal production also stopped from Aug'2020. However we have clear intention of putting up of the coal washery.

2.0 POINT WISE COMPLIANCE REPORT FOR THE ENVIRONMENT CLEARANCE CONDITIONS;

Conditions ofEC Validity extended (MoEF&CCExtension letter dated 30th Sep, 2020)

Sl No	Conditions	Compliance Details
5(i)	The project proponent shall obtain Consent to Establish/ Operate from the State Pollution Control Board for the proposed peak capacity of 1.8 MTPA (Peak) prior to commencement of the production.	Agreed, to obtain the CTE before start of the Construction
(ii)	Permission for ground water withdrawal shall be obtained from Central Ground Water Authority (CGWA), if applicable.	CGWA permission is available, NOC valid upto 07.06.2020 and it is under deemed extension upto 31.03.2021 as per 17365/2021 of CGWA & deemed extension up to 31/3/2022 as per public notification dtd 17/6/2021 by CGWA & 24/9/2020 Those who have submitted their comprehensive water impact assessment before 30/06/2021
(iii)	100% water requirement for washery shall be met with mine water. No other source water shall be used for washery operations	Agreed to use only mine water
(iv)	The washing technology so chosen should conform to 'Zero Liquid Discharge'.	Agree
(v)	Continuous monitoring of occupational safety and other health hazards, and the corrective actions need to be ensured.	Agree
(vi)	For proper baseline air quality assessment, adequate monitoring stations in the downwind areas based on wind rose pattern of the area, shall be set up for collection of air quality date and air quality modelling.	Agreed, this will be completed on the commencement of washery
(vii)	Disposal of washery rejects shall only be in proposed CPP of the project proponent.	Agreed to use in CPP of cement or may opt to sell for TPP around coal mine with permission of CCO/along with intimation to

		MoEF&CC, if permitted& follow the guidelines as per the Reject & Middling Handling Policy of MOC dated27/05/2021
(viii)	Thick green belt of20mtswidth to be provided around the washery to mitigate/ check the dust pollution. A 3-tier avenue plantation should be developed along vacant areas, storage yards, loading/ transfer points, and also along internal roads/ main approach roads.	Agreed
(ix)	Peripheral and inside road shall be made of rigid pavements	Agreed
6	All other conditions stipulated in the environmental clearance letter dated 10th June 2013 and 1stApril, 2019 shall also apply.	Agreed
Conditions ofthe transferred EC dated 1stApril, 2019 in the name of M/s Ambuja Cement Ltd, & Original EC granted to JaiswalNico Ltd, dated 10th June, 2013		
i	Any change in scope of work will attract provisions of the Environment (Protection) Act, 1986 and the EIA Notification, 2006 and subsequent amendments therein	Agreed
ii	All conditions stipulated in the environment clearance dated 10thJune, 2013 shall remain unchanged.	Agreed
iii	The allottee shall be liable for any act of violation of the Environment (Protection) Act, 1986/EIA Notification, 2006/subsequent amendments and circulars which it has inherited during the revalidation/ transfer.	Agreed
iv	The allottee shall be liable for compliance of all court directions, if any.	Agreed
Conditions of Original EC Granted to M/s JayaswalNeco Ltd on 10th June, 2013 **A. Specific conditions:**		
(i)	As large numbers of existing and proposed neighbouring mines and industries in the area, the Cumulative Impact Assessment study of entire coal mining area should be carried out by proponent.	Agreed to conduct the comprehensive study once the OC reaches its full capacity and UG mine start production and before start of the washery
(ii)	The entire water of the area is acidic due to presence of Pyrites. People use carbonate	Agreed, RCC sedimentation tank is constructed of size 40 m X20 mX3

	toincrease alkanity. Proponent shall take measures to reduce the acid in water.	M , on settling, water is treated through the RO plant and waste water of RO is used for dust suppression and plantation
(iii)	Recharging of groundwater is required.	Agreed to comply Number of settling ponds and rechargeable bore well are done & by rainwater harvesting
(iv)	Schedule-1 Fauna- Peacock, Sloth bear and Elephant reported in area. Proponent shouldcontribute on proportionate basis in Wild Life Conservation Plan prepared by state Govt.for conservation of flora and fauna.	Rs 1.0 Cr was deposited by erstwhile allottee /prior allottee under CAMPA as per the wildlife management plan approved by CCF (WL) CG on16/6/2012 If any additional plan is prepared by State government, we agree to contribute proportionately .
(v)	Thick green belt of 50 mtshould be provided all around the plant area with native speciesas watery is polluting the area.	Agreed to comply upon completion of construction
(vi)	The coal washery plant and area should be completely covered.	Agreed, covers as preferable as possible to prevent the airborne dust spreading
(vii)	One season (non-monsoon) primary base-line data on Environment quality (PM10 &PM2.5) should be done.	Agreed, data is attached in **Annexure-1**
(viii)	All the internal roads within washery should be made of concrete.	Agreed
(ix)	Electrical equipment should be dust proof and properly protected.	Agreed
(x)	Transportation of Coal to Bhupdeopur (60km) by road should be by mechanicallycovered trucks and later on by rail upto Raipur.	Agreed, but the coal will now be transported to EUP of Ambuja at Bhatapara& trucks will be covered by tarpoulin.
(xi)	The transportation of coal from the coalmine/washery till Bhupdeopur railway siding willbe by road until the railway siding comes in that area. Once the railway siding isestablished the entire transportation of coal will be done through railwaysfrom the minehead/washery.	Agreed but due to change in the EC ownership coal will go to EUP of Ambuja Cements Ltd but in covered truck.
(xii)	CSR 1% of the cost of project i.e. Rs. 44.50 lakhs for upliftment of surrounding villagesbe provided by the proponent.	Agreed
(xiii)	Coal washing shall be operated in closed water circuit. Water after coal washing shall betaken to	Agreed to comply

	treatment plant. After separating the coal fines from the water shall be reused forcoal washing. No waste water will be discharge from the coal washery premises. Thus,Kelo river and Sajaranala will not get polluted.	
(xiv)	The raw coal, washed coal and coal wastes (rejects) shall be stacked properly atearmarked site(s) within stockyards fitted with wind breakers/shields. Adequate measureshall be taken to ensure that the stored minerals do not catch fire.	Agreed to comply
(xv)	Hoppers of the coal crushing unit and washery unit shall be fitted with high efficiencybag filters and mist spray water sprinkling system shall be installed and operated effectively at all times of operation to check fugitive emissions from crushing operations,transfer points of closed belt conveyor systems and from transportation roads.	Agreed to comply
(xvi)	The report titled 'Flora and fauna and conservation plan for endangered species of GareIV/8 coal B block" approved by the PCCF (wildlife) of Chhattisgarh dated 22.11.2011states that there is no national park, tiger reserve eco-sensitive zones within 15 km radius. It was informed that this area is neither affected by elephant nor any elephant corridor exists. However, there are occasional presence of elephants and other wild lives.	Agreed
(xvii)	A Wildlife Conservation Plan for conservation and protection of wildlife in the study areahas been approved at a cost of Rs 1 crore and shall be implemented by the proponent inconsultation with Departments of Forest and Wildlife, Govt. of Chhattisgarh. The WLCPshall comprise of components of habitat improvement and conservation of biodiversity,provision of water holes, and augmenting water bodies, nursery and plantation of species of natural food and fodder found in the natural habitat, salt licks, measures for protectionagainst forest fires and poaching, awareness campaign of villagers in the study area andcompensation in case of man-animal conflicts. The status of implementation of the WLConservation Plan including budgetary provisions of various activities and status ofexpenditure shall be regularly uploaded on the website of the Forest and WildlifeDepartments of Govt. of Chhattisgarh and of the project proponent	Agreed Rs 1 Cr was deposited by prior allotee in CAMPA on 16/6/2012

	and the status shall beregularly reported to this Ministry and the MoEF Regional Office, as part of thecompliance report.	
(xviii)	As per the approved plan of the 'Flora and fauna and conservation plan for endangeredspecies of Gare IV/4 coal Block" and recommended by the PCCF (Wild Life), Rs onecrore be deposited, at one time, with the Department of Forest and Wildlife, Govt. ofChhattisgarh for implementation of the plan.	Prior allotee has already deposited with Govt of CG &IV/4 Coal mine is not with Ambuja Cements ltd, Prior allottee was JayaswalNeco Ltd.
(xix)	The project authorities shall also participate in a Regional Action Plan of the StateGovernment for conservation of flora and fauna found within the study area, in additionto the above funds shall also contribute financially for implementation of the RWLCP. Habitat development such as grasslands/conservation measures along the migratoryroute/habitats of elephants found/visiting the area shall form a part of the RegionalAction Plan.	Agreed to comply
(xx)	It will be used for growing plants along the fringes of the site roads and reclamation ofexternal dump and backfilled area. The top soil stockpiles will be low height notexceeding 6 m and will be made use for concurrent filling without keeping the topsoil fora long period.	Agreed
(xxi)	The coal transportation will be by road. JNIL developed dedicated road from Gare IV/4(Banjikhol) to Milupara (2 km). JNIL developed 2.2 km dedicated road from Gare IV/4(Bankheta) to Dongamouha JNIL along with Monnet developed dedicated road fromMillupara to Hukradipa passing through Gare IV/8 (8.8 km). Thereafter, BOOT road is used till Raigarh (approx. 50 km). Coal movement done by 35 T dumpers. Traineddrivers used.	Agreed to transport coal by Road Now GP IV/8 Coal mine is only with Ambuja Cements Ltd and coal trucks will directly ply from GP IV/8 throgh PWD road up to Hukradeepa& then reach the BOOT road till Raigarh Further a railway track is likely to established for pelma Coal block by CERC-Chattisgargh, then road movement will be very less.
(xxii)	All approach roads shall be black topped and internal roads shall be concreted. The roadsshall be regularly cleaned with 8 mechanical sweepers.	Agreed
(xxiii)	Coal rejects with an ash content of 76% or less shall be fully utilised for powergeneration in linked TPP.	Agreed
(xxiv)	The proponent shall maintain proper records of the ash content of raw (ROM) coal, cleancoal, middling	Agreed

	and coal rejects along with quantum of raw coal obtained and washed anddispatched every month and the same shall be uploaded on the company website everymonth.	
(xxv)	Green belt shall be developed all along the periphery of the site, along the areas such asthe washery unit, crushing unit, and stockyard. A 3-tier avenue plantation would bedeveloped along vacant areas, near washery, storage yards, loading points and transferpoints and along internal roads and main approach roads and on the 2-km road upto therailway siding and at the siding.	Agreed
(xxvi)	Trucks engaged for mineral transportation outside the washeryupto the railway sidingcovering a distance of 2km shall be optimally loaded and covered with tarpaulin with nospillage *en route*. The trucks shall be properly maintained, and emissions shall be belownotified limits. Facilities for parking of trucks carrying raw coal from the linkedcoalmines shall be created within the Unit.	Agreed
(xxvii)	The 16580 TPD wash coal from the washery will be taken to steel plant at Siltara, Raipur,3850 TPD middling will be taken to 600 MW TPD at Hamirpur, Raigarh.	Now due to change in the allottee, washed coal could be taken to EUP at Bhatapara and middlings to CPP or TPP around through open selling. Other plants of EUP as per the Diversion Notice-II submitted to MOC
(xxviii)	All internal roads shall be concreted or black topped and the approach roads and roadsused for transportation/nearby roads not owned by the company but used for the projectshall be blacked topped. Facilities for parking of trucks carrying raw coal from the linkedcoalmines shall be created within the Unit.	Agreed
(xxix)	The roads (internal/approach/and roads used for the project) shall be regularly cleanedwith mechanical sweepers and with water sprinklers. A 3-tier avenue plantation usingnative species shall be developed along the roads.	Agreed
(xxx)	Hoppers of the coal crushing unit at the crushing shed and washery unit shall be fitted with high efficiency bag filters/Must extractors and mist spray water sprinkling systemshall be installed and operated effectively at all times of operation to check fugitiveemissions from crushing operations, transfer points of belt conveyor systems which shallbe closed and from transportation roads.	Agreed
(xxxi)	Proper housekeeping practices shall be followed and all the raw materials including sludge and	Agreed

	waste oil shall be stored separately in designated places only.	
(xxxii)	Industrial wastewater (workshop and wastewater from the washery-cum Re-Rolling Unit)shall be properly collected, treated in an ETP so as to conform to the standards prescribedunder GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended fromtime to time. Oil and grease trap shall be installed for treatment of workshop effluents.No wastewater shall be discharged from the washery into the drains/natural watercourses.Storm water shall be let out through separate storm water drains and shall be tested forpH, TDS, etc and the water shall be treated to prescribe limits before discharge from thepremises.	Agreed
(xxxiii)	Socio-economic and welfare measures for the local communities for the villageBhelatand and other adjoining villages shall be implemented under CSR and shall be notless than Rs. 1 crore per annum. Details of village-wise activities under CSR and thestatus of its implementation along with expenditure thereon shall be uploaded on thecompany website.	Agreed
(xxxiv)	Records of quantum and ash content of raw coal being washed, and clean coal and coalrejects produced from every batch of washing shall be maintained and details thereofuploaded on the company website.	Agreed
(xxxv)	The Washery unit shall be a zero-discharge facility and no wastewater shall bedischarged from the washery into the drains/natural watercourses. Recycled water shallbe used for development and no additional groundwater shall be used for the PlantOperations. Any additional water requirement envisaged shall be obtained byrecycle/reuse to the maximum extent and from rainwater harvesting measures.	Agreed
(xxxvi)	Socio-economic and welfare measures for the local communities for the adjoiningvillages shall be implemented under CSR. Activities under CSR activities to beundertaken for the adjoining villages shall be identified in consultation with the localauthorities, the details of status of implementation of CSR and expenditure thereon whichshould be annually updated on the company website.	Agreed
(xxxvii)	Heavy metal content in raw coal, and washed coal shall be analysed once in a year andrecords maintained thereof.	Agreed

B. General Conditions		
(i)	No change in process technology and scope of working including quantum of mineralcoal washed shall be made without prior approval of the Ministry of Environment andForests.	Agreed
(ii)	Four ambient air quality monitoring stations shall be established in the core zone as wellas in the buffer zone for monitoring PM_{10}, $PM_{2.5}$, SO_2 and NOx. Location of the stationsshall be decided based on the meteorological data, topographical features andenvironmentally and ecologically sensitive targets in consultation with the State PollutionControl Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, in SPM andRSPM etc. shall be carried out at least one in six months.	Agreed, attached in **Annexure-2**
(iii)	Data on ambient air quality (PM_{10}, $PM_{2.5}$, SO_2 and NOx, and heavy metals such as Hg, As,Ni, Cr, etc) shall be regularly submitted to the Ministry including its Regional Officeat Bhopal and to the State Pollution Control Board and the Central Pollution ControlBoard once in six months. Random verification of samples through analysis fromindependent laboratories recognized under the EP Rules, 1986 shall be furnished as partof the compliance report.	Agreed, attached in **Annexure-2**
(iv)	Adequate measures shall be taken for control of noise levels below 85 dBA in the workenvironment, Workers engaged in blasting and drilling operations, operation of HEMM,etc shall be provided with ear plugs/muffs.	Agreed
(v)	Monitoring of environmental quality parameters shall be carried out throughestablishment of adequate number and type of pollution monitoring and analysisequipment in consultation with the State Pollution Control Board and data got analysedthrough a laboratory recognised under EP Rules, 1986,	Agreed, attached in **Annexure-2**
(vi)	Personnel working in dusty areas shall wear protective respiratory devices and they shallalso be provided with adequate training and information on safety and health aspects.Occupational health surveillance program of the workers shall be undertakenperiodically to observe any contractions due to exposure to dust and to take correctivemeasures, if needed.	Agreed & in the existing mine operation all PPE, is provided to all workmen & other personal
(vii)	A separate environmental management cell with suitable qualified personnel shall be setup under	Agreed

	the control of a Senior Executive, who will report directly to the Head of thecompany.The funds earmarked for environmental protection measures shall be kept inseparate account and shall not be diverted for other purpose, Year-wise expenditure shallbe reported to this Ministry and its Regional Office at Bhopal.	
(viii)	The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has beenaccorded environmental clearance and a copy of the clearance letter is available with theState Pollution control Board and may also be seen at the website of the ministry of Environment & Forests at http://envfor.nic.in.	Advertised by prior allottee
(ix)	A copy of the environmental clearance letter shall be marked to concerned Panchayat/ ZillaParishad/Municipal Corporation or Urban Local Body/ local NGO, if any, fromwhom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on the company's website.	Complied by prior allottee
(x)	A Copy of the clearance letter shall be displayed on the website of the concerned StatePollution Control Board. The EC letter shall also be displayed at the Regional Office,District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.	Complied by prior allottee
(xi)	The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the MOEF, the respective Zonal offices of CPCB and the SPCB. The compliance status of the stipulated EC conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as tobring the same in the public domain. The monitoring data of environmental quality parameters (air, water, noise and soil) shall also be displayed at the entrance of theproject premises and mines office and in corporate office and on the company's website.	Agreed
(xii)	The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s)of the Regional Office by furnishing the requisite data/	Agreed to extend full support

	information/monitoring reports.	
(xiii)	The environmental statement for each financial year ending 31st March in Form-V ismandated to be submitted by the project proponent to the concerned State PollutionControl Board as prescribed under the Environment (Protection) Rules, 1986, as amendedsubsequently.The sameshall also be uploaded on the company's website along with the status ofcompliance of EC conditions and shall be sent to the respective Regional Offices of theMoEF by E-mail.	Agreed

Annexure-1

Results of Ambient air quality monitoring for particulate matter(<10µm)

Month	Station	Value(µg/m³)
Jan'21	Durga house	49.7
feb'21	Durga house	52.3
Mar'21	Durga house	52.2
Apr'21	Durga house	57.4

Results of Ambient air quality monitoring for particulate matter(<2.5µm)

Month	Station	Value(µg/m³)
Jan'21	Durga house	21.4
feb'21	Durga house	23.6
Mar'21	Durga house	23.8
Apr'21	Durga house	22.6

AMBIENT AIR QUALITY

1. GENERAL

To assess the ambient air quality in & around Gare Palma IV/8 Coal mine lease of M/s Ambuja Cements Ltd atvillage-Khamaria, Dist.Raigarh(C.G.), **total five** numbers of ambient air quality monitoring locations were selected. Different air pollution parameters like PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO and heavy metals were identified as related to the mining activities. All the sampling stations were identified in & around the mine. Descriptive listing of the air quality monitoring stations is given in **Table – 1** and **Figure 4.**

TABLE – 1: DESCRIPTION OF AMBIENT AIR QUALITY (AAQ) MONITORING STATIONS

S.N	Sampling Stations	Station Code	Distance from Mine Lease	Direction from Mine Lease	Coordinates
1.	At Site Office	AAQ-1	Within	Within	Longitude- 83°29'39" E Latitude- 22°10'14" N
2.	At Banjari Temple	AAQ-2	0.3 km	North	Longitude- 83°30'32" E Latitude- 22°10'43" N
3.	Khamaria village	AAQ-3	0.5 km	NW	Longitude- 83°29'51" E Latitude- 22°09'59" N
4.	Nr School, Rampura village	AAQ-4	0.4 km	East	Longitude- 83°30'16" E Latitude- 22°09'59" N
5.	At Durga House	AAQ-5	0.3 km	South	Longitude- 83°29'53" E Latitude- 22°09'42" N

2. OBSERVATIONS

The results of Ambient Air Quality monitoring with regard to the parameters are given below in **Table – 2, 3, 4, 5 and 6.** The **National Ambient Air Quality Standards** are given in **Table – 7**and Graphical presentation in **Figure 5, 6, 7, 8, and Figure 9**

TABLE – 2: RESULTS OF AMBIENT AIR QUALITY MONITORINGFOR PARTICULATE MATTER (<10 µm)

Code	Stations	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	MIN	MAX	AVG	98 percentiles
AAQ-1	At Site Office	69.4	69.7	67.2	68.4	58.7	55.1	55.1	69.7	64.8	69.7
AAQ-2	At Banjari Temple	54.9	56.8	57.4	58.6	59	56.8	54.9	59	57.3	59.0
AAQ-3	Khamaria village	63.7	54	54.6	56.2	55.4	50.8	50.8	63.7	55.8	63.0
AAQ-4	Nr School, Rampura village	64.5	56.8	55.4	57.2	56	52.6	52.6	64.5	57.1	63.8
AAQ-5	At Durga House	49.7	52.3	54.2	57.4	54	50.2	49.7	57.4	53.0	57.1

*Values are in µg/m³

TABLE – 3: RESULTS OF AMBIENT AIR QUALITY MONITORINGFOR PARTICULATE MATTER (<2.5 µm)

Code	Stations	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	MIN	MAX	AVG	98 percentiles
AAQ-1	At Site Office	28.4	28	26.2	24.6	22.4	20.8	20.8	28.4	25.1	28.4
AAQ-2	At Banjari Temple	23.4	23.4	22.8	23.4	20.8	20.2	20.2	23.4	22.3	23.4
AAQ-3	Khamaria village	24.1	23.5	22.6	23	20.7	19.5	19.5	24.1	22.2	24.0
AAQ-4	Nr School, Rampuravillage	24.1	23.5	22.8	22.6	21.2	20.3	20.3	24.1	22.4	24.0
AAQ-5	At Durga House	21.4	23,6	23.8	22.6	20.8	19.8	19.8	23.8	21.7	23.7

*Values are in µg/m³

TABLE – 4: RESULTS OF AMBIENT AIR QUALITY MONITORING FOR SULPHUR DIOXIDE (SO_2)

Code	Stations	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	MIN	MAX	AVG	98 percentiles
AAQ-1	At Site Office	18.6	17.1	16.8	14.4	14.2	12.4	12.4	18.6	15.6	18.5
AAQ-2	At Banjari Temple	16.2	14.8	14.4	16.6.	12.6	11	11	16.2	13.8	16.1
AAQ-3	Khamaria village	18.7	16.9	16.5	17.6	13.5	10.7	10.7	18.7	15.7	18.6
AAQ-4	Nr School, Rampura village	20.6	17.2	16.8	18.2	13	11.5	11.5	20.6	16.2	20.4
AAQ-5	At Durga House	15.7	14.6	16.2	16.2	12.5	10.4	10.4	16.2	14.3	16.2

*Values are in µg/m³

TABLE – 5: RESULTS OF AMBIENT AIR QUALITY MONITORINGFOR OXIDES OF NITROGEN (NO_x)

Code	Stations	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	MIN	MAX	AVG	98 percentile
AAQ-1	At Site Office	29.4	20.7	20.3	18.2	18.9	16.9	16.9	29.4	20.7	28.5
AAQ-2	At Banjari Temple	23.8	21.2	20.6	21.2	19	17.5	17.5	23.8	20.6	23.5
AAQ-3	Khamaria village	29.7	19.4	20.2	21.6	17.2	15.6	15.6	29.7	20.6	28.9
AAQ-4	Nr School, Rampura village	28.5	18.6	20	20.8	16.5	14.9	14.9	28.5	19.9	27.7
AAQ-5	At Durga House	23.9	21.4	20.8	21.4	18	16.1	16.1	23.9	20.3	23.7

*Values are in µg/m³

TABLE – 6: RESULTS OF AMBIENT AIR QUALITY MONITORINGFOR CARBON MONOXIDE (CO)

Code	Stations	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	MIN	MAX	AVG	98 percentiles
AAQ-1	At Site Office	548	506	502	496	480	450	450	548	497.0	543.8
AAQ-2	At Banjari Temple	472	486	482	494	490	482	472	494	484.3	493.6
AAQ-3	Khamaria village	508	496	492	496	510	490	490	510	498.7	509.8
AAQ-4	Nr School, Rampura village	464	488	486	498	485	460	460	498	480.2	497.0
AAQ-5	At Durga House	405	457	462	474	467	455	405	474	453.3	473.3

*Values are in µg/m3

HEAVY METALS-

Heavy metals (i.e. Pb, As, Ni, Hg) have been monitored &analyzed simultaneously, however, every time concentrations of heavy metals are observed as BDL (below detectable level).

TABLE – 7: NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQMS) (REVISED-2009)

S. N	Pollutant	Unit	Area	Concentration in Ambient Air	
				Annual Average	24 Hours
1.	Sulphur Dioxide (SO_2)	$\mu g/m^3$	Industrial	50.0	80.0
2.	Nitrogen Dioxide (NO_x)	$\mu g/m^3$	Industrial	40.0	80.0
3.	Particulate Matter PM_{10}	$\mu g/m^3$	Industrial	60.0	100.0
4.	Particulate Matter $PM_{2.5}$	$\mu g/m^3$	Industrial	40.0	60.0
5.	Ozone (O_3)	$\mu g/m^3$	Industrial	100.0	180.0
6.	Lead (Pb)	$\mu g/m^3$	Industrial	0.50	1.2
7.	Carbon Monoxide(CO) mg/m^3	mg/m^3	Industrial	2.0	4.0
8.	Ammonia (NH_3)	$\mu g/m^3$	Industrial	100.0	400.0
9.	Benzene (C_6H_6) $\mu g/m^3$	$\mu g/m^3$	Industrial	05.0	05.0
10.	Benzo(α) Pyrene,	$\mu g/m^3$	Industrial	01.0	01.0
11.	Arsenic (As) $\mu g/m^3$	$\mu g/m^3$	Industrial	6.0	6.0
12.	Nickel (Ni) $\mu g/m^3$	$\mu g/m^3$	Industrial	20.0	20.0

- Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice in a week 24 hourly at uniform intervals.
- 24 hourly or 08 hourly or 01 hourly monitored values as applicable shall be complied with 98% of the time in a year 2% of the time, then may exceed the limits but not on two consecutive days of monitoring.

3. RESULTS AND DISCUSSION

On the basis of above observations, the parameter-wise results havebeen discussed below.

3.1 PARTICULATE MATTER<10 μ (PM_{10})

Average concentration of Particulate Matter (PM_{10}) at all five air quality monitoring stations AAQ-1, AAQ-2, AAQ-3, AAQ-4 and AAQ-5 are 64.8, 57.3, 55.8, 57.1 and 53.0 $\mu g/m^3$ respectively. All monitored stations have PM_{10} concentrations well within stipulated 24hours limit, 100 $\mu g/m^3$ as prescribed for residential, rural and other areas in longstanding NAAQ Standards of CPCB. Thus, the position regarding PM_{10}concentration in ambient air is quite satisfactory. Maximum concentration of PM_{10} was found **69.7 $\mu g/m^3$**during the month of **Feb-2021** at AAQ-1 [At Site Office].

3.2 PARTICULATE MATTER<2.5 μ ($PM_{2.5}$)

The average $PM_{2.5}$ concentration at all fiveambient air quality monitoring stations AAQ-1, AAQ-2, AAQ-3,AAQ-4 and AAQ-5 are 25.1, 22.3, 22.2, 22.4 and 21.7 $\mu g/m^3$respectively. All monitored stations have $PM_{2.5}$ concentrations well within stipulated 24 hours limit, 60$\mu g/m^3$ prescribed for industrial, residential, rural and other areas in revised NAAQ Standards from CPCB. Maximum concentration of $PM_{2.5}$ was found **28.4 $\mu g/m^3$**during the month of **Feb-2021** at AAQ-1 [At Site Office].

3.3 SULPHUR DIOXIDE (SO_2)

Average Sulphur Dioxide (SO_2) concentrations at all fivesampling stations AAQ-1, AAQ-2, AAQ-3, AAQ-4 and AAQ-5are 15.6, 13.8,15.7, 16.2 and 14.3 $\mu g/m^3$ respectively and well within the stipulated 24 hours limit, 80$\mu g/m^3$ recommended for industrial, residential, rural and other areas in revised NAAQ Standards of CPCB. Maximum concentration of SO_2 was found20.6 **$\mu g/m^3$**during the month of **January 2021** at AAQ-4 [Near School, Rampura Village].

3.4 OXIDES OF NITROGEN (NO_x)

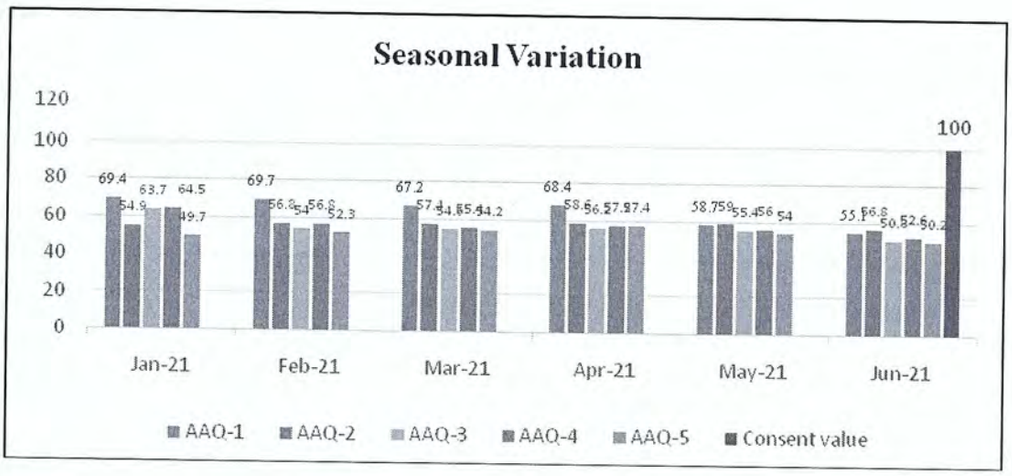
Average Oxides of Nitrogen (NO_x) concentrations at all sampling stations AAQ-1, AAQ-2, AAQ-3,AAQ-4 and AAQ-5 are 20.7, 20.6, 20.6, 19.9 and 20.3 µg/m^3 respectively and these are also well within the stipulated 24-hour limit, 80 µg/m^3 recommended for industrial, residential, rural and other areas in revised NAAQ Standards of CPCB. Maximum concentration of Oxides of Nitrogenwas found **29.4 µg/m^3**during the month of **January - 2021** at AAQ-1 [At Mine Site].

3.4 CARBON MONOXIDE (CO)

Average Carbon Monoxide (CO) concentrations at all sampling stations AAQ-1, AAQ-2, AAQ-3, AAQ-4 and AAQ-5 are 497, 484, 499, 480 and 453 µg/m^3 respectively and these values are well within stipulated 8 hours limit, 2000 µg/m^3 recommended for industrial, residential, rural and other areas in revised NAAQ Standards. Maximum concentration of Oxides of Nitrogenwas found **548 µg/m^3**during the month of **January -2021**at AAQ-1 [At Site Office].

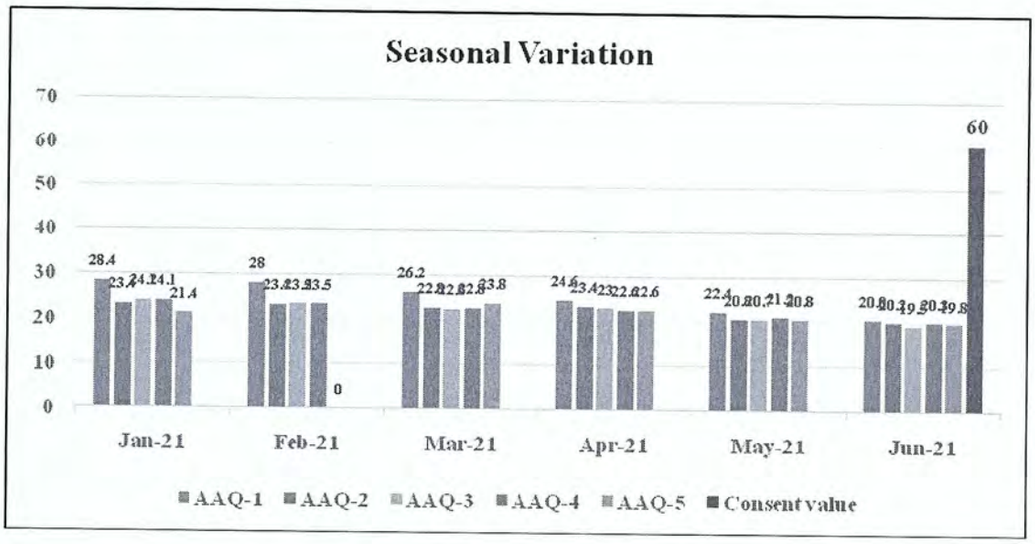
All observed values meet the prescribed standards.

FIGURE 6: GRAPHICAL REPRESENTATION FOR PM10



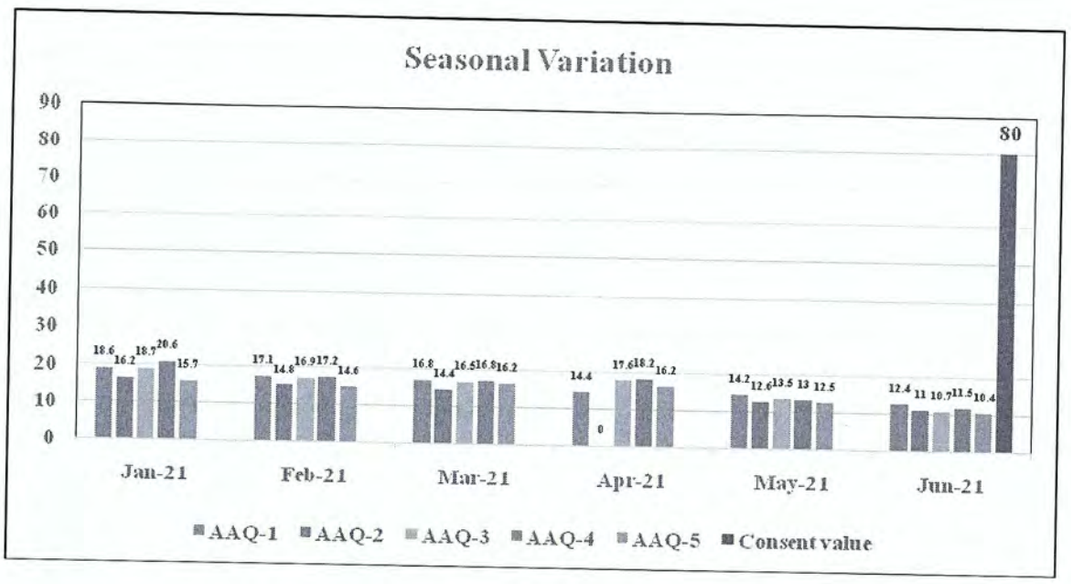
Values are in µg/m³

Figure 7: Graphical Representation for PM2.5



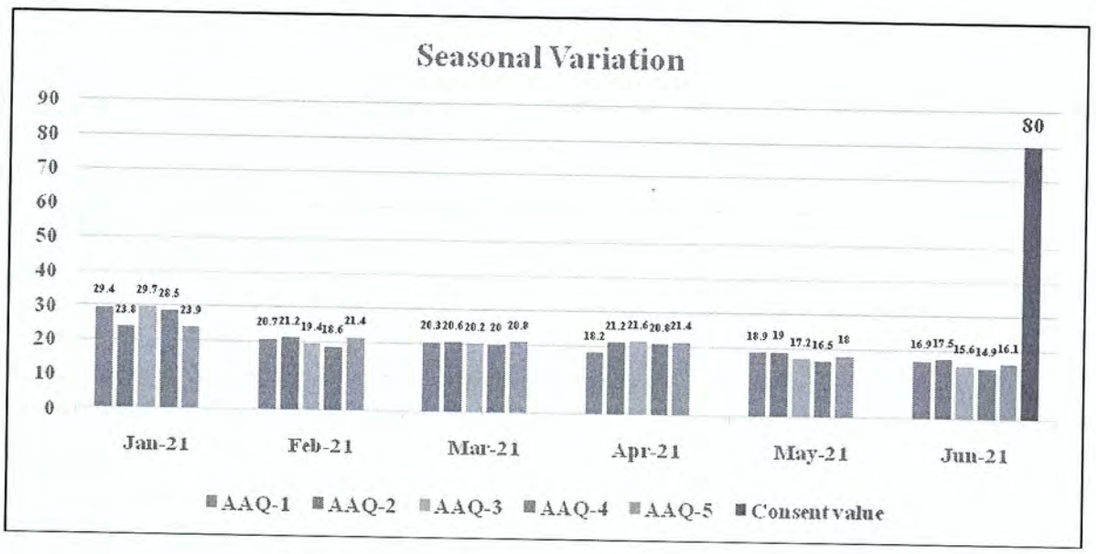
*Values are in µg/m³

Figure 8: Graphical Representation for SO_2



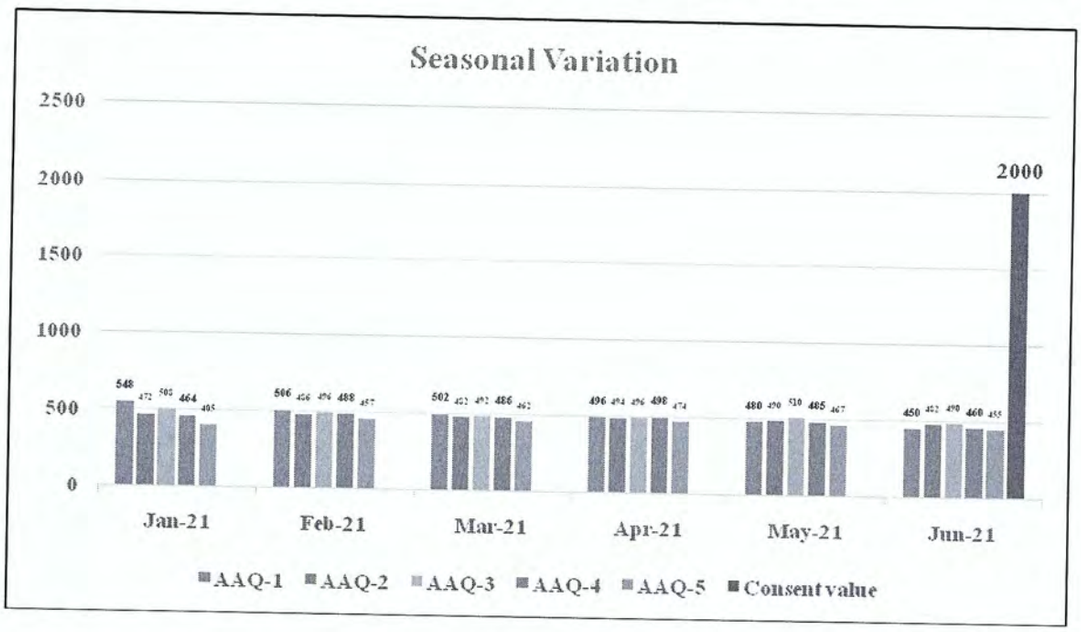
*Values are in µg/m³

Figure 9: Graphical Representation for NOx



*Values are in µg/m³

Figure 10: Graphical Representation for CO



*Values are in µg/m³