Odisha Coal and Power Limited
OCPL
Odisha Coal and Power Limited
(A Government of Odisha Company)
CIN U10100OR2015SGC018623
Website: www.ocpl.org.in

Letter No. OCPL/436
Date: 30/05/2020

To,

The Joint Director(s)
Regional Office, Eastern Region (ERO)
Ministry of Environment, Forest & Climate Change
A-3, Chandrasekharpur, Bhubaneswar-751023

Sub: Submission of Half Yearly Compliance Report of the Environmental Clearance conditions of Manoharpur Open Cast Coal Mine Project (8.00 MTPA) of Odisha Coal & Power Limited located in IB valley, Dist. Sundargarh, Odisha.

Ref: (i) EC letter No. J-11015/139/2008-IA.II (M) dated 21.02.2014
(ii) EC transfer order vide letter no. J-11015/139/2008-IA.II (M)Pt. file dt. 30.12.2015
(iii) Amendment in EC vide letter no. J-11015/139/2008-IA.II (M)Pt. dt. 06.11.2019

Dear Sir,

In reference to the notification issued by MoEF&CC vide letter S.O. 5845 (E) dated 26.11.2018 and Environmental Clearance as referred above in respect of Manoharpur Open Cast Coal Mine (8.00 MTPA) of Odisha Coal & Power Limited located in IB valley, Dist. Sundargarh, Odisha, please find enclosed herewith Half Yearly Compliance Report in soft copy (CD) as well as hard copy for the period of October 2019 to March 2020.

As per MoEF&CC (ERO) letter dated 11.05.2020, the scanned copy of report is being submitted to their good office at the given email address (roez.bsr-mef@nic.in).

This is for your kind information and needful action at your end.

Yours Faithfully

30/5/2020

Authorized Signatory

Copy to:

1. The Scientist ('E' & Regional Directorate), Central Pollution Control Board, South end Conclave, Block 502, 5th & 6th Floors, 1582 Razidanga Main Road, Kolkata-700107.
2. The Member Secretary, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilkanthnagar, Unit VIII, Bhubaneswar 751012

HALF YEARLY COMPLIANCE REPORT

For

Environmental Conditions

October 2019 – March 2020

MANOHARPUR OPENCAST COAL MINE

OCPL Odisha Coal and Power Limited

Odisha Coal & Power Limited,
Zone-A, Ground Floor,
Fortune Tower, Bhubaneswar-751023, Odisha
Web: www.ocpl.org.in

ENVIRONMENTAL CLEARANCE(EC) COMPLIANCE REPORT

PROJECT NAME - MANOHARPUR OPENCAST COAL MINE PROJECT

EC letter No. J-11015/139/2008-IA.II (M) dated 21.02.2014 and

EC Transfer Order - EC-No. J-11015 / 139/2008-IA.II (M) Pt. file Dated 30TH December 2015

Period of Compliance Report – October 2019 to March 2020

Sr. No.	EC Letter Condition	Compliance
A. SPECIFIC CONDITIONS		
i.	The maximum production from the mine at any given time shall not exceed the limit as prescribed in the EC.	The rated maximum production capacity of the mine is 8.00MTPA as per the approved Mining Plan (Rev II). Hence, the limit shall not exceed as prescribed in EC. Mine development work were started w.e.f. 01.11.2018 and coal production started from 10.10.2019. Thereafter, due to evacuation constraints, coal dispatch started w.e.f. 14.12.2019 from mine end to Kanika Railway Siding of MCL. Till March 2020, OCPL has produced1.002 MT of coal in the FY 2019-20.
ii.	Environmental clearance to the proposal is subject to obtaining clearance under the wildlife (Protection) Act, 1972 from the Standing Committee of National Board for Wildlife, as applicable	Not Applicable. The proposed Manoharpur coal mine project does not fall within 10km of National park/sanctuary and as such clearance from National Board of Wildlife is not required for the said project. However, the Site Specific Wildlife Conservation Plan of this project has been approved by Principal Chief Conservator of Forests (PCCF-WL) &Chief Wildlife Warden (CWW), Odisha which is being implemented.
iii.	The OB should be kept in ML area and there should be no OB dumps at the end of mining.	As per the approved Mine Plan & Mine Closure Plan (Revision – II), total 3 nos. of OB dumps will be acquired in non-coal bearing area by OCPL. Major portion of the overburden (86%) will be utilized in back filling and there will be no external dump at the end of mining. Currently, the generated OB from the mining operation is being stored at External OB dump as per approved Mining Plan
iv.	The land for OB dumping should be made ready for original use after mine closure.	Noted

v.	All the sandstone taken out during mining should be utilized for house construction and given free of cost to locals.	Efforts will be made to comply with the conditions.
vi.	Since the mining area is total forest land, the sandstones should not be dumped as OB.	Maximum care will be taken for compliance of the same.
vii.	Fly ash dumping is not permitted` in mine void.	Fly ash will not be dumped. If any situation arises which requires fly ash dumping then proper scientific studies will be done and permissions will be obtained from competent authorities prior to dumping.
viii.	The leachability study may be carried out for chromium, arsenic and mercury that may be present in fly ash.	The required leachability study shall be carried out by concerned authority and the test result of same will be submitted to MOEF & CC for obtaining necessary permission before commencement of fly ash disposal, if required, in Manoharpur Coal Mine Project.
ix.	The CSR amount should be Rs.4 crores in initial 3 years, and thereafter it should be Rs 5/T of coal/annum till the end of the life of project with the escalation factor every year coal production.	This is being complied. CSR activities already carried out in the vicinity of the project area. Total expenditure incurred on CSR activities till March 2020 is Rs. 4.55 Cr. The year wise expenditure carried out on CSR activities is attached as **Annexure 1** for your kind reference.
x.	The CSR activity, which had already been carried out by proponent, be audited by a 3rd Party. The audit should be carried out by a reputed agency.	Noted. The audit has been carried out by reputed agency M/s GEOENVITECH (Research and Consultancy Services Pvt. Ltd.) which is empaneled with Govt. of Odisha.
xi.	The proponent shall come back to the Committee for its washery proposal for further consideration.	Will be complied, if applicable.
xii.	Coal transportation from mine to railway siding by conveyor belt and from siding to TPP by MGR through SILO loading of the wagons	Coal transportation from mine to railway siding will be done by conveyor belt and from siding to TPP by MGR through SILO loading of the wagons. OCPL would like to mention that initially commissioning of MGR system was getting delayed due to land acquisition issue which has been resolved now and the construction work of MGR system is in full swing which is expected to be completed by 31st March

		2021. However, currently OCPL transporting the coal from mine end to Kanika siding through road as an interim arrangement and the same is being utilized under the provisions of Allotment Agreement (Clause – 8). An approval/amendment in the EC letter for transporting the coal by road from mine end to Kanika siding has been obtained from MoEF&CC vide letter no. J-11015/139/2008-IA-II(M) Pt. dated 06th November 2019. The copy of same has already been submitted to your good office vide letter no. *OCPL/16 dated 06.01.2020 (Refer Annexure 2).*
xiii.	The embankment constructed along the river boundary shall be of suitable dimensions and critical patches shall be strengthened by stone pitching on the river front side and stabilized with plantation so as to withstand the peak water flow and prevent mine inundation.	There is no river in and around the project area. One seasonal nalla passes through the coal block which will be diverted outside the coal block. Strong embankment, stone pitching will be provided along the nalla to withstand the peak water flow and prevent mine inundation.
xiv.	There shall be no overflow of OB into the river and into the agricultural fields and massive plantation of native species shall be taken up in the area between the river and the project.	OCPL will make their best efforts by engaging the technical staff for the monitoring of dumping of OB as per the approved Mining Plan (Rev II) so that no overflow of OB will get into the river and into agricultural fields. Plantation of approx. 3064 nos. comprises local species i.e. Mango, Amla, Neem, Jamun etc. has been carried out by protecting the existing trees on the bank of Garia nalla on the space available between OB dump & Garia nalla.
xv.	OB shall be stacked at two earmarked external OB dumpsite(s) only. The ultimate slope of the dump shall not exceed 28°. Monitoring & management of existing reclaimed dumpsites shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its	The overburden from the mine is being stored at their earmarked location and also dump design is in line with approved Mining Plan (Revision II).

	Regional office located at Bhopal on yearly basis.	
xvi.	Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilized for watering the mine area, roads, green belt development, etc. The drains shall be regularly de-silted and maintained properly. Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.	Catch drain around the External OB dump 1 has been provided to arrest the flows from OB dump. One sump of sufficient capacity has been provided within the mine to cater the peak sudden rainfall and discharge/seepage from adjoining areas. The water so collected in sump is being utilized for watering the mine area, roads, green belt development, etc.
xvii.	Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.	Presently, OB dumps are in the active stage. The provision of retaining wall will be complied once the OB dumps reach to its final stage.
xviii.	Crushers at the CHP of adequate capacity for the expansion project shall be operated with high efficiency bag filters, water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, transfer points, etc.	Currently, the construction of CHP is also on full swing. Hence, the compliance will be done when CHP becomes operational.
xix.	Drills shall be wet operated.	is being complied.
xx.	The project authorities shall undertake regular repairing and tarring of roads used for mineral transportation. A 3-tier green belt comprising of a mix of native species shall be developed all along the major approach roads.	Continuous efforts are being made to comply with the conditions.
xxi.	Controlled blasting shall be practiced with use of delay detonators and only during daytime. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.	Due care is being taken during blasting operation in the mine area. Also, the blasting operation is being carried out under the guidance of technical expertise of OCPL as per the applicable guideline/directive of competent authority.
xxii.	A progressive afforestation plan shall be implemented covering an area of 512.584 ha	Areas will be afforested including reclaimed areas etc. and native species of plantation

	at the end of mining, which includes reclaimed external OB dump (193.478 ha), internal dump (257.11 ha), and green belt (61.996 ha) and in township located outside the lease by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha. Massive plantation shall be carried out in open spaces in and around the mine and a 3-tier avenue plantation along the main approach roads to the mine.	will be decided in consultation with DFO/Agriculture department. Technical and Biological reclamation plan as per approved Mine Plan (Rev II) has already been submitted to your good office. Till date, approx. 15.926 hac (1,59,260 sqm) area has been covered as green area under the green area development plan and about 3064 nos. plants of native species has been planted. The plantation has been done by protecting the existing trees on the bank of Garia nalla between the space available of OB dump & Garia nalla (3000 Nos. trees) and near the CHP area (64 Nos. trees). The planation comprises of local / native species i.e. Mango, Neem, Amla, Jamun, Jack Fruit, Ashok etc.
xxiii.	An estimated 61.73 M Cum of OB will be generated during the entire life of the mine. Out of which 29.23 Mm^3 of OB will be dumped in four external OB dump in non-coal bearing area. The maximum height of external OB dump for hard OB will not exceed 30 m each. The maximum slope of the dump shall not exceed 28°. Monitoring and management of reclaimed dump sites shall continue till the vegetation becomes self-sustaining and compliance status shall be submitted to MOEF and its Regional Office on yearly basis.	As per the approved Mine Plan & Mine Closure Plan (Revision – II), total 3 nos. of OB dumps will be acquired in non-coal bearing area by OCPL. Complied Compliance & Status report will be submitted to MoEF &CC and its Regional office on yearly basis along with the six monthly post EC compliance report. Also, kindly refer the point no. xv as mentioned above.
xxiv.	Of the total quarry area of ha, the backfilled quarry area of 489 ha shall be reclaimed with plantation and a void of 162 ha which is proposed to be converted into a water body, shall be gently sloped and the upper benches shall be terraced and stabilized with plantation/afforestation by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha	Back filled area will be reclaimed with plantation. Density of trees will be 2500/ha. Water body (reservoir) will be gently sloped. Plantation with native species will be done with consultation of DFO/Agriculture department.

xxv.	The proponent should prepare restoration and reclamation plan for the degraded area. The land be used in a productive and sustainable manner.	Will be complied as specified in approved Mining Plan (Rev II).
xxvi.	Compensatory Ecological & Restoration of waste land, other degraded land and OB dumps in lieu of breaking open the land be carried out	Will be complied as specified in approved Mining Plan (Rev II). Year wise plan for progressive reclamation and afforestation as per approved Mine Plan has already been submitted to your good office.
xxvii.	The mining should be phased out in sustainable manner. No extra over burden dumps are permitted.	Noted and being complied as per approved Mining Plan (Rev II).
xxviii.	No groundwater shall be used for mining operations	Noted and is being complied.
xxix.	Regular monitoring of groundwater level and quality shall be carried out by establishing a network of existing wells and construction of new piezometers. The monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected shall be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.	Monitoring of groundwater level and quality has been carried out by establishing a network of existing dug wells and construction of new piezometers. The monitoring carried out for quantity and quality till Aug-2018 has already been submitted to your good office. Also, the monthly monitoring of ground water quality for two locations in the core zone (within the proposed mine site) and two locations in the buffer zone is being carried out regularly by MoEF&CC/NABL/OSCPB accredited laboratory M/s Visiontek Consultancy Services Pvt. Ltd. The latest monitoring report for the 1st quarter of 2020 (Jan to March 2020) is attached herewith as **Annexure 2** for your ready reference.
xxx.	The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource in case monitoring indicates a decline in water table. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine	Sump of sufficient capacity has been provided as artificial ground water recharge measures within the mine to recharge the ground water table of the adjoining areas. The Garland drains will also help in retaining the rain water and recharge of ground water table.
xxxi.	Sewage treatment plant shall be installed in the existing colony. ETP shall also be provided for workshop and CHP wastewater.	Sewage Treatment Plant (STP) will be installed to treat the generated domestic waste water at required places i.e. mine

		colony and the STP treated water will be reused in horticulture development within the colony. ETP shall also be installed as specified.
xxxii.	Besides carried out regular periodic health checkup of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health checkup for occupational diseases and hearing impairment, if any, through an specialized agency/institution within the District/State and the results reported to this Ministry and to DGMS	Being complied with as per applicable guidelines of Coal Mine Rules.
xxxiii.	There are 370 PDFs and 385 PAFs. Land oustees shall be compensated as per the norms laid out R&R Policy of CIL or the National R&R Policy or R&R Policy of the State Government whichever is higher	Complied. Details of rehabilitation and resettlement of the project affected population has already been submitted to your good office.
xxxiv.	For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on scale of 1:5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its concerned Regional Office.	Noted and will be complied with.
xxxv.	A detail final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests within 6 months of grant of Environmental Clearance	The approved Mine Plan and Mine Closure Plan (Rev II) has been submitted to MoEF&CC on dated 08.05.2018. Further, the Mining Plan & Mine Closure Plan (Rev-III), has been approved on 26-09-2019 by MoC for 16 MTPA which includes the expansion of Manoharpur Coal Mine towards its Dipside.
xxxvi.	The project authorities shall in consultation with the Panchayats of the local villages and administration identify socio-economic and welfare measures under CSR to be carried out over the balance life of the mine	As mentioned above in Point no. (ix), CSR activities is being carried out in consultation with concerned Panchayat / local administration.
xxxvii.	The proponent should implement the assurances given during the Public Hearing	Assurance given during the Public Hearing is being implemented in the vicinity of project area.

xxxviii.	Corporate Environment Responsibility: a) The Company shall have a well laid down Environment Policy approved by the Board of Directors. b) b) The Environment Policy shall prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions c) c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished d) To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large	a) Environment policy has been approved by Board and it is in place. b) Will be complied with. c) There is an environment management cell comprises of technical qualified persons who is taking care of all environmental compliances of clearances and monitoring. The cell is headed by Head of Company through Head of Mines. d) Organizational Structure for Environmental Management & System of Reporting of Non-compliance - The Environmental Management Cell (EMC) has important role for coordination of the actions required for environmental management, mitigation, and for monitoring the progress of the proposed management plans and actions to be taken. The cell is responsible for monitoring of the implementation of the environment issues.
B. GENERAL CONDITIONS		
i.	No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests	Prior approval will be obtained, if applicable.
ii.	No change in calendar plan of production for quantum of mineral coal shall be made.	Agreed and if there is any change in calendar plan of production of coal, due permission/approval shall be obtained from competent authority complying the MoEF&CC guidelines in this regard.
iii.	Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM10, PM2.5, so2 and NOx monitoring. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally	The monthly environmental monitoring including ambient air quality is being carried out regularly in the core zone (4 locations) as well as in the buffer zone (4locations)by MoEF&CC/NABL/OSCPB accredited laboratory M/s Visiontek Consultancy

	and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, etc carried out at least once in six months.	Services Pvt. Ltd. for PM_{10}, $PM_{2.5}$, SO_x, and NO_x and the copy of same is being submitted regularly to Odisha State Pollution Control Board (OSPCB).Also, the monitoring of heavy metals such as Hg, As, Ni, Cd, Cr etc. has been carried out on six monthly basis. The test results show that parameters are within the permissible limits as prescribed by MoEF&CC and test report in this regard has already been submitted to your good office along with last six monthly post EC compliance report vide letter no. OCPL/16 dated 06.01.2020. The monitoring report showing the results of pollutants (PM_{10}, $PM_{2.5}$, SO_x, and NO_x) for the 1st quarter of 2020 (Jan to March 2020) is attached as **Annexure 3** for ready reference.
iv.	Data on ambient air quality (PM10, PM2.5, SO2 and NOx) and heavy metals such as Hg, As, Ni, Cd, Cr and other monitoring data shall be regularly submitted to the Ministry including its concerned Regional Office and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognized under the EPA rules, 1986 shall be furnished as part of compliance report.	Kindly refer the Point no. iii (General Condition) as mentioned above.
v.	Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs	Complied
vi.	Industrial Wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents	Will be complied with.

vii.	Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded	Complied
viii.	Monitoring of environmental quality parameters shall be carried out through a laboratory recognized under EPA Rules, 1986	The environmental monitoring is being carried out as mentioned above in Point no. iii (General Condition).
ix.	Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.	Agreed and is being complied with.
x.	Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed and records maintained thereof. The quality of environment due to outsourcing and the health and safety issues of the outsourced manpower should be addressed by company while outsourcing.	Noted and will be complied with as per applicable norms of Coal Mine Rules.
xi.	A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company.	An environment management cell comprising of technical qualified personnel has been working in the organization who is directly reporting to the Head of Company through Head of Mines.
xii.	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its concerned Regional Office.	Will be complied as advised.
xiii.	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 been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at the website of the Ministry of Environment & Forests at http://envfor.nic.in	Complied.

xiv.	A copy of the environmental clearance letter shall be marked to concern Panchayat/ZilaParishad, Municipal Corporation or Urban local body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on company's website	Complied.
xv.	A copy of environmental clearance letter shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Sector and Collector's Office/Tehsildar's Office for 30 days	Complied
xvi.	The clearance letter, shall be uploaded on the company's website. The compliance status of the stipulated environmental clearance conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in public domain. The monitoring data of environmental quality parameter (air, water, noise and soil) and critical pollutant such as PM10, PM2.5, SO2 and Nox (ambient) and critical sectoral parameters shall also be displayed at the entrance of project premises and mine office and in corporate office and on company's website	The environmental clearance letter along with compliance status of stipulated conditions has been uploaded on company website.
xvii.	The project proponent shall submit six monthly compliance reports on status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the Ministry, respective Zonal Offices of CPCB and the SPCB.	Being Complied in confirmation to notification issued by MOEF&CC vide letter no. S.O. 5845 (E) dated 26.11.2018.
xviii.	The Regional Office of this Ministry located in the Region shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of	Project authorities will extend full cooperation to the Ministry Regional Office.

	the Regional Office by furnishing the requisite data/information/monitoring reports.	
xix.	The environmental statement for each financial year ending 31 March in Form V is mandated to be submitted by the project proponent for the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MoEF by e-mail.	Being Complied.

ENVIRONMENTAL CLEARANCE(EC) COMPLIANCE REPORT

MANOHARPUR OPENCAST COAL MINE PROJECT

(Amendment vide letter No. EC-No. J-11015 / 139/2008-IA.II (M) Pt. file Dated 06TH November 2019)

Sr. No.	EC Letter Condition	Compliance
C. CONDITIONS		
i.	High rated tippers i.e. 25 to 30 tonne capacity coal carrying tippers for same quantity shall be used to reduce number of trips.	complied.
ii.	Accordingly, 9200 TPD of coal from Manoharpur Coal Mine to Kanika siding / ACB siding / any other Indian railway siding in the near vicinity of mine (23 km) by road and from there to Ib TPP of OPGC by Indian rail.	Coal is being transported from mine end to Kanika siding of MCL by road as an interim arrangement and the same is being utilized under the provisions of Allotment Agreement (Clause – 8). The quantity of daily dispatch is well within the approved limit.
iii.	Further, 3000 TPD of coal from Manoharpur Coal Mine to Ib TPP directly by road (i.e. 117 km road) only if Route 1 is not available. The stretch of 1.2 km having width of ~ 5.5 mts (single lane) shall be widened to 7mts width and made double lane before commencement of transportation.	No coal is presently being transported by OCPL through this Route.
iv.	All necessary environment mitigation such as tree plantation, mechanized road sweeping should be taken to prevent increase in air pollution level in villages/settlements lying within 100 m (23 km till Kanika Railway siding) along the Route 1 and villages/settlements (117 km road) lying along the Route 2.	Necessary mitigation measures i.e. water sprinkling, tree planation, proper covering of coal carrying tippers etc. are being carried out at site to prevent increase in air pollution level in nearby villages.
v.	The state pollution control board, while considering consent to operate for project, shall ensure that with the proposed coal transportation by road, air quality would remain within the national ambient air quality standards.	Noted & agreed. An intimation letter has already been submitted to Odisha State Pollution Control Board (OSPCB) regarding the obtaining of EC from MoEF&CC for transportation of coal from Manoharpur coal mine to Kanika siding of MCL through road.
vi.	Implementation of MGR shall be expedited.	Construction work of MGR is on full swing.

vii.	All the recommendations given in study on Traffic Impact Assessment Report shall be complied.	Is being complied.

Manoharpur Coal Mine Project, Tehsil Hemgir, Dist. Sundergarh, Odisha

ANNEXURE 1

Year wise Expenditure Detail on CSR

Sl.No	Sectors	OPGC	OCPL					Total Expenditure on CSR
		2008-2015	2015-2016	2016-2017	2017-2018	2018-19	2019-20 (Till March 2020)	
1	Health	16922646	95000	225900	414000	412309	243562	
2	Education		1290000	1244300	1326500	912000	300000	
3	Skill Development			2151263	1854000	1925170	2143354	
4	Socio-Culture		168000	100560	305000	565000	150000	
5	Sports		226000		117800	140000	95000	
6	Rural Infrastructure			3114404	3791751	2340609	1969011	
7	Livelihood		0	0	0		0	
8	Water Sanitation		0	0	330000	440000	169000	
9	Public Relation		0	0	0	64000	0	
	Total	**1,69,22,646**	**17,79,000**	**68,36,427**	**81,39,051**	**67,99,088**	**50,69,927**	**4,55,46,139**

Note: Rs. 16922646 expenditure submitted by OPGC to OCPL

Ref: Enviab/19/R-7656 *Date:* 03.02.2020

GROUND WATER QUALITY REPORT JANUARY-2020
(CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water -1 (Borehole at Vocational Training Centre)**
4. Date of Sampling : 04.01.2020
5. Date of Receiving : 06.01.2020
6. Date of Analysis : 06.01.2020 to 14.01.2020
7. Sample Collected By : VCSPL Representative in presence of OCPL representative

Sl. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
1.	pH	—	APHA 4500H⁺B	6.5-8.5	7.25
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	—	APHA 2150 B	Agreeable	Agreeable
4.	Taste	—	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	262
8.	Electrical Conductivity	µS/cm	APHA 2510 B	—	432.4
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	84.0
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	118.0
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	26.2
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	12.8
13.	Chloride as Cl	mg/l	APHA 4500Cl⁻ B	250	35.5
14.	Fluoride as F	mg/l	APHA 4500 F⁻ C	1.0	0.37
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	21.5
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3E	45	2.16
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as Cr^{+6}	mg/l	APHA 3111 B	—	BDL
20.	Phenolic Compounds as C_6H_6OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN⁻ C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	—	7.2
23.	Potassium as K	mg/l	APHA 3500K B	—	2.1
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.21
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	BDL
27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL
29.	Selenium as Se	mg/l	APHA 3114 B	0.01	BDL

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30.	Arsenic as As	mg/l	APHA 3114 B	0.01	BDL
31	Lead as Pb	mg/l	APHA 3111 B,C	0.01	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	1.46
33.	Nickel as Ni	mg/l	APHA 3500 Ni	0.02	BDL
34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	0.05	BDL
35.	Boron as B	mg/l	APHA 4500 B C	0.5	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	0.1	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	0.7	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	0.2	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	1.0	ND
40.	Mineral Oil	mg/l	APHA 5220 B	0.5	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	Shall not be detectable in any 100 ml	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	Shall not be detectable in any 100 ml	Absent
43.	Feacal Coliform	MPN/100ml	APHA 9221 F	—	<1.8
44.	Pesticides	mg/l	APHA 6630 C	—	Absent

BDL Value: Cu < 0.02mg/l, Al < 1.0mg/l, B < 0.1mg/l, Ba < 0.5mg/l, Mn < 0.05mg/l, Hg< 0.002 mg/l, Cd < 0.01 mg/l, Se <.0.001 mg/l, As < 0.004 mg/l, Pb < 0.01mg/l, Ni< 0.05 mg/l, Cr < 0.05mg/l, Cr^{+6} < 0.01mg/l, Phenol < 0.05mg/l, CN < 0.01mg/l, Ba< 0.1mg/l

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Ref: Envlab/19/R-7657 *Date:* 03.02.2020

GROUND WATER QUALITY REPORT JANUARY-2020
(CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water-2 (Borehole behind BGR Camp Site)**
4. Date of Sampling : 03.01.2020
5. Date of Receiving : 04.01.2020
6. Date of Analysis : 04.01.2020 to 13.01.2020
7. Sample Collected By :VCSPL Representative in presence of OCPL representative

SL. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
1.	pH	---	APHA 4500H⁺B	6.5-8.5	7.38
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	---	APHA 2150 B	Agreeable	Agreeable
4.	Taste	---	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl⁻ B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	228
8.	Electrical Conductivity	µS/cm	APHA 2510 B	---	385.2
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	78.0
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	94.0
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	24.0
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	8.3
13.	Chloride as Cl	mg/l	APHA 4500Cl⁻ B	250	32.0
14.	Fluoride as F	mg/l	APHA 4500 F⁻ C	1.0	0.29
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	19.3
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3 E	45	2.04
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as Cr^{+6}	mg/l	APHA 3111 B	--	BDL
20.	Phenolic Compounds as C_6H_6OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN⁻ C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	---	6.9
23.	Potassium as K	mg/l	APHA 3500K B	---	2.3
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.18
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	BDL
27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL
29.	Selenium as Se	mg/l	APHA 3114 B	0.01	BDL
30.	Arsenic as As	mg/l	APHA 3114 B	0.01	BDL

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31.	Lead as Pb	mg/l	APHA 3111 B,C	0.01	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	1.33
33.	Nickel as Ni	mg/l	APHA 3500 Ni	0.02	BDL
34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	0.05	BDL
35.	Boron as B	mg/l	APHA 4500 B C	0.5	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	0.1	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	0.7	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	0.2	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	1.0	ND
40.	Mineral Oil	mg/l	APHA 5220 B	0.5	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	Shall not be detectable in any 100 ml	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	Shall not be detectable in any 100 ml	Absent
43.	Feacal Coliform	MPN/100ml	APHA 9221 F	- —	<1.8
44.	Pesticides	mg/l	APHA 6630 C	—	Absent

BDL Value: Cu < 0.02mg/l, Al < 1.0mg/l, B < 0.1mg/l, Ba < 0.5mg/l, Mn < 0.05mg/l, Hg< 0.002 mg/l, Cd < 0.01 mg/l, Se < 0.001 mg/l, As < 0.004 mg/l, Pb < 0.01mg/l, Ni< 0.05 mg/l, Cr < 0.05mg/l, Cr^{6+} < 0.01mg/l, Phenol < 0.05mg/l, CN < 0.01mg/l, Ba< 0.1mg/l

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Ref: Envlab/19/R-8186 *Date:* 03.03.2020

GROUND WATER QUALITY REPORT FEBRUARY-2020

(CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water -1 (Borehole at Vocational Training Centre)**
4. Date of Sampling : 07.02.2020
5. Date of Receiving : 08.02.2020
6. Date of Analysis : 08.02.2020 to 15.02.2020
7. Sample Collected By : VCSPL Representative in presence of OCPL representative

SL. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
1.	pH	---	APHA 4500H⁺B	6.5-8.5	7.03
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	---	APHA 2150 B	Agreeable	Agreeable
4.	Taste	---	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	249
8.	Electrical Conductivity	µS/cm	APHA 2510 B	---	398.6
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	76.0
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	106.0
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	28.0
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	8.8
13.	Chloride as Cl	mg/l	APHA 4500Cl⁻ B	250	31.5
14.	Fluoride as F	mg/l	APHA 4500 F⁻ C	1.0	0.33
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	19.7
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3 E	45	1.88
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3 F	0.5	BDL
19.	Hexavalent Chromium as Cr^{+6}	mg/l	APHA 3111 B	---	BDL
20.	Phenolic Compounds as C_6H_6OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN⁻ C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	---	6.7
23.	Potassium as K	mg/l	APHA 3500K B	---	2.4
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.24
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	BDL
27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL
29.	Selenium as Se	mg/l	APHA 3114 B	0.01	BDL

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30.	Arsenic as As	mg/l	APHA 3114 B	0.01	BDL
31	Lead as Pb	mg/l	APHA 3111 B,C	0.01	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	1.25
33.	Nickel as Ni	mg/l	APHA 3500 Ni	0.02	BDL
34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	0.05	BDL
35.	Boron as B	mg/l	APHA 4500 B C	0.5	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	0.1	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	0.7	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	0.2	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	1.0	ND
40.	Mineral Oil	mg/l	APHA 5220 B	0.5	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	Shall not be detectable in any 100 ml	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	Shall not be detectable in any 100 ml	Absent
43.	Feacal Coliform	MPN/100ml	APHA 9221 F	---	<1.8
44.	Pesticides	mg/l	APHA 6630 C	---	Absent

BDL Value: Cu <0.02mg/l, Al <1.0mg/l, B <0.1mg/l, Ba <0.5mg/l, Mn <0.05mg/l, Hg< 0.002 mg/l, Cd <0.01 mg/l, Se <0.001 mg/l, As <0.004 mg/l, Pb <0.01mg/l, Ni<0.05 mg/l, Cr <0.05mg/l, Cr^6 <0.01mg/l, Phenol <0.05mg/l, CN <0.01mg/l, Ba<0.1mg/l

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Ref: Envlab/19/R-8187 *Date:* 03.03.2020

GROUND WATER QUALITY REPORT FEBRUARY-2020

(CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water-2 (Borehole behind BGR Camp Site)**
4. Date of Sampling : 06.02.2020
5. Date of Receiving : 07.02.2020
6. Date of Analysis : 07.02.2020 to 15.02.2020
7. Sample Collected By :VCSPL Representative in presence of OCPL representative

Sl. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
1.	pH	---	APHA 4500H⁺B	6.5-8.5	7.16
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	---	APHA 2150 B	Agreeable	Agreeable
4.	Taste	---	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl⁻ B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	213
8.	Electrical Conductivity	µS/cm	APHA 2510 B	---	357.4
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	72.0
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	90.0
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	25.4
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	6.5
13.	Chloride as Cl	mg/l	APHA 4500Cl⁻ B	250	29.5
14.	Fluoride as F	mg/l	APHA 4500 F⁻ C	1.0	0.28
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	18.6
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3^-E	45	1.83
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as Cr^{6+}	mg/l	APHA 3111 B	--	BDL
20.	Phenolic Compounds as C_6H_5OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN^- C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	---	6.3
23.	Potassium as K	mg/l	APHA 3500K B	---	2.5
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.19
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	BDL
27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL
29.	Selenium as Se	mg/l	APHA 3114 B	0.01	BDL
30.	Arsenic as As	mg/l	APHA 3114 B	0.01	BDL

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31.	Lead as Pb	mg/l	APHA 3111 B,C	0.01	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	1.16
33.	Nickel as Ni	mg/l	APHA 3500 Ni	0.02	BDL
34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	0.05	BDL
35.	Boron as B	mg/l	APHA 4500 B C	0.5	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	0.1	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	0.7	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	0.2	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	1.0	ND
40.	Mineral Oil	mg/l	APHA 5220 B	0.5	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	Shall not be detectable in any 100 ml	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	Shall not be detectable in any 100 ml	Absent
43.	Feacal Coliform	MPN/100ml	APHA 9221 F	---	<1.8
44.	Pesticides	mg/l	APHA 6630 C	---	Absent

BDL Value: Cu <0.02mg/l, Al <1.0mg/l, B <0.1mg/l, Ba <0.5mg/l, Mn <0.05mg/l, Hg< 0.002 mg/l, Cd <0.01 mg/l, Se <0.001 mg/l, As <0.004 mg/l, Pb <0.01mg/l, Ni<0.05 mg/l, Cr <0.05mg/l, Cr^{+6} <0.01mg/l, Phenol <0.05mg/l, CN <0.01mg/l, Ba<0.1mg/l

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(An Enviro Engineering Consulting Cell)

ISO 9001 : 2008
ISO 14001 : 2015
OHSAS 45001 : 2018

Ref: **Envlab/19/R-9384** *Date: 03.04.2020*

GROUND WATER QUALITY REPORT MARCH-2020

(CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water -1 (Borehole at Vocational Training Centre)**
4. Date of Sampling : 03.03.2020
5. Date of Receiving : 04.03.2020
6. Date of Analysis : 04.03.2020 to 11.03.2020
7. Sample Collected By :VCSPL Representative in presence of OCPL representative

SL. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
1.	pH	---	APHA 4500H^+B	6.5-8.5	7.17
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	---	APHA 2150 B	Agreeable	Agreeable
4.	Taste	---	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl^- B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	240
8.	Electrical Conductivity	µS/cm	APHA 2510 B	---	372.5
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	72.0
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	98.0
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	27.6
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	7.1
13.	Chloride as Cl	mg/l	APHA 4500Cl^- B	250	30.0
14.	Fluoride as F	mg/l	APHA 4500 F^- C	1.0	0.35
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	18.8
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3^-E	45	1.75
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as Cr^{+6}	mg/l	APHA 3111 B	–	BDL
20.	Phenolic Compounds as C_6H_6OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN^- C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	—	6.4
23.	Potassium as K	mg/l	APHA 3500K B	—	2.1
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.26
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	BDL
27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL
29.	Selenium as Se	mg/l	APHA 3114 B	0.01	BDL
30.	Arsenic as As	mg/l	APHA 3114 B	0.01	BDL
31	Lead as Pb	mg/l	APHA 3111 B,C	0.01	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	1.19

33.	Nickel as Ni	mg/l	APHA 3500 Ni	**0.02**	BDL
34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	**0.05**	BDL
35.	Boron as B	mg/l	APHA 4500 B C	**0.5**	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	**0.1**	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	**0.7**	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	**0.2**	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	**1.0**	ND
40.	Mineral Oil	mg/l	APHA 5220 B	**0.5**	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	**Shall not be detectable in any 100 ml**	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	**Shall not be detectable in any 100 ml**	Absent
43.	Feacal Colfform	MPN/100ml	APHA 9221 F	**---**	<1.8
44.	Pesticides	mg/l	APHA 6630 C	**---**	Absent

BDL Value: *Cu <0.02mg/l, Al <1.0mg/l, B <0.1mg/l, Ba <0.5mg/l, Mn <0.05mg/l, Hg<0.002 mg/l, Cd <0.01 mg/l, Se <0.001 mg/l, As <0.004 mg/l, Pb <0.01mg/l, Ni<0.05 mg/l, Cr <0.05mg/l, Cr^{+6} <0.01mg/l, Phenol <0.05mg/l, CN <0.01mg/l, Ba<0.1mg/l*

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(An Enviro Engineering Consulting Cell)

ISO 9001 : 2008
ISO 14001 : 2015
OHSAS 45001 : 2018

Ref: **Envlab/19/R-9385** *Date: 03.04.2020*

GROUND WATER QUALITY REPORT MARCH-2020

(CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water-2 (Borehole behind BGR Camp Site)**
4. Date of Sampling : 03.03.2020
5. Date of Receiving : 04.03.2020
6. Date of Analysis : 04.03.2020 to 11.03.2020
7. Sample Collected By :VCSPL Representative in presence of OCPL representative

SL. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
1.	pH	---	APHA 4500H^+B	6.5-8.5	7.31
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	---	APHA 2150 B	Agreeable	Agreeable
4.	Taste	---	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl^- B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	204
8.	Electrical Conductivity	µS/cm	APHA 2510 B	---	349.2
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	68.0
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	82.0
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	23.4
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	5.7
13.	Chloride as Cl	mg/l	APHA 4500Cl^- B	250	27.5
14.	Fluoride as F	mg/l	APHA 4500 F^- C	1.0	0.29
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	17.3
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3^-E	45	1.69
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as $Cr+^6$	mg/l	APHA 3111 B	–	BDL
20.	Phenolic Compounds as C_6H_6OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN^- C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	---	5.9
23.	Potassium as K	mg/l	APHA 3500K B	---	2.3
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.21
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	BDL
27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL
29.	Selenium as Se	mg/l	APHA 3114 B	0.01	BDL
30.	Arsenic as As	mg/l	APHA 3114 B	0.01	BDL
31.	Lead as Pb	mg/l	APHA 3111 B,C	0.01	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	1.13
33.	Nickel as Ni	mg/l	APHA 3500 Ni	0.02	BDL

34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	**0.05**	BDL
35.	Boron as B	mg/l	APHA 4500 B C	**0.5**	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	**0.1**	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	**0.7**	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	**0.2**	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	**1.0**	ND
40.	Mineral Oil	mg/l	APHA 5220 B	**0.5**	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	**Shall not be detectable in any 100 ml**	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	**Shall not be detectable in any 100 ml**	Absent
43.	Feacal Coliform	MPN/100ml	APHA 9221 F	---	<1.8
44.	Pesticides	mg/l	APHA 6630 C	---	Absent

BDL Value: *Cu <0.02mg/l, Al <1.0mg/l, B <0.1mg/l, Ba <0.5mg/l, Mn <0.05mg/l, Hg<0.002 mg/l, Cd <0.01 mg/l, Se <0.001 mg/l, As <0.004 mg/l, Pb <0.01mg/l, Ni<0.05 mg/l, Cr <0.05mg/l, Cr^{+6} <0.01mg/l, Phenol <0.05mg/l, CN <0.01mg/l, Ba<0.1mg/l*

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Ref: Envlab/19/R-7660 *Date:* 03.02.2020

GROUND WATER QUALITY REPORT JANUARY-2020
(BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water-1: Near Paramanandpur Village**
4. Date of Sampling : 11.01.2020
5. Date of Receiving : 13.01.2020
6. Date of Analysis : 13.01.2020 to 21.01.2020
7. Sample Collected By : VCSPL Representative in presence of OCPL representative

SL. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
					GW-1
1.	pH	---	APHA 4500H⁺B	6.5-8.5	7.3
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	---	APHA 2150 B	Agreeable	Agreeable
4.	Taste	---	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl⁻ B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	206
8.	Electrical Conductivity	µS/cm	APHA 2510 B	---	367.8
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	78
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	110
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	30.4
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	8.3
13.	Chloride as Cl	mg/l	APHA 4500Cl⁻ B	250	33.0
14.	Fluoride as F	mg/l	APHA 4500 F⁻ C	1.0	0.31
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	19.4
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3^-E	45	1.95
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as Cr^{+6}	mg/l	APHA 3111 B	--	BDL
20.	Phenolic Compounds as C_6H_6OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN^- C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	---	10.4
23.	Potassium as K	mg/l	APHA 3500K B	---	3.1
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.27
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	BDL

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27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL
29.	Selenium as Se	mg/l	APHA 3114 B	0.01	BDL
30.	Arsenic as As	mg/l	APHA 3114 B	0.01	BDL
31.	Lead as Pb	mg/l	APHA 3111 B,C	0.01	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	1.42
33.	Nickel as Ni	mg/l	APHA 3500 Ni	0.02	BDL
34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	0.05	BDL
35.	Boron as B	mg/l	APHA 4500 B C	0.5	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	0.1	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	0.7	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	0.2	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	1.0	ND
40.	Mineral Oil	mg/l	APHA 5220 B	0.5	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	Shall not be detectable in any 100 ml	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	Shall not be detectable in any 100 ml	Absent
43.	Feacal Coliform	MPN/100ml	APHA 9221 F	—	<1.8
44.	Pesticides	mg/l	APHA 6630 C	—	Absent

BDL Value: Cu < 0.02mg/l, Al < 1.0mg/l, B < 0.1mg/l, Ba < 0.5mg/l, Mn < 0.05mg/l, Hg< 0.002 mg/l, Cd <0.01 mg/l, Se < 0.001 mg/l, As < 0.004 mg/l, Pb < 0.01mg/l, Ni< 0.05 mg/l, Cr < 0.05mg/l, Cr^{+6} <0.01mg/l, Phenol < 0.05mg/l, CN < 0.01mg/l, Ba< 0.1mg/l

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Ref: Envlab/19/R-7661 *Date:* 03.02.2020

GROUND WATER QUALITY REPORT JANUARY-2020
(BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water-2: Near Dulanga Village**
4. Date of Sampling : 11.01.2020
5. Date of Receiving : 13.01.2020
6. Date of Analysis : 13.01.2020 to 21.01.2020
7. Sample Collected By : VCSPL Representative in presence of OCPL representative

Sl. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
					GW-2
1.	pH	---	APHA 4500H⁺B	6.5-8.5	7.43
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	---	APHA 2150 B	Agreeable	Agreeable
4.	Taste	---	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	185
8.	Electrical Conductivity	µS/cm	APHA 2510 B	---	343.2
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	72
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	94
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	22.6
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	9.1
13.	Chloride as Cl	mg/l	APHA 4500Cl B	250	29.5
14.	Fluoride as F	mg/l	APHA 4500 F⁻ C	1.0	0.26
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	17.8
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3^-E	45	2.13
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as Cr^{+6}	mg/l	APHA 3111 B	—	BDL
20.	Phenolic Compounds as C_6H_5OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN⁻ C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	---	8.3
23.	Potassium as K	mg/l	APHA 3500K B	—	2.5
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.31
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	0.082

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27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL
29.	Selenium as Se	mg/l	APHA 3114 B	0.01	BDL
30.	Arsenic as As	mg/l	APHA 3114 B	0.01	BDL
31.	Lead as Pb	mg/l	APHA 3111 B,C	0.01	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	1.78
33.	Nickel as Ni	mg/l	APHA 3500 Ni	0.02	BDL
34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	0.05	BDL
35.	Boron as B	mg/l	APHA 4500 B C	0.5	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	0.1	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	0.7	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	0.2	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	1.0	ND
40.	Mineral Oil	mg/l	APHA 5220 B	0.5	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	Shall not be detectable in any 100 ml	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	Shall not be detectable in any 100 ml	Absent
43.	Feacal Coliform	MPN/100ml	APHA 9221 F	—	<1.8
44.	Pesticides	mg/l	APHA 6630 C	—	Absent

BDL Value: Cu < 0.02mg l, Al < 1.0mg l, B < 0.1mg l, Ba < 0.5mg l, Mn < 0.05mg l, Hg< 0.002 mg l, Cd < 0.01 mg l, Se < 0.001 mg l, As < 0.004 mg l, Pb < 0.01mg l, Ni< 0.05 mg l, Cr < 0.05mg l, Cr^{+6} < 0.01mg l, Phenol < 0.05mg l, CN < 0.01mg l, Ba< 0.1mg l

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Ref: Envlab/19/R-8190

Date: 03.03.2020

GROUND WATER QUALITY REPORT FEBRUARY-2020
(BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water-1: Near Paramanandpur Village**
4. Date of Sampling : 12.02.2020
5. Date of Receiving : 13.02.2020
6. Date of Analysis : 13.02.2020 to 21.02.2020
7. Sample Collected By : VCSPL Representative in presence of OCPL representative

Sl. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
					GW-1
1.	pH	---	APHA 4500H⁺B	6.5-8.5	7.12
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	---	APHA 2150 B	Agreeable	Agreeable
4.	Taste	---	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	187
8.	Electrical Conductivity	µS/cm	APHA 2510 B	---	352.4
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	70
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	96
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	28.4
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	6.1
13.	Chloride as Cl	mg/l	APHA 4500Cl⁻ B	250	28.5
14.	Fluoride as F	mg/l	APHA 4500 F⁻ C	1.0	0.29
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	18.7
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3^- E	45	1.83
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as Cr^{6+}	mg/l	APHA 3111 B	--	BDL
20.	Phenolic Compounds as C_6H_5OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN^- C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	---	9.8
23.	Potassium as K	mg/l	APHA 3500K B	---	3.4
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.22
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	BDL

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27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL
29.	Selenium as Se	mg/l	APHA 3114 B	0.01	BDL
30.	Arsenic as As	mg/l	APHA 3114 B	0.01	BDL
31.	Lead as Pb	mg/l	APHA 3111 B,C	0.01	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	1.34
33.	Nickel as Ni	mg/l	APHA 3500 Ni	0.02	BDL
34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	0.05	BDL
35.	Boron as B	mg/l	APHA 4500 B C	0.5	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	0.1	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	0.7	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	0.2	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	1.0	ND
40.	Mineral Oil	mg/l	APHA 5220 B	0.5	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	Shall not be detectable in any 100 ml	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	Shall not be detectable in any 100 ml	Absent
43.	Feacal Coliform	MPN/100ml	APHA 9221 F	---	<1.8
44.	Pesticides	mg/l	APHA 6630 C	---	Absent

BDL Value: Cu < 0.02mg/l, Al < 1.0mg/l, B < 0.1mg/l, Ba <0.5mg/l, Mn <0.05mg/l, Hg<0.002 mg/l, Cd < 0.01 mg/l, Se < 0.001 mg/l, As <0.004 mg/l, Pb < 0.01mg/l, Ni< 0.05 mg/l, Cr < 0.05mg/l, Cr^{+6} <0.01mg/l, Phenol < 0.05mg/l, CN < 0.01mg/l, Ba<0.1mg/l

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Ref: **Envlab/19/R-8191** *Date:* **03.03.2020**

GROUND WATER QUALITY REPORT FEBRUARY-2020
(BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water-2: Near Dulanga Village**
4. Date of Sampling : 12.02.2020
5. Date of Receiving : 13.02.2020
6. Date of Analysis : 13.02.2020 to 21.02.2020
7. Sample Collected By : VCSPL Representative in presence of OCPL representative

Sl. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
					GW-2
1.	pH	—	APHA 4500H⁺B	6.5-8.5	7.38
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	—	APHA 2150 B	Agreeable	Agreeable
4.	Taste	—	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl⁻ B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	169
8.	Electrical Conductivity	µS/cm	APHA 2510 B	—	331.6
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	64
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	82
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	23.6
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	5.6
13.	Chloride as Cl	mg/l	APHA 4500Cl⁻ B	250	26.0
14.	Fluoride as F	mg/l	APHA 4500 F⁻ C	1.0	0.24
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	17.3
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3^-E	45	1.95
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as Cr^{+6}	mg/l	APHA 3111 B	—	BDL
20.	Phenolic Compounds as C_6H_5OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN^- C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	—	8.1
23.	Potassium as K	mg/l	APHA 3500K B	—	2.6
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.29
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	0.074

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27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL
29.	Selenium as Se	mg/l	APHA 3114 B	0.01	BDL
30.	Arsenic as As	mg/l	APHA 3114 B	0.01	BDL
31.	Lead as Pb	mg/l	APHA 3111 B,C	0.01	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	1.65
33.	Nickel as Ni	mg/l	APHA 3500 Ni	0.02	BDL
34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	0.05	BDL
35.	Boron as B	mg/l	APHA 4500 B C	0.5	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	0.1	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	0.7	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	0.2	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	1.0	ND
40.	Mineral Oil	mg/l	APHA 5220 B	0.5	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	Shall not be detectable in any 100 ml	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	Shall not be detectable in any 100 ml	Absent
43.	Feacal Coliform	MPN/100ml	APHA 9221 F	---	<1.8
44.	Pesticides	mg/l	APHA 6630 C	---	Absent

BDL Value: Cu <0.02mg/l, Al <1.0mg/l, B <0.1mg/l, Ba < 0.5mg/l, Mn <0.05mg/l, Hg<0.002 mg/l, Cd <0.01 mg/l, Se <0.001 mg/l, As < 0.004 mg/l, Pb < 0.01mg/l, Ni<0.05 mg/l, Cr < 0.05mg/l, Cr^{+6} <0.01mg/l, Phenol < 0.05mg/l, CN < 0.01mg/l, Ba<0.1mg/l

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ISO 9001 : 2008
ISO 14001: 2015
OHSAS 45001: 2018

Ref: **Envlab/19/R-9387** *Date: 03.04.2020*

GROUND WATER QUALITY REPORT MARCH-2020
(BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water-1: Near Paramanandpur Village**
4. Date of Sampling : 04.03.2020
5. Date of Receiving : 05.03.2020
6. Date of Analysis : 05.03.2020 to 13.03.2020
7. Sample Collected By : VCSPL Representative in presence of OCPL representative

SL. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
					GW-1
1.	pH	—	APHA 4500H^+B	6.5-8.5	7.25
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	---	APHA 2150 B	Agreeable	Agreeable
4.	Taste	---	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl^- B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	194
8.	Electrical Conductivity	µS/cm	APHA 2510 B	---	367.6
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	66
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	102
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	29.6
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	6.8
13.	Chloride as Cl	mg/l	APHA 4500Cl^- B	250	29.0
14.	Fluoride as F	mg/l	APHA 4500 F^- C	1.0	0.31
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	18.2
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3^-E	45	1.74
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as Cr^{+6}	mg/l	APHA 3111 B	--	BDL
20.	Phenolic Compounds as C_6H_6OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN^- C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	---	9.3
23.	Potassium as K	mg/l	APHA 3500K B	---	3.1
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.25
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	BDL
27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL

29.	Selenium as Se	mg/l	APHA 3114 B	**0.01**	BDL
30.	Arsenic as As	mg/l	APHA 3114 B	**0.01**	BDL
31.	Lead as Pb	mg/l	APHA 3111 B,C	**0.01**	BDL
32.	Zinc as Zn	mg/l	APHA 3111 B,C	**5.0**	1.27
33.	Nickel as Ni	mg/l	APHA 3500 Ni	**0.02**	BDL
34.	Total Chromium as Cr	mg/l	APHA 3500 Cr B	**0.05**	BDL
35.	Boron as B	mg/l	APHA 4500 B C	**0.5**	BDL
36.	Silver as Ag	mg/l	APHA 3500 Ag	**0.1**	BDL
37.	Barium as Ba	mg/l	APHA 3500 Ba	**0.7**	BDL
38.	Aluminium as Al	mg/l	APHA 3500 Al B	**0.2**	BDL
39.	Anionic detergent as MBAS	mg/l	APHA 5540 C	**1.0**	ND
40.	Mineral Oil	mg/l	APHA 5220 B	**0.5**	ND
41.	Total Coliform	MPN/100ml	APHA 9221 B	**Shall not be detectable in any 100 ml**	<1.8
42.	E Coli	MPN/100ml	APHA 9221 E	**Shall not be detectable in any 100 ml**	Absent
43.	Feacal Coliform	MPN/100ml	APHA 9221 F	---	<1.8
44.	Pesticides	mg/l	APHA 6630 C	---	Absent

BDL Value: *Cu <0.02mg/l, Al <1.0mg/l, B <0.1mg/l, Ba <0.5mg/l, Mn <0.05mg/l, Hg<0.002 mg/l, Cd <0.01 mg/l, Se <0.001 mg/l, As <0.004 mg/l, Pb <0.01mg/l, Ni<0.05 mg/l, Cr <0.05mg/l, Cr^{+6} <0.01mg/l, Phenol <0.05mg/l, CN <0.01mg/l, Ba<0.1mg/l*

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Ref: **Envlab/19/R-9388** *Date: 03.04.2020*

GROUND WATER QUALITY REPORT MARCH-2020
(BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Name of the Location : **Ground Water-2: Near Dulanga Village**
4. Date of Sampling : 06.03.2020
5. Date of Receiving : 07.03.2020
6. Date of Analysis : 07.03.2020 to 14.03.2020
7. Sample Collected By : VCSPL Representative in presence of OCPL representative

SL. No.	Name of the Parameters	Unit	Testing Method	Standard as per IS 10500:2012, Amnd. 2015 & 2018	Analysis Result
					GW-2
1.	pH	---	APHA 4500H^+B	6.5-8.5	7.43
2.	Color	Hazen	APHA 2120 B,C	5.0	<5
3.	Odor	---	APHA 2150 B	Agreeable	Agreeable
4.	Taste	---	APHA 2160 C	Agreeable	Agreeable
5.	Turbidity	NTU	APHA 2130 B	1.0	<1.0
6.	Residual Free Chlorine	mg/l	APHA 4500 Cl^- B	0.2	ND
7.	Total Dissolved Solids	mg/l	APHA 2540 C	500.0	174
8.	Electrical Conductivity	µS/cm	APHA 2510 B	—	343.8
9.	Total Alkalinity as $CaCO_3$	mg/l	APHA 2320 B	200	58
10.	Total Hardness as $CaCO_3$	mg/l	APHA 2340 C	200	86
11.	Calcium as Ca	mg/l	APHA 3500 Ca B	75	24.4
12.	Magnesium as Mg	mg/l	APHA 3500Mg B	30	6.1
13.	Chloride as Cl	mg/l	APHA 4500Cl^- B	250	24.5
14.	Fluoride as F	mg/l	APHA 4500 F^- C	1.0	0.26
15.	Sulphide	mg/l	APHA 4500 S^{2-} D	0.05	ND
16.	Sulphate as SO_4	mg/l	APHA 4500SO_4^{2-} B	200	16.8
17.	Nitrate as NO_3	mg/l	APHA 4500NO_3^-E	45	1.82
18.	Ammonical Nitrogen as NH_3-N	mg/l	APHA 4500 NH_3F	0.5	BDL
19.	Hexavalent Chromium as Cr^{+6}	mg/l	APHA 3111 B	–	BDL
20.	Phenolic Compounds as C_6H_6OH	mg/l	APHA 5530 B,D	0.001	BDL
21.	Cyanide as CN	mg/l	APHA 4500 CN^- C D	0.05	BDL
22.	Sodium as Na	mg/l	APHA 3500Na B	---	7.6
23.	Potassium as K	mg/l	APHA 3500K B	—	2.2
24.	Copper as Cu	mg/l	APHA 3111 B,C	0.05	BDL
25.	Iron as Fe	mg/l	APHA 3500Fe B	1.0	0.31
26.	Manganese as Mn	mg/l	APHA 3500Mn B	0.1	0.078
27.	Mercury as Hg	mg/l	APHA 3500 Hg	0.001	BDL
28.	Cadmium as Cd	mg/l	APHA 3111 B,C	0.003	BDL

Ref: Envlab/19/R-7648 *Date:* 03.02.2020

AAQ MONITORING REPORT FOR JANUARY-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-1:BGR Office Camp**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	Hg (mg/m^3)	As (ng/m^3)	Ni (ng/m^3)	Cd (mg/m^3)	Cr (mg/m^3)
03.01.2020	66.0	34.2	21.4	27.8	BDL	BDL	BDL	BDL	BDL
21.01.2020	71.0	36.4	22.8	31.7	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	--	6	20	--	--
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017	AAS Method IS 5182(Part -22):2004				

BDL Values SO_2 < 4 $\mu g/m^3$, NO_x < 9 $\mu g/m^3$, Ni < 0.01 ng/m^3, As < 0.001 ng/m^3, Hg < 0.0001 mg/m^3, Cd < 0.002 mg/m^3, Cr < 0.006 mg/m^3

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Ref: Envlab/19/R-7649 *Date:* 03.02.2020

AAQ MONITORING REPORT FOR JANUARY-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-2: Vocational Training Center**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	Hg (mg/m^3)	As (ng/m^3)	Ni (ng/m^3)	Cd (mg/m^3)	Cr (mg/m^3)
03.01.2020	66.0	35.6	18.1	24.8	BDL	BDL	BDL	BDL	BDL
20.01.2020	62.0	33.4	17.6	22.7	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	–	6	20	–	–
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017	AAS Method IS 5182(Part -22):2004				

BDL Values: SO_2 < 4 $\mu g/m^3$, NO_x < 9 $\mu g/m^3$, Ni < 0.01 ng/m^3, As < 0.001 ng/m^3, Hg < 0.0001 mg/m^3, Cd < 0.002 mg/m^3, Cr < 0.006 mg/m^3

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Ref: Envlab/19/R-7650 *Date:* 03.02.2020

AAQ MONITORING REPORT FOR JANUARY-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-3: CHP OCPL Office**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	Hg (mg/m^3)	As (ng/m^3)	Ni (ng/m^3)	Cd (mg/m^3)	Cr (mg/m^3)
04.01.2020	65.0	35.4	19.4	26.3	BDL	BDL	BDL	BDL	BDL
21.01.2020	72.0	38.6	21.3	28.1	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	--	6	20	--	--
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017	AAS Method IS 5182(Part -22):2004				

BDL Values: SO_2 < 4 $\mu g/m^3$, NO_x < 9 $\mu g/m^3$, Ni< 0.01 ng/m^3, As < 0.001 ng/m^3, Hg < 0.0001 mg/m^3, Cd < 0.002 mg/m^3, Cr < 0.006 mg/m^3

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Ref: Envlab/19/R-7651 *Date:* 03.02.2020

AAQ MONITORING REPORT FOR JANUARY-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-4: OCPL Mines Area**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	Hg (mg/m^3)	As (ng/m^3)	Ni (ng/m^3)	Cd (mg/m^3)	Cr (mg/m^3)
04.01.2020	85.0	46.2	25.7	29.2	BDL	BDL	BDL	BDL	BDL
20.01.202	79.0	44.1	23.4	30.4	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	--	6	20	--	--
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part 6) RA2017	AAS Method IS 5182(Part -22):2004				

BDL Values: SO_2 < 9 $\mu g/m^3$, NO_x < 9 $\mu g/m^3$, Ni < 0.01 ng/m^3, As < 0.001 ng/m^3, Hg < 0.0001 mg/m^3, Cd < 0.002 mg/m^3, Cr < 0.006 mg/m^3

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Ref: Envlab/19/R-7652 *Date:* 03.02.2020

AAQ MONITORING REPORT FOR JANUARY-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-1: Dulanga Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	Hg (mg/m^3)	As (ng/m^3)	Ni (ng/m^3)	Cd (mg/m^3)	Cr (mg/m^3)
11.01.2020	68.0	35.7	12.7	17.6	BDL	BDL	BDL	BDL	BDL
25.01.2020	62.0	33.2	12.3	16.4	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	--	6	20	--	--
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017	AAS Method IS 5182(Part -22):2004				

BDL Values: SO_2< 4 $\mu g/m^3$, NO_X< 9 $\mu g/m^3$, Ni< 0.01 ng/m^3, As < 0.001 ng/m^3, Hg < 0.0001 mg/m^3, Cd < 0.002 mg/m^3, Cr < 0.006 mg/m^3

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Ref: **Envlab/19/R-7653** *Date:* **03.02.2020**

AAQ MONITORING REPORT FOR JANUARY-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-2: Kalamegha Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	Hg (mg/m^3)	As (ng/m^3)	Ni (ng/m^3)	Cd (mg/m^3)	Cr (mg/m^3)
14.01.2020	53.0	28.7	9.7	14.6	BDL	BDL	BDL	BDL	BDL
27.01.2020	57.0	30.4	10.5	15.7	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	--	6	20	--	--
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017	AAS Method IS 5182(Part-22):2004				

BDL Values: SO_2< 4 $\mu g/m^3$, NO_X< 9 $\mu g/m^3$, Ni<0.01 ng/m^3, As < 0.001 ng/m^3, Hg < 0.0001 mg/m^3, Cd < 0.002 mg/m^3, Cr < 0.006 mg/m^3

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Ref: Envlab/19/R-7654 *Date:* 03.02.2020

AAQ MONITORING REPORT FOR JANUARY-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-3: Paramanandpur Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	Hg (mg/m^3)	As (ng/m^3)	Ni (ng/m^3)	Cd (mg/m^3)	Cr (mg/m^3)
11.01.2020	55.0	29.6	10.3	14.5	BDL	BDL	BDL	BDL	BDL
25.01.2020	58.0	31.7	10.8	15.2	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	–	6	20	–	–
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017	AAS Method IS 5182(Part -22):2004				

BDL Values: SO_2< 4 $\mu g/m^3$, NO_X< 9 $\mu g/m^3$, Ni< 0.01 ng/m^3, As < 0.001 ng/m^3, Hg < 0.0001 mg/m^3, Cd < 0.002 mg/m^3, Cr < 0.006 mg/m^3

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Ref: Envlab/19/R-7655 *Date:* 03.02.2020

AAQ MONITORING REPORT FOR JANUARY-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-4: Kiripsira Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	Hg (ng/m^3)	As (ng/m^3)	Ni (ng/m^3)	Cd (mg/m^3)	Cr (mg/m^3)
14.01.2020	56.0	29.4	12.8	15.5	BDL	BDL	BDL	BDL	BDL
27.01.2020	62.0	33.5	13.7	16.3	BDL	BDL	BDL	BDL	BDL
CPCB, New Delhi AAQ Standard	100	60	80	80	--	6	20	--	--
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017	AAS Method IS 5182(Part -22):2004				

BDL Values: SO_2< 4 $\mu g/m^3$, NO_X< 9 $\mu g/m^3$, Ni< 0.01 ng/m^3, As < 0.001 ng/m^3, Hg < 0.0001 mg/m^3, Cd < 0.002 mg/m^3, Cr < 0.006 mg/m^3

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Ref: Envlab/19/R-8178 *Date:* 03.03.2020

AAQ MONITORING REPORT FOR FEBRUARY-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-1:BGR Office Camp**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
06.02.2020	72.0	39.7	22.7	29.6
20.02.2020	68.0	37.5	21.2	27.5
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Gaeke Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: $SO_2 < 4\ \mu g/m^3$, $NO_X < 9\ \mu g/m^3$

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Ref: Envlab/19/R-8179 *Date:* 03.03.2020

AAQ MONITORING REPORT FOR FEBRUARY-2020 (CORE ZONE)

6. Name of Project : **Manoharpur Open Cast Coal Mine Project**
7. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
8. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
9. Sampling Location : **AAQMS-2: Vocational Training Center**
10. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
07.02.2020	59.0	33.6	17.2	23.2
19.02.2020	67.0	37.2	19.3	25.7
CPCB, New Delhi AAQ Standard	100	60	80	80
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017

BDL Values: SO_2<4 $\mu g/m^3$, NO_x<9 $\mu g/m^3$

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Ref: Envlab/19/R-8180

Date: 03.03.2020

AAQ MONITORING REPORT FOR FEBRUARY-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : AAQMS-3: CHP OCPL Office
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
07.02.2020	70.0	37.8	22.3	29.3
20.02.2020	64.0	34.6	20.7	28.4
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: SO_2< 4 $\mu g/m^3$, NO_X< 9 $\mu g/m^3$

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Ref: Envlab/19/R-8181 *Date:* 03.03.2020

AAQ MONITORING REPORT FOR FEBRUARY-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : AAQMS-4: OCPL Mines Area
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
06.02.2020	73.0	41.4	23.5	28.3
19.02.2020	80.0	45.2	24.7	29.7
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017

BDL Values: SO_2< 4 $\mu g/m^3$, NO_X< 9 $\mu g/m^3$

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Ref: Envlab/19/R-8182

Date: 03.03.2020

AAQ MONITORING REPORT FOR FEBRUARY-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-1: Dulanga Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
12.02.2020	57.0	31.8	11.8	15.3
25.02.2020	63.0	35.3	12.5	16.8
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: SO_2< 4 $\mu g/m^3$, NO_x< 9 $\mu g/m^3$

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Ref: Envlab/19/R-8183 *Date:* 03.03.2020

AAQ MONITORING REPORT FOR FEBRUARY-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-2: Kalamegha Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
11.02.2020	56.0	30.6	10.1	14.8
21.02.2020	51.0	28.8	10.7	13.5
CPCB, New Delhi AAQ Standard	100	60	80	80
Testing Method	Gravimetric IS 5182: Part 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (Part-2) RA2017	Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017

BDL Values: $SO_2 < 4\ \mu g/m^3$, $NO_x < 9\ \mu g/m^3$

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Ref: Envlab/19/R-8184 *Date:* 03.03.2020

AAQ MONITORING REPORT FOR FEBRUARY-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-3: Paramanandpur Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
12.02.2020	59.0	33.0	9.7	12.8
25.02.2020	54.0	30.2	10.4	14.6
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: SO_2< 4 $\mu g/m^3$, NO_X< 9 $\mu g/m^3$

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Ref: Envlab/19/R-8185

Date: 03.03.2020

AAQ MONITORING REPORT FOR FEBRUARY-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-4: Kiripsira Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
11.02.2020	55.0	30.7	12.3	15.2
21.02.2020	52.0	28.5	11.6	14.7
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: SO_2 < 4 $\mu g/m^3$, NO_x < 9 $\mu g/m^3$

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ISO 14001: 2015
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Ref: **Envlab/19/R-9376** *Date: 03.04.2020*

AAQ MONITORING REPORT FOR MARCH-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-1:BGR Office Camp**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
03.03.2020	69.0	38.5	22.1	28.4
16.03.2020	63.0	35.2	19.6	26.3
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: $SO_2 < 4\ \mu g/m^3$, $NO_X < 9\ \mu g/m^3$

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Ref: **Envlab/19/R-9377** *Date:* ***03.04.2020***

AAQ MONITORING REPORT FOR MARCH-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-2: Vocational Training Center**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
02.03.2020	61.0	33.8	18.6	24.7
16.03.2020	55.0	30.4	17.5	23.6
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: $SO_2 < 4\ \mu g/m^3$, $NO_X < 9\ \mu g/m^3$

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Ref: **Envlab/19/R-9378** *Date: 03.04.2020*

AAQ MONITORING REPORT FOR MARCH-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-3: CHP OCPL Office**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
03.03.2020	63.0	34.0	21.2	27.6
20.03.2020	72.0	38.3	23.0	29.7
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: $SO_2 < 4\ \mu g/m^3$, $NO_X < 9\ \mu g/m^3$

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Ref: **Envlab/19/R-9379** *Date: 03.04.2020*

AAQ MONITORING REPORT FOR MARCH-2020 (CORE ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-4: OCPL Mines Area**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
02.03.2020	78.0	43.6	24.1	28.0
20.03.2020	71.0	39.5	22.6	25.6
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: $SO_2 < 4\ \mu g/m^3$, $NO_x < 9\ \mu g/m^3$

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Ref: **Envlab/19/R-9380** *Date: 03.04.2020*

AAQ MONITORING REPORT FOR MARCH-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-1: Dulanga Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
06.03.2020	58.0	32.0	12.5	16.6
23.03.2020	52.0	28.7	11.6	15.4
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: $SO_2 < 4\ \mu g/m^3$, $NO_X < 9\ \mu g/m^3$

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ISO 14001: 2015
OHSAS 45001: 2018

Ref: **Envlab/19/R-9381** *Date: 03.04.2020*

AAQ MONITORING REPORT FOR MARCH-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-2: Kalamegha Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
06.03.2020	54.0	29.5	11.3	14.7
23.03.2020	49.0	26.3	10.5	12.8
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: $SO_2 < 4\ \mu g/m^3$, $NO_X < 9\ \mu g/m^3$

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ISO 14001: 2015
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Ref: **Envlab/19/R-9382** *Date: 03.04.2020*

AAQ MONITORING REPORT FOR MARCH-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-3: Paramanandpur Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
04.03.2020	50.0	27.6	9.5	12.7
21.03.2020	56.0	30.2	10.8	14.3
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: $SO_2 < 4\ \mu g/m^3$, $NO_X < 9\ \mu g/m^3$

Prepared by

Verified by

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(An Enviro Engineering Consulting Cell)

ISO 9001: 2008
ISO 14001: 2015
OHSAS 45001: 2018

Ref: **Envlab/19/R-9383** *Date:* ***03.04.2020***

AAQ MONITORING REPORT FOR MARCH-2020 (BUFFER ZONE)

1. Name of Project : **Manoharpur Open Cast Coal Mine Project**
2. Name of Industry : **Odisha Coal and Power Limited (OCPL), Sundargarh**
3. Monitoring Instruments : RDS (APM 460 BL), FPS (APM 550)
4. Sampling Location : **AAQMS-4: Kiripsira Village**
5. Sample collected by : VCSPL representative in presence of OCPL representative

Date	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)
04.03.2020	57.0	31.4	11.8	16.1
21.03.2020	50.0	27.5	11.2	15.3
CPCB, New Delhi AAQ Standard	**100**	**60**	**80**	**80**
Testing Method	**Gravimetric IS 5182: Part 23**	**Gravimetric EPA 1998**	**Improved West & Geake Method IS 5182 (Part-2) RA2017**	**Modified Jacob & Hochheiser Method IS 5182 (Part-6) RA2017**

BDL Values: $SO_2 < 4\ \mu g/m^3$, $NO_X < 9\ \mu g/m^3$

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