

REGD. OFFICE & WORKS : RAJGANGPUR-770017 (ODISHA) INDIA

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 CIN : L26942OR1949PLC000185



Env. / EC / 14-2017

o/c Date: 09.06.2017

To
 The Additional Director, Government of India
 Ministry of Environment, Forest & Climate Change (I.A. Division),
 Indira Paryavaran Bhavan, Aliganj, jorbagh Road
 New Delhi - 110003

Sub:- Submission of six month compliance report (October, 2016 to March, 2017) of EC letter for expansion cum modernization Project from 0.7 MTPA to 1.2 MTPA of clinker and from 1.275 MTPA to 2.00 MTPA of cement of M/s OCL INDIA LTD at Village - Rajgangpur, Tehsil Rajgangpur, District - Sundargarh, Odisha.

Ref:- Environment Clearance letter F. No. J-11011/206/2004- 1A II (I) dated 21st July 2005.

Daer Sir,

With reference to above letter, we enclose herewith the six monthly compliance report (Ending March, 2017) of conditions stipulated in the Environmental Clearance for the above project.

Thanking you

Yours sincerely
 For OCL India Limited


(S. K. ROUT)
Asst. Executive Director (Mines & Env)

Encl: As above

Copy to:

1. The Chairman,
 Central Pollution Control Board
 Parivesh Bhavan
 CBD - cum- Office Complex
 East Arjun Nagar
 NEW DELHI - 110032
2. The Director (S)
 Government of India
 Ministry of Environment and Forest
 Eastern Regional Office
 A.3. Chandrasekharapur
 BHUBANESWAR - 751023
3. The Chairman,
 State Pollution Control Board, Orissa
 Parivesh Bhavan, A 118, Nilakanthnagar, Unit - VIII
 BHUBANESWAR - 751023

**SIX MONTHLY COMPLIANCE REPORT
(OCTOBER, 2016 TO MARCH, 2017)
OF
ENVIRONMENT CLEARANCE LETTER NO.
J-11011/206/2004-IA II (I) DATED 21st JULY, 2005
FOR EXPANSION CUM MODERNISATION PROJECT
FROM 0.7 MTPA TO 1.2 MTPA OF KLINKER
AND
1.275 MTPA TO 2.0 MTPA OF CEMENT
BY
OCL INDIA LIMITED
RAJGANGPUR – 770017
DIST- SUNDARGARH
ODISHA**

Date-28th May 2017**OCL INDIA LTD, RAJGANGPUR**

Sub: Submission of six monthly compliance report (October, 2016 to March, 2017) of conditions stipulated in Environmental Clearance letter No:- 11011/206/2004-IA II (I) J. dated 21st July 2005 by MoEF for the project of OCL India Limited, Rajgangpur.

A.SPECIAL CONDITION

Sl. NO.	Description of Conditions	Compliance Status																																																																
i	The gaseous and particulate matter emissions from various units shall conform to the standards prescribed by the state pollution control board. At no time the particulate emissions shall exceed 50 mg/Nm ³ . Further, the company may also take appropriate additional measures to improve design and operating practices of pollution control equipment. Tripping in kiln ESP shall be minimized. Interlocking facility shall be provided in the pollution control equipment so that in the event of the pollution control equipment not working, the respective unit(s) is shut down automatically.	<p>a. Complied.</p> <p>b. The compliance status of Stack emission is given below. The reading taken from different location are stipulated with respect to the standard prescribed within the norms of emission level. We have installed all the pollution control equipment in order to meet new emission standards, as revised by Gazette Notification G.S.R. 612 (E) dtd. 25th Aug.2014.</p> <p>Online CEEMS (Continuous Emission Monitoring system have been installed and facility for transmitting online data though GPRS to OSPCB/CPCB Server is in place and is being transmitted. The gaseous and particulate matter emissions at all point of time have been noted within the prescribed limits.</p> <p>We have been also conducted third party monitoring of the emissions by an NABL Accredited laboratory recognized by OSPCB and MoEFCC. Summary of the same is reproduced below:</p> <table border="1" data-bbox="954 943 2136 1353"> <thead> <tr> <th data-bbox="954 943 1384 1023">Stack attached to</th> <th colspan="6" data-bbox="1384 943 2136 986">Particulate matter emission in mg/Nm³</th> </tr> <tr> <th data-bbox="954 986 1384 1023"></th> <th data-bbox="1384 986 1514 1023">Oct-16</th> <th data-bbox="1514 986 1644 1023">Nov-16</th> <th data-bbox="1644 986 1774 1023">Dec-16</th> <th data-bbox="1774 986 1904 1023">Jan-17</th> <th data-bbox="1904 986 2033 1023">Feb-17</th> <th data-bbox="2033 986 2136 1023">March-17</th> </tr> </thead> <tbody> <tr> <td data-bbox="954 1023 1384 1066">Cement VRM-1 B/F</td> <td data-bbox="1384 1023 1514 1066">20.1</td> <td data-bbox="1514 1023 1644 1066">18.1</td> <td data-bbox="1644 1023 1774 1066">29.6</td> <td data-bbox="1774 1023 1904 1066">14.5</td> <td data-bbox="1904 1023 2033 1066">22.3</td> <td data-bbox="2033 1023 2136 1066">13.7</td> </tr> <tr> <td data-bbox="954 1066 1384 1109">Cement VRM-2 B/F</td> <td data-bbox="1384 1066 1514 1109">41.2</td> <td data-bbox="1514 1066 1644 1109">30.6</td> <td data-bbox="1644 1066 1774 1109">17.3</td> <td data-bbox="1774 1066 1904 1109">23.7</td> <td data-bbox="1904 1066 2033 1109">23.6</td> <td data-bbox="2033 1066 2136 1109">23.1</td> </tr> <tr> <td data-bbox="954 1109 1384 1152">Cement VRM-3 B/F</td> <td data-bbox="1384 1109 1514 1152">25.8</td> <td data-bbox="1514 1109 1644 1152">24.9</td> <td data-bbox="1644 1109 1774 1152">21.5</td> <td data-bbox="1774 1109 1904 1152">27.0</td> <td data-bbox="1904 1109 2033 1152">19.0</td> <td data-bbox="2033 1109 2136 1152">19.6</td> </tr> <tr> <td data-bbox="954 1152 1384 1195">Kiln + VRM ESP</td> <td data-bbox="1384 1152 1514 1195">30.4</td> <td data-bbox="1514 1152 1644 1195">34.0</td> <td data-bbox="1644 1152 1774 1195">36.5</td> <td data-bbox="1774 1152 1904 1195">32.7</td> <td data-bbox="1904 1152 2033 1195">26.3</td> <td data-bbox="2033 1152 2136 1195">23.6</td> </tr> <tr> <td data-bbox="954 1195 1384 1238">Cooler ESP</td> <td data-bbox="1384 1195 1514 1238">21.6</td> <td data-bbox="1514 1195 1644 1238">28.5</td> <td data-bbox="1644 1195 1774 1238">22.9</td> <td data-bbox="1774 1195 1904 1238">23.9</td> <td data-bbox="1904 1195 2033 1238">17.3</td> <td data-bbox="2033 1195 2136 1238">20.8</td> </tr> <tr> <td data-bbox="954 1238 1384 1281">Coal Mill B/F</td> <td data-bbox="1384 1238 1514 1281">21.4</td> <td data-bbox="1514 1238 1644 1281">23.8</td> <td data-bbox="1644 1238 1774 1281">17.4</td> <td data-bbox="1774 1238 1904 1281">19.5</td> <td data-bbox="1904 1238 2033 1281">14.0</td> <td data-bbox="2033 1238 2136 1281">17.7</td> </tr> <tr> <td data-bbox="954 1281 1384 1324">Cement Mill (1&2)B/F</td> <td colspan="6" data-bbox="1384 1281 2136 1324" rowspan="2">Units were stopped</td> </tr> <tr> <td data-bbox="954 1324 1384 1367">Cement Mill (3&4) Hybrid filter</td> </tr> </tbody> </table> <p>c. Interlocking facility has already been provided in the plant in the event of ESP tripping, kiln feed gets shut down automatically.</p>	Stack attached to	Particulate matter emission in mg/Nm ³							Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	March-17	Cement VRM-1 B/F	20.1	18.1	29.6	14.5	22.3	13.7	Cement VRM-2 B/F	41.2	30.6	17.3	23.7	23.6	23.1	Cement VRM-3 B/F	25.8	24.9	21.5	27.0	19.0	19.6	Kiln + VRM ESP	30.4	34.0	36.5	32.7	26.3	23.6	Cooler ESP	21.6	28.5	22.9	23.9	17.3	20.8	Coal Mill B/F	21.4	23.8	17.4	19.5	14.0	17.7	Cement Mill (1&2)B/F	Units were stopped						Cement Mill (3&4) Hybrid filter
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ii	<p>Ambient Air Quality including ambient noise level must not exceed the standards stipulated under EPA/State authorities. Monitoring of ambient air quality and stack emission shall be carried out regularly in consultation with SPCB and report submitted to the Board quarterly and to the ministry (Regional office at Bhubaneswar) half yearly. Continuous stack monitoring system shall be installed.</p>	<p>a. Complied. b. Monitoring of ambient air quality including ambient noise level are being carried out as per the standard stipulated. The data is given hereunder in Table A.ii.a.; correspondingly, the data on ambient noise level are shown in B. v under general condition. c. Continuous stack monitoring system has been installed. On-line data is being transferred through GPRS to OSPCB/CPCB server. Reports are submitted to SPCB in every month and half yearly to Regional office of MoEF&CC, Bhubaneswar.</p>																																																																	
<p>Ambient air quality monitoring reports are as under: Table No. A.ii.a</p>																																																																			
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iii	<p>The company shall install adequate dust collection and extraction system to system to control fugitive dust emission at various transfer points. The dust collected from pollution control equipment shall be recycled back into the process. Water sprinkling arrangements shall be made to control the fugitive emissions in the raw material stockyard, unloading hoppers, and discharge gate at reclaimers of soils and cement bag loading areas. Dust emission from bag filters and ESP shall not exceed 50mg/Nm³.</p>	<p>a. Bag filters are installed at various transfer points and equipped to recycle back the dust collected, into the process. b. Water sprinkling arrangements are made at the raw material stockyard, unloading hoppers and at various discharge gates. c. Covered shed for Raw material storage has made. d. Belt conveyors are fully covered.</p> <p>Stack emission from Bag filters and ESPs are well within the prescribed limit.</p>																																																																	

iv	The company shall undertake measures to reduce the pollution load by covering narrow gauge track to electrified meter/ broad gauge, and also to increase the rake size by adding higher capacity locomotives so that number of trips for transportation of limestone from Lanjiberna Mines to the cement plant shall not be increased.	<p>a. Narrow gauge track is no more on use for limestone transport.</p> <p>b. Entire transport of limestone from mine are being done through cross country belt conveyer.</p>																																				
v	The company shall use flyash up to 35% for manufacturing of Portland Pozolana cement	Complied																																				
vi	The company shall undertake water conservation measures by recycling of waste water after treatment and utilization of 100% of waste heat in VRM, Coal mill and CVRMs to reduce water consumption and replacement of water-cooling machines by air-cooling machines	<p>a. Measures have been taken to recycle 100% waste water, after treatment. Waste water after treatment is used for machines cooling, hot material and spraying inside VRM and CVRMs.</p> <p>b. At all times, the heat requirement of VRM, Coal Mill and CVRMs is met from recoverable waste heat. Action already been taken to replace existing water cooled reciprocating compressors by air cooled screw compressors. Installation of GRR (Air cooling machine) in place of LRR (Water cooling machine) of PH fan was made.</p>																																				
vii	The company shall developed green belt in an area 44.39 ha. Central pollution Control board guidelines must be followed in planning and developing green belt and selection of species etc.	<p>Green belt cover has already been developed in 44.39 ha. In addition, company has also taken up plantation campaign outside plant area by distributing saplings to nearby villagers free of cost and ensuring that the saplings are planted. Total area covered under green belt is around 79 ha., Statistical data is enclosed as Annexure-I</p> <table border="1" data-bbox="1055 981 2130 1418"> <thead> <tr> <th colspan="3">DETAILS OF YEAR WISE PALNTATION (CUMULATIVE STATUS)</th> </tr> <tr> <th>YEAR</th> <th>NO. TREES PLANTED</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>Up to march,2007-08</td> <td>148655</td> <td>Plantation & sapling distributed</td> </tr> <tr> <td>2008-2009</td> <td>155155</td> <td>2300</td> </tr> <tr> <td>2009-2010</td> <td>162401</td> <td>4800</td> </tr> <tr> <td>2010-2011</td> <td>171757</td> <td>6964</td> </tr> <tr> <td>2011-2012</td> <td>177957</td> <td>9964</td> </tr> <tr> <td>2012-2013</td> <td>183957</td> <td>14164</td> </tr> <tr> <td>2013-2014</td> <td>190246</td> <td>19664</td> </tr> <tr> <td>2014-2015</td> <td>196660</td> <td>27664</td> </tr> <tr> <td>2015-2016</td> <td>203892</td> <td>92664</td> </tr> <tr> <td>2016-2017</td> <td>209442</td> <td>130364</td> </tr> </tbody> </table>	DETAILS OF YEAR WISE PALNTATION (CUMULATIVE STATUS)			YEAR	NO. TREES PLANTED	REMARKS	Up to march,2007-08	148655	Plantation & sapling distributed	2008-2009	155155	2300	2009-2010	162401	4800	2010-2011	171757	6964	2011-2012	177957	9964	2012-2013	183957	14164	2013-2014	190246	19664	2014-2015	196660	27664	2015-2016	203892	92664	2016-2017	209442	130364
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viii	No discharge of treated effluent shall be done outside the premises and all treated effluent (STP) should be utilized for green belt development and other plant related activities.	There is no discharge of any effluent outside the premises of the company. All treated effluent of STP is being utilized for green belt development and other plant related activities.
ix	The company must harvest the rain water from the rooftops and storm water drains to recharge ground water.	<p>Following rain water harvesting projects are existing</p> <p>a. One rain water harvesting project from storm water near STP and near CPP.</p> <p>b. Roof top rain water-harvesting has been completed in colony under guidance of the Office of Hydrologist, Ground Water Survey & Investigation Division, Sambalpur, and Government of Orissa.</p> <p>c. Rain water harvesting projects from the roof top of raw material shed inside the plant.</p>

B.GENERAL CONDITION

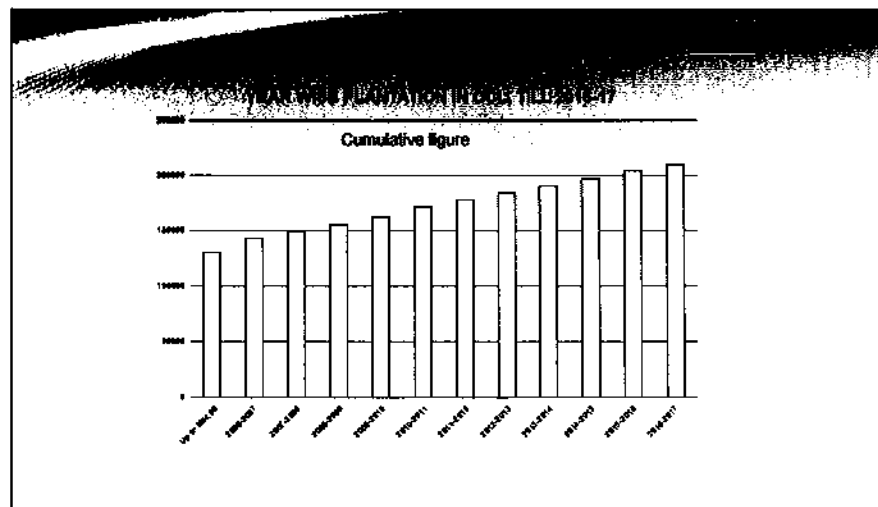
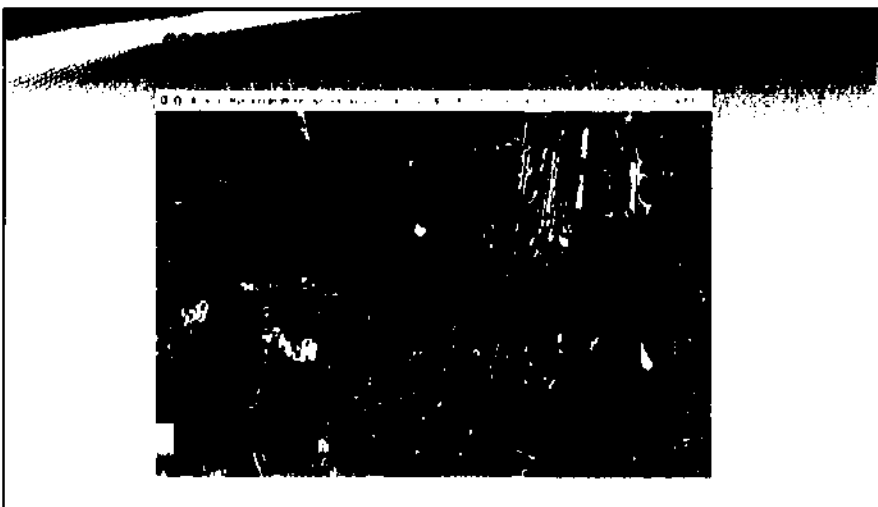
Sl. No.	Description of conditions	Compliance Status
i	The project authority must adhere to the stipulation made by Orissa state pollution control board and state government.	All condition laid by Orissa state pollution control board is strictly abiding to all stipulations.
ii	No further expansion or modification of the plant should be carried out without prior approval of this ministry.	No expansion or modification have been made.
iii	At least four ambient air quality- monitoring station should be established in the downward direction as well as where maximum ground level concentration of SPM, SO ₂ and NO _x are anticipated in consultation with the Orissa State pollution Control Board. Data on ambient air quality and stack emission should be regularly submitted to this ministry including regional Office at Bhubaneswar and the State Pollution Control board / Central Pollution Control Board once in six months.	<p>a. Four numbers of ambient air quality monitoring stations are installed as per SPCB guideline, which are shown in the Table A.ii.a</p> <p>b. Data on ambient air quality and stack emission is regularly been submitted to SPCB/CPCB and MoEF&CC (Detail Monitoring report is enclosed as Annexure-II)</p>

iv	Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 th May 1993 and 31 st December 1993 or as amended from time to time. The treated waste water should be utilized for plantation.	<p>a. Waste water generated in the plant is being treated in the effluent treatment plant (ETP). The last analysis report of ETP outlet is given here under. Date of sampling:- 03.03.2017</p> <table border="1" data-bbox="1030 343 1971 590"> <thead> <tr> <th>Sl. No.</th> <th>parameter</th> <th>Result of ETP outlet treated water</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>PH value</td> <td>8.06</td> </tr> <tr> <td>2</td> <td>Total suspended solids (mg/l)</td> <td>8.0</td> </tr> <tr> <td>3</td> <td>B.O.D (mg/l)</td> <td>11</td> </tr> <tr> <td>4</td> <td>C.O.D (mg/l)</td> <td>19.35</td> </tr> <tr> <td>5</td> <td>Oil & Grease (mg/l)</td> <td>0.2</td> </tr> </tbody> </table> <p>b. The colony effluent is treated in STP & treated water is used for plantation & greenery.</p>	Sl. No.	parameter	Result of ETP outlet treated water	1	PH value	8.06	2	Total suspended solids (mg/l)	8.0	3	B.O.D (mg/l)	11	4	C.O.D (mg/l)	19.35	5	Oil & Grease (mg/l)	0.2					
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v	The overall noise levels in and around the plant area shall be kept well within the standards (85dB) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under Environmental (Protection) Act 1986 Rules, 1989 viz 75 dB (day time) and 70 dB (night time).	<p>a. Noise level are within the prescribed standards. b. Ambient noise monitored data is given hereunder in the table B.v.a.1</p> <table border="1" data-bbox="1019 758 2116 997"> <thead> <tr> <th rowspan="2">Particulars</th> <th colspan="5">Sampling locations</th> </tr> <tr> <th>Store building</th> <th>DITIC building</th> <th>LOCO gate</th> <th>Near Canteen</th> <th>OCL Colony</th> </tr> </thead> <tbody> <tr> <td>Noise level(L day) during day time</td> <td>61.5</td> <td>67.8</td> <td>67.5</td> <td>61.9</td> <td>47.3</td> </tr> <tr> <td>Noise level (L night) during night time</td> <td>55.7</td> <td>54.6</td> <td>57.6</td> <td>54.2</td> <td>38.7</td> </tr> </tbody> </table>	Particulars	Sampling locations					Store building	DITIC building	LOCO gate	Near Canteen	OCL Colony	Noise level(L day) during day time	61.5	67.8	67.5	61.9	47.3	Noise level (L night) during night time	55.7	54.6	57.6	54.2	38.7
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vi	Proper housekeeping and adequate occupational health programme must be taken up. Occupational Health Surveillance programme should be done on a regular basis and records maintained. The programme must include lung function and sputum analysis tests once in six month.	Proper housekeeping is being carried out. Occupational health surveillance programme is mandatory for all persons The occupational health checkup covers lung function and sputum analysis tests and records are maintained.																							
vii	The project proponent shall comply with all the environmental protection measures and safeguards recommended in the Environmental Impact Assessment / Environmental Management Plan.	Fully complied.																							
viii	A separate environmental management cell with full-fledged laboratory facilities to carry out various management and monitoring functions should be set up under control of Senior Executive.	Separate Environment Management Cell (EMC) already exists and taking care of Environmental management plant, Environmental monitoring & compliance. The EMC is under control of Senior Executive																							

ix	The project authority will provided separate funds for both recurring and non-recurring to implement the conditions stipulated by the ministry of Environment and forest as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided should not be diverted for any purposes.	A separate budget made to implement the air pollution control measures and regular implementation towards pollution control systems is in continuous progress.
x	The Regional Office of this Ministry at Bhubaneswar/Central Pollution Control Board/State pollution Control Board will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.	Six monthly compliance report along with monitored data (through NABL accredited agency as well as by Online system of CEMS & CAAQMS) are being submitted regularly.
xi	The Project Authority shall inform the regional Office as well as the Ministry, the data of financial closure and final approval of the project by the concerned authorities and the data of commencing the land development work.	Complied
xii	The Project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with State Pollution Control Board/Committee and may also be seen at website of the Ministry of Environment and Forest at http://envfor.nic.in . This should be advertised wit in seven days from the date of issue of clearance letter at least two local newspaper that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy the same shall be forwarded to the Regional office.	Complied

**STATUS ON PLANTATION
AND
GREEN BELT AREA
DEVELOPED
BY
OCL INDIA LIMITED**

YEARWISE PLANTATION DETAILS IN AND AROUND OCL PREMISES	
YEAR	Trees planted in & around plant (Cumulative)
Up to Mar,06	130000
2006-2007	142645
2007-2008	148656
2008-2009	155155
2009-2010	162401
2010-2011	171757
2011-2012	177957
2012-2013	183957
2013-2014	190246
2014-2015	196660
2015-2016	203692
2016-2017	209442



ENVIRONMENTAL MONITORING REPORT

BASED ON DATA GENERATED

FROM

OCTOBER 2016 – MARCH 2017

FOR

OCL INDIA LIMITED

At/Po: RAJGANGPUR, District: SUNDARGARH, ODISHA

AT

CEMENT PLANT(LINE – 1 & 2)

Prepared By:

Cleenviron Private Limited

D-124, KOELNAGAR, ROURKELA, ODISHA

Tele fax: 0661 – 2475746

Email: cleenviron@gmail.com & cpl_rkl@yahoo.co.in

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1. INTRODUCTION

OCL is currently manufacturing Ordinary Portland Cement (OPC) of various grades including grade 53S specially meant for concrete sleepers for railways, Portland Slag Cement (PSC), flyash based Portland Pozzolana Cement (PPC), Sulphate Resistance Portland Cement (SRPC) and Oil well cement. The main raw materials used for manufacturing of various types of cement are Clinker, Slag, Flyash and Gypsum. Clinker is the main raw material, which is produced by sintering limestone along with other additives like clay, morrum, char, cinder etc. Coal is used as fuel for burning the limestone in kiln.

Cement Division of OCL India Limited (OCL) is currently operating a cement plant located at Rajgangpur in Sundargarh district of Odisha state. The existing plant has production capacity of 2.9 million tonnes clinker per annum and cement manufacturing capacity 4 million tonnes cement per annum.

The limestone requirement for the proposed expansion is proposed to be met by the increased production from the existing captive mines at Lanjiberna.

2. LOCATION AND ACCESSIBILITY

The proposed site is well within the existing factory premises of OCL at Rajgangpur and has the following coordinates (as per Survey of India toposheet no. 73 B/12, scale 1:50000):

- Latitude : 22° 12' N
- Longitude : 84° 35' E

The area covered by OCL comes under Rajgangpur village of Tehsil Rajgangpur, district Sundargarh. The general elevation of land is about 250 m above mean sea level. Accessibility to the site is as per details given below:

Road

The plant is located about 43 km from Rourkela on Rourkela-Sambalpur state highway (SH-10).

Rail

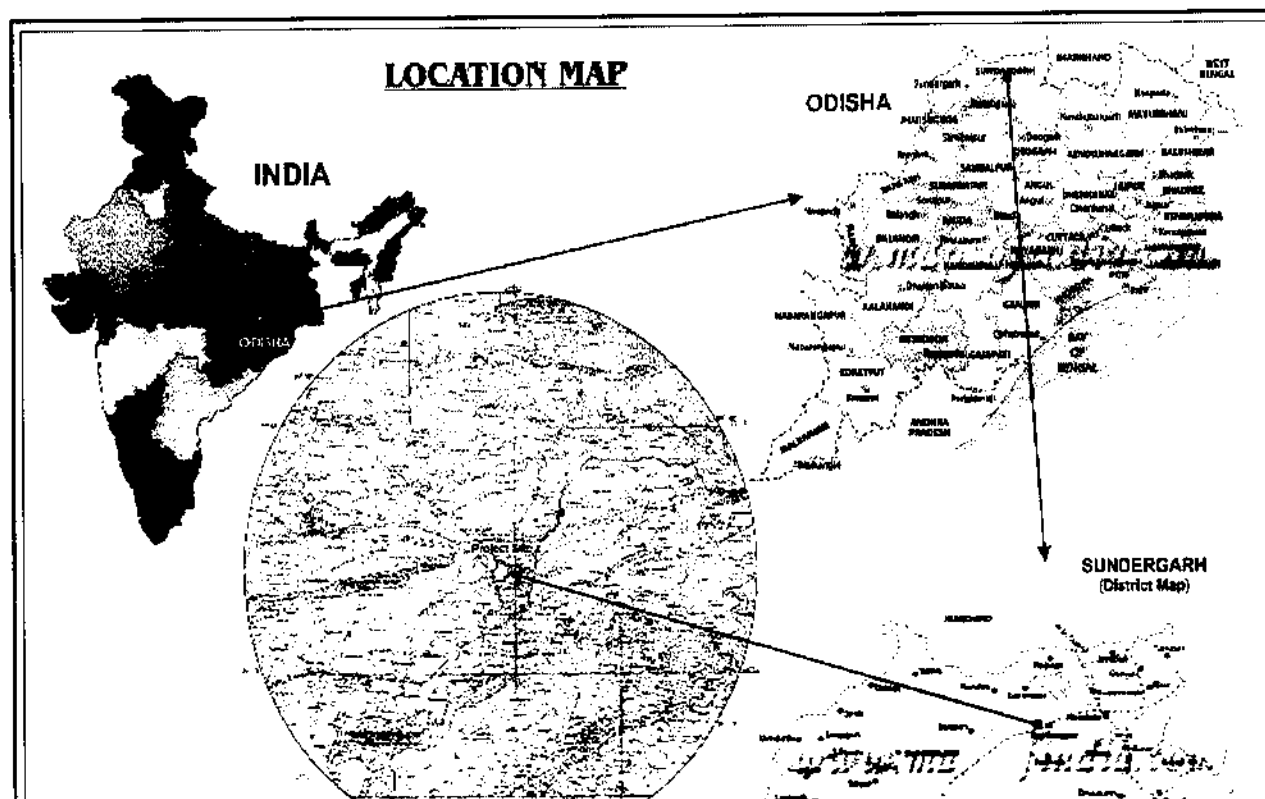
The nearest railway station is at Rajgangpur, which is about 2 km from the plant site and is located on the Howrah-Mumbai section of South Eastern Railway.

Air

The nearest airport is at Kolkatta, which is about 450 km from plant site and well connected by rail and road.

The location of the project site is depicted as in **Figure1.1**

Figure No: 1.1



OCL has affianced **Cleenviron Private Limited (NABL accredited Laboratory)**, Rourkela, Odisha, to carry out periodical environmental monitoring and to prepare Environment monitoring report. The study has been carried out as per the guidelines of Ministry of Environment & Forests (MOEF) and State Pollution Control Board, Odisha (SPCB).

3. ASPECTS CONSIDERED FOR ENVIRONMENTAL MONITORING

This report is based on the monitoring results generated from October 2016 to March 2017 covering post-monsoon and winter seasons of the year. Ambient Air Quality and Stack Emission monitoring was carried out on Quarterly once basis.

- i. Micro-meteorological Monitoring
- ii. Ambient Air Quality Monitoring
- iii. Stack Emission Monitoring

Monitoring of environmental parameters for collection of data involves field work, which is described below:

3.1 Micro-meteorological Study

For collection of micro-meteorological data like Temperature, Relative Humidity, Wind Speed, Wind Direction, & Rainfall, a weather monitoring station is fixed on the Magazine Hill Top of Lanjiberna Limestone and Dolomite Mines of M/s OCL India Ltd. Hourly data is being recorded continuously by putting up windows compatible data logging facility instrument, Make: Virtual Electronics Company, Roorkee.

3.2 Ambient Air Monitoring

To assess ambient air quality, total 7 (seven) monitoring stations are fixed including 5 (five) in the Line - 1 and 2 (two) in the Line - 2. The monitoring locations are fixed according to the micro-meteorological data and in consultation with State Pollution Control Board. The monitoring was carried out for parameters like PM2.5, PM10, SO₂, NO_x, NH₃, O₃, CO, As, Ni, Pb, Benzene & Benzo(a)pyrene and monitoring was carried out once during three months from each location. For collection of samples Respirable Dust sampler with PM2.5 attachment was placed at each location, sampling and analytical techniques are followed as per the standard methods of ambient air sampling and analysis.

3.3 Stack Emission Monitoring

The essential units of the cement plant are equipped with pollution control equipments. To assess the emission level of Particulate Matter from the stacks of different units, monitoring of Stack emission levels were scheduled on quarterly once basis. Particulate Matter emission was monitored following the BIS methods for Stack monitoring.

4. SAMPLING LOCATIONS

4.1 Micro-Meteorological Study

One meteorological station was set up on the Magazine Hill Top of the Lanjiberna Limestone & Dolomite Mines to monitor wind speed, wind direction, temperature, relative humidity and rainfall on hourly basis by data logging technique. The station is at an aerial distance of around 8 kms from the project site.

4.2 Ambient Air Quality Monitoring

Five ambient air quality monitoring stations are fixed within the Line -1 and two stations are fixed in the Line - 2 area. General precautions were taken to position the Respirable Dust Samplers at all the locations. The descriptions of the Ambient Air Monitoring Stations are as follows:

A-1 Stores Building (Line - 1):

The sampling station is located within the Plant site and the station was selected to assess the present level of pollution due to the general unit operations of the Line - 1.

A-2 DITC Building Near Line - 2:

This location is nearer to the Line - 2 operational area. This was selected to assess the air quality in and around the Line - 2 unit operations.

A-3 Near Canteen Building (Line - 1):

The sampling station is located within the Plant site and the station was selected to assess the present level of pollution due to the general unit operations of the Line - 1.

A-4 Near Loco Gate (Line - 1):

The sampling station is located within the Plant site and the station was selected to assess the present level of pollution due to the general unit operations of the Line - 1.

A-5 CCR Building (Line - 1):

The sampling station is located within the Plant site and the station was selected to assess the present level of pollution due to the general unit operations of the Line - 1.

A-6 Workshop Building (Line - 1):

The sampling station is located within the Plant site and the station was selected to assess the present level of pollution due to the general unit operations of the Line - 1.

A-7 Near Water Harvesting Area of CPP (Line – 2):

This location is within the Line – 2 operational area. This was selected to assess the air quality in and around the Line – 2 unit operations.

4.3 Stack Emission Monitoring:

The stack of the different units of the Cement plant like, VRM – Line – 1, CVRM – 1, CVRM – 2, CVRM – 3, RABH Line – 2, Bolier – 1, Boiler – 2, Coal Mill Line – 1, Coal Mill Line – 2, Cooler Line – 2, were carried out for parameters like, Particulate Matter, Sulphur Dioxide and Nitrogen Oxides emission levels.

5. METHODOLOGY OF SAMPLING & ANALYTICAL PROCEDURES

5.1 Meteorological Study

For recording various meteorological parameters like, Temperature, RH, Wind Speed, Wind Direction & Rainfall, a weather monitoring station, Make: Virtual Electronics Company, Roorkee was installed at the site. The instrument is equipped with windows based data logging software to store each data on hourly basis, which can be further down loaded to a PC and data can be interpreted as per the requirement of the report.

5.2 Ambient Air Monitoring

Air quality samples were monitored for all parameters as per NAAQS. For sampling and analysis, methods prescribed by CPCB were followed and Respirable Dust Samplers (RDS) APM 460BL – 411TE, Make: Envirotech Instruments Pvt. Ltd. were used and for PM2.5 sampling AAS 190 attachment for fine particulate sampling along with RDS was used where ever necessary at the site.

5.3 Stack Monitoring

Stack monitoring were carried out once in every three months from the bag filter and ESP outlet stacks of the units mentioned and the Indian standard methods for monitoring of Stack emission was followed for collecting the sample and the concentration of Particulate Matter were calculated by following the standard methods. For collection of sample Vayubodhan Upkaran Pvt. Ltd. make Stack sampler Model: VSS -1 was used at the site.

6. DATA ANALYSIS

6.1 Micro-meteorological Study:

6.1.1 Wind Speed & Wind Direction

During the entire period from 1st October to 31st March all total 4370 no. of data are recorded by the instrument and after interpretation of the collected data it was found that Calm condition prevailed over 39.49%. while considering the 24 hourly data. 37.48% calm condition prevailed from morning 6 hrs to 14hrs for the entire study period, 40.90% calm condition prevailed from 14hrs to 22hrs and 39.44% calm condition prevailed from 22hrs to 06hrs. The predominant wind directions were from NE & SW with average wind speed 1.08 m/sec. The wind rose diagrams for the entire study period are depicted on the **Figure No: 6.1, 6.2, 6.3 & 6.4.**

6.1.2 Temperature

The maximum & minimum temperature during the entire study period were divided in to two parts as the study period was covering post-monsoon as well as winter seasons. The Minimum temperature during the post-monsoon season was found to be 13.02°C and the Maximum temperature was found to be 34.83°C up to the end of 30th November.

The minimum and maximum temperature during the winter season i.e. from December to March was found to be 9.64°C and 43.04°C. **Table No 6.1** shows a summary of micro-meteorological data collected for the entire period.

6.1.3 Rainfall

The total rain fall from 1st October to 31st March was observed to be 2.454 mm. during the study period. A month wise rainfall data recorded at the site is depicted in **Table No 6.1**.

Table No: 6.1
A Summary of the Micro-meteorological Data

Project Site (Ref.) : OCL Lanjiberna Mines
Location : Magazine Hill Top

SI No	Parameters	From October' 16 – March' 17
1	Predominant Wind Direction	From NE & SW
2	Calm Condition %	39.49
3	Average Wind Speed m/sec	1.08
4	Temperature °C	
	Post-monsoon Season	
	Minimum	13.02
	Maximum	34.83
	Winter Season	
	Minimum	9.64
	Maximum	43.04
5	Rain Fall in mm	
	October	0.80
	November	0.60
	December	0.00
	January	0.00
	February	0.00
	March	1.05
	Total	2.454

Figure No: 6.1 Wind Rose Diagram for 24 Hours

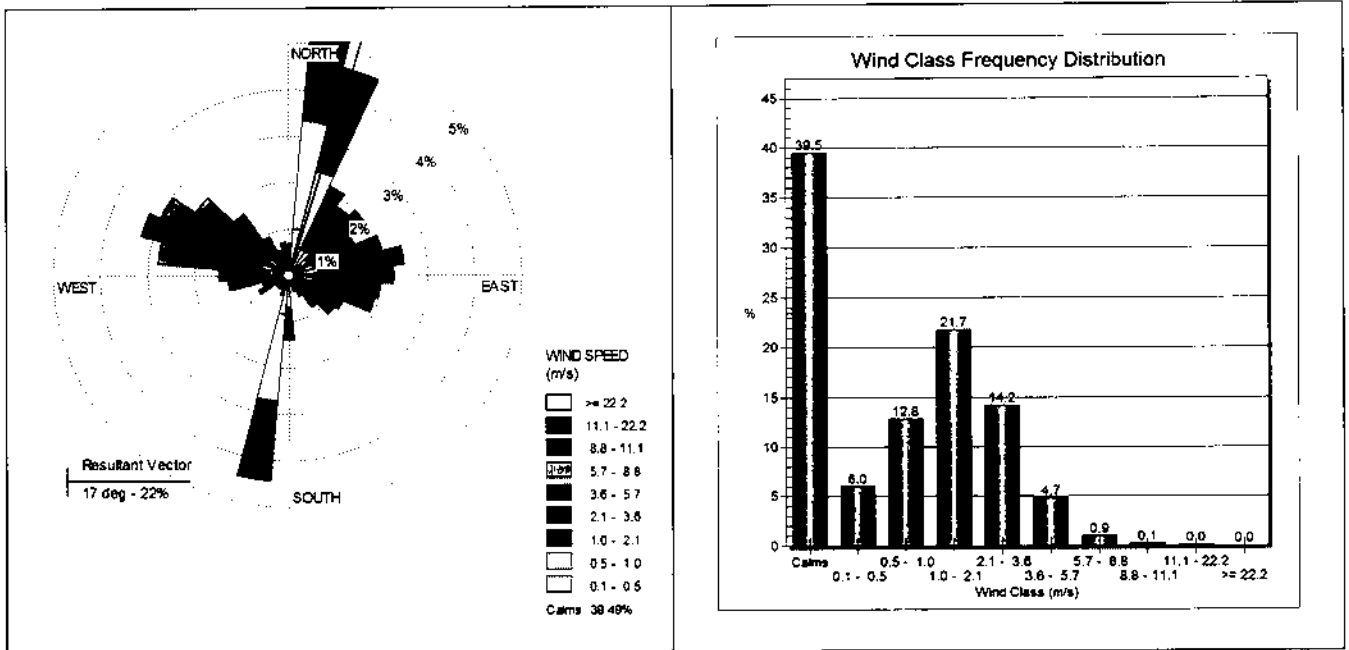


Figure No: 6.2 Wind Rose Diagram from 06 – 14 Hours

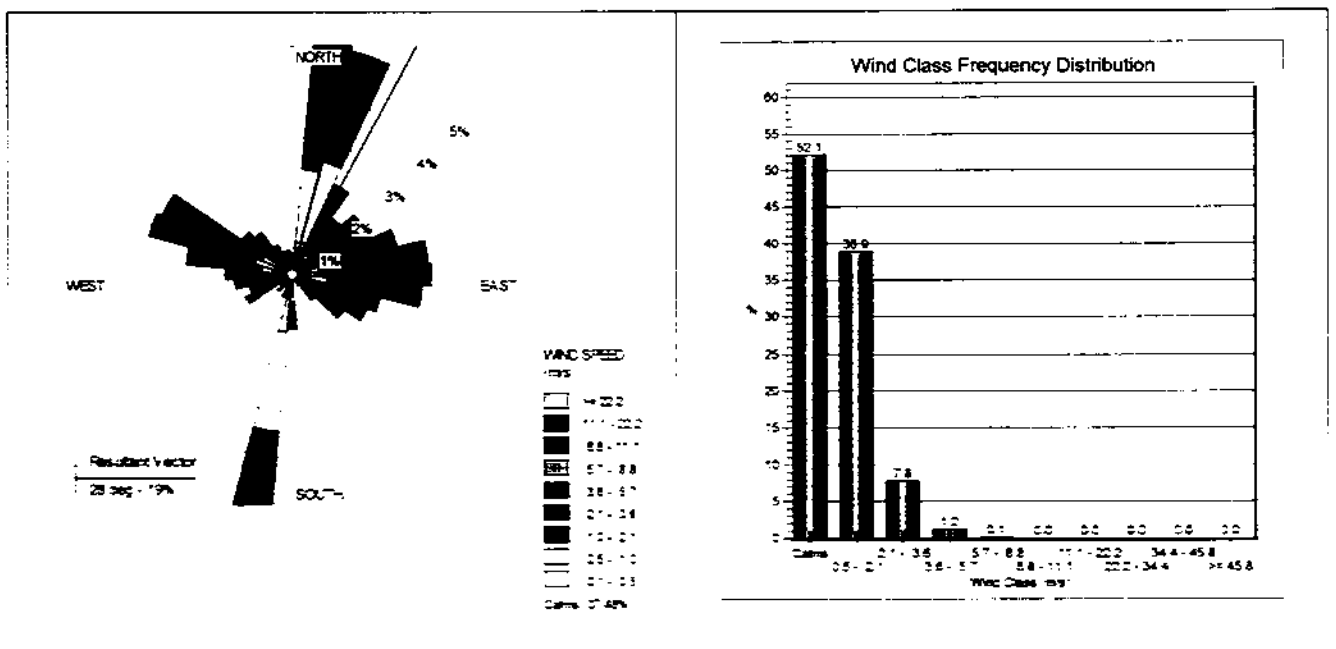


Figure No: 6.3 Wind Rose Diagram from 14 – 22 Hours

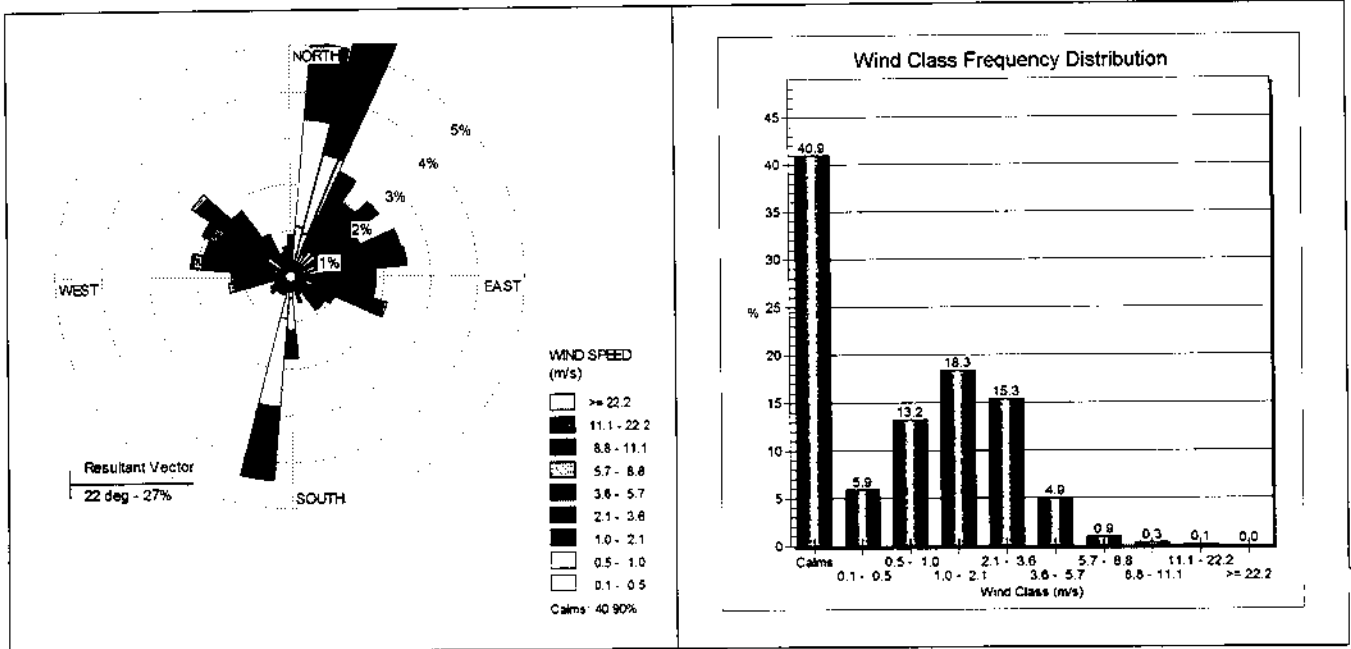


Figure No: 6.4 Wind Rose Diagram from 22 – 06 Hours

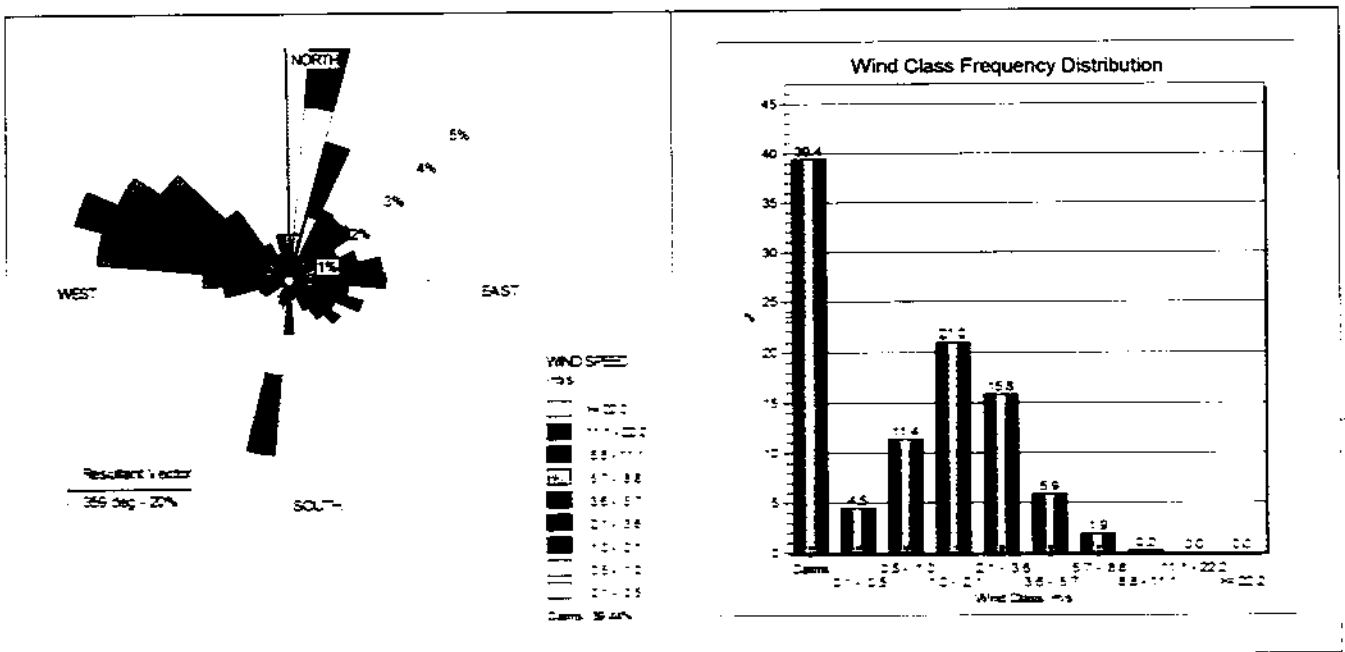


Table No: 6.2
AMBIENT AIR QUALITY DATA
 From 01.10.2016 to 31.03.2017
 Station: A-1 Stores Building (Line - 1)

Date	PM2.5	PM10	SO ₂	NO _x
05.12.2016	34	88	05	11
07.02.2017	30	84	05	11

Table No: 6.2A

Sl No	Date of Sampling	Parameters							
		NH ₃	O ₃	Lead (Pb)	Arsenic (As)	Nickel (Ni)	Benzene (C ₆ H ₆)	Carbon Monoxide (CO)	Benzo(a)pyrene (BaP) – Particulate Phase
Units		µg/m ³	µg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	mg/m ³	ng/m ³
Method of Analysis		APWA 3 rd Ed. Method - 401	APWA 3 rd Ed. Method - 411	APWA 3 rd Ed. Method - 822	APWA 3 rd Ed. Method - 804	APWA 3 rd Ed. Method - 822	IS 5182 (Part - 11)	Electro-chemical Sensor	IS 5182 (Part - 12)
1.	05.12.2016	31	26	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1
2.	07.02.2017	26	< 19.6	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1

Table No: 6.3
AMBIENT AIR QUALITY DATA
 From 01.10.2016 to 31.03.2017
 Station: A-2 DITC Building Near Line - 2

Date	PM2.5	PM10	SO ₂	NO _x
07.12.2016	36	99	04	15
09.02.2017	44	93	< 3	08

Table No: 6.3A

Sl No	Date of Sampling	Parameters							
		NH ₃	O ₃	Lead (Pb)	Arsenic (As)	Nickel (Ni)	Benzene (C ₆ H ₆)	Carbon Monoxide (CO)	Benzo(a)pyrene (BaP) – Particulate Phase
Units		µg/m ³	µg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	mg/m ³	ng/m ³
Method of Analysis		APWA 3 rd Ed. Method - 401	APWA 3 rd Ed. Method - 411	APWA 3 rd Ed. Method - 822	APWA 3 rd Ed. Method - 804	APWA 3 rd Ed. Method - 822	IS 5182 (Part - 11)	Electro-chemical Sensor	IS 5182 (Part - 12)
1.	07.12.2016	33	23	< 0.4	< 1.0	< 5.0	< 0.1	0.60	< 0.1
2.	09.02.2017	23	21	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1

Table No: 6.4
AMBIENT AIR QUALITY DATA
 From 01.10.2016 to 31.03.2017
 Station: A-3 Near Canteen Building (Line - 1)

Date	PM2.5	PM10	SO ₂	NO _x
05.12.2016	38	86	< 3	< 6
07.02.2017	20	80	< 3	13

Table No: 6.4A

Sl No	Date of Sampling	Parameters							
		NH ₃	O ₃	Lead (Pb)	Arsenic (As)	Nickel (Ni)	Benzene (C ₆ H ₆)	Carbon Monoxide (CO)	Benzo(a)pyrene (BaP) – Particulate Phase
Units		µg/m ³	µg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	mg/m ³	ng/m ³
Method of Analysis		APWA 3 rd Ed. Method - 401	APWA 3 rd Ed. Method - 411	APWA 3 rd Ed. Method - 822	APWA 3 rd Ed. Method - 804	APWA 3 rd Ed. Method - 822	IS 5182 (Part - 11)	Electro-chemical Sensor	IS 5182 (Part - 12)
1.	05.12.2016	28	23	< 0.10	< 1.0	< 5.0	< 0.1	0.44	< 0.1
2.	07.02.2017	56	< 19.6	0.50	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1

Table No: 6.5
AMBIENT AIR QUALITY DATA
 From 01.10.2016 to 31.03.2017
 Station: A-4 Near Loco Gate (Line - 1)

Date	PM2.5	PM10	SO ₂	NOx
05.12.2016	19	89	34	18
07.02.2017	32	86	49	16

Table No: 6.5A

Sl No	Date of Sampling	Parameters							
		NH ₃	O ₃	Lead (Pb)	Arsenic (As)	Nickel (Ni)	Benzene (C ₆ H ₆)	Carbon Monoxide (CO)	Benzo(a)pyrene (BaP) – Particulate Phase
Units		µg/m ³	µg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	mg/m ³	ng/m ³
Method of Analysis		APWA 3 rd Ed. Method - 401	APWA 3 rd Ed. Method - 411	APWA 3 rd Ed. Method - 822	APWA 3 rd Ed. Method - 804	APWA 3 rd Ed. Method - 822	IS 5182 (Part - 11)	Electro-chemical Sensor	IS 5182 (Part - 12)
1.	05.12.2016	< 20	22	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1
2.	07.02.2017	39	< 19.6	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1

Table No: 6.6
AMBIENT AIR QUALITY DATA
 From 01.10.2016 to 31.03.2017
 Station: A-5 CCR Building (Line - 1)

Date	PM2.5	PM10	SO ₂	NOx
06.12.2016	32	87	06	17
08.02.2017	31	98	38	30

Table No: 6.6A

Sl No	Date of Sampling	Parameters							
		NH ₃	O ₃	Lead (Pb)	Arsenic (As)	Nickel (Ni)	Benzene (C ₆ H ₆)	Carbon Monoxide (CO)	Benzo(a)pyrene (BaP) - Particulate Phase
Units		µg/m ³	µg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	mg/m ³	ng/m ³
Method of Analysis		APWA 3 rd Ed. Method - 401	APWA 3 rd Ed. Method - 411	APWA 3 rd Ed. Method - 822	APWA 3 rd Ed. Method - 804	APWA 3 rd Ed. Method - 822	IS 5182 (Part - 11)	Electro-chemical Sensor	IS 5182 (Part - 12)
1.	06.12.2016	< 20	< 19.6	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1
2.	08.02.2017	25	< 19.6	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1

Table No: 6.7
AMBIENT AIR QUALITY DATA
 From 01.10.2016 to 31.03.2017
 Station: A-6 Workshop Building (Line - 1)

Date	PM2.5	PM10	SO ₂	NOx
06.12.2016	25	94	< 3	11
08.02.2017	26	89	26	29

Table No: 6.7A

Sl No	Date of Sampling	Parameters							
		NH ₃	O ₃	Lead (Pb)	Arsenic (As)	Nickel (Ni)	Benzene (C ₆ H ₆)	Carbon Monoxide (CO)	Benzo(a)pyrene (BaP) - Particulate Phase
Units		µg/m ³	µg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	mg/m ³	ng/m ³
Method of Analysis		APWA 3 rd Ed. Method - 401	APWA 3 rd Ed. Method - 411	APWA 3 rd Ed. Method - 822	APWA 3 rd Ed. Method - 804	APWA 3 rd Ed. Method - 822	IS 5182 (Part - 11)	Electro-chemical Sensor	IS 5182 (Part - 12)
1.	06.12.2016	< 20	< 19.6	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1
2.	08.02.2017	40	< 19.6	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1

Table No: 6.8
AMBIENT AIR QUALITY DATA
 From 01.10.2016 to 31.03.2017
 Station: A-7 Near Water Harvesting Area of CPP (Line - 2)

Date	PM2.5	PM10	SO ₂	NOx
06.12.2016	30	83	< 3	16
08.02.2017	31	95	17	10

Table No: 6.8A

Sl No	Date of Sampling	Parameters							
		NH ₃	O ₃	Lead (Pb)	Arsenic (As)	Nickel (Ni)	Benzene (C ₆ H ₆)	Carbon Monoxide (CO)	Benzo(a)pyrene (BaP) – Particulate Phase
Units		µg/m ³	µg/m ³	µg/m ³	ng/m ³	ng/m ³	µg/m ³	mg/m ³	ng/m ³
Method of Analysis		APWA 3 rd Ed. Method - 401	APWA 3 rd Ed. Method - 411	APWA 3 rd Ed. Method - 822	APWA 3 rd Ed. Method - 804	APWA 3 rd Ed. Method - 822	IS 5182 (Part - 11)	Electro-chemical Sensor	IS 5182 (Part - 12)
1.	06.12.2016	< 20	< 19.6	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1
2.	08.02.2017	47	< 19.6	< 0.4	< 1.0	< 5.0	< 0.1	< 0.1	< 0.1

6.2 Stack Emission Monitoring

The Quarterly monitoring results of stack emission from the different units of the Cement Plant are given below:

Table No 6.9: Stack Emission Monitoring Results

Sl No	Location	Particulate Matter Concentration in mg/Nm ³	
		December 2016	February 2017
1	Coal Mill, Line - 2	08	05
2	RABH Kiln, Line - 2	11	04
3	Cooler, Line - 2	08	03
4	CVRM - 2, Line - 1	20	02
5	CVRM - 3, Line - 1	46	23
6	CVRM - 1, Line - 1	15	03
7	Boiler - 2 Outlet ESP	12	11
8	Boiler - 1 Outlet ESP	07	32
9	VRM, Line - 1	45	24
10	Coal Mill, Line - 1	-	14

7. CONCLUSION

7.1 Ambient Air Quality

It is concluded from the above study that the overall ambient air quality of the Cement Plant, both Line -1 and Line - 2 of OCL India Ltd. is good and the action taken by the plant authority were quite satisfactory.

7.2 Stack Emission Monitoring

The stack emission monitoring results of all control equipments monitored is very much effective and results are all within the prescribed standards by the State Pollution Control Board, Odisha.

Annual average-AAQ stations

Secure http://sunpcbri.das.com/AAQMS/Station

6 ☆



Year	Station Id.	NOX (ug/m ³)	PM10 (ug/m ³)	PM2.5 (ug/m ³)	SO2 (ug/m ³)	Station Id.	Location
2017	AAQMS-1	21.31	29.56	25.75	11.96	● AAQMS-	WORKSHOP BUILDING
2017	AAQMS-2	12.89	13.31	5.00	12.84	Threshold:	NOX:80.00, PM10:100.00, PM2.5:60.00, SO2:80.00
2017	AAQMS-3	20.31	29.45	11.23	8.62	● AAQMS-	RGP CLUB
2017	AAQMS-4	17.49	27.90	45.49	4.09	Threshold:	NOX:80.00, PM10:100.00, PM2.5:60.00, SO2:80.00
						● AAQMS-	STP
						Threshold:	NOX:80.00, PM10:100.00, PM2.5:60.00, SO2:80.00
						● AAQMS-	RGP CLUB MUNICIPALITY ROAD
						Threshold:	NOX:80.00, PM10:100.00, PM2.5:60.00, SO2:80.00

Reset Chart Max To Original

Year	Station Id.	NOX (ug/m ³)	PM10 (ug/m ³)	PM2.5 (ug/m ³)	SO2 (ug/m ³)	Station Id.	Location
2017	AAQMS-1	21.31	29.56	25.75	11.96	AAQMS-1	WORKSHOP BUILDING
2017	AAQMS-2	12.89	13.31	5.00	12.84	Threshold:	NOX:80.00, PM10:100.00, PM2.5:60.00, SO2:80.00
2017	AAQMS-3	20.31	29.45	11.23	8.62	AAQMS-2	RGP CLUB
2017	AAQMS-4	17.49	27.90	45.49	4.09	Threshold:	NOX:80.00, PM10:100.00, PM2.5:60.00, SO2:80.00
						AAQMS-3	STP
						Threshold:	NOX:80.00, PM10:100.00, PM2.5:60.00, SO2:80.00
						AAQMS-4	RGP OCL COLONY MUNICIPALITY ROAD
						Threshold:	NOX:80.00, PM10:100.00, PM2.5:60.00, SO2:80.00

Annual Average-CEMS stations



LIST VIEW DASH BOARD

Year	Station Id.	NOX (avg. Avg)	PM (avg. Avg)	SOX (avg. Avg)	Station Id.	Location
2017	CEMS-1	353.45	20.85	12.31	● CEMS-1	LINE-1 KILN ESP
2017	CEMS-10	211.62	34.56	118.24	Threshold:	NOX:800.00, PM:100.00, SOX:100.00
2017	CEMS-2	N/A	28.78		● CEMS-2	LINE-1 COAL MILL BH
2017	CEMS-3	N/A	21.48		Threshold:	PM:100.00
2017	CEMS-4	N/A	23.49		● CEMS-3	LINE-1 COOLER ESP
2017	CEMS-5	N/A	16.54		Threshold:	PM:100.00
2017	CEMS-6	N/A	32.65		● CEMS-4	LINE-1 CVRM-1
2017	CEMS-7	370.55	8.56	14.67	Threshold:	PM:100.00
2017	CEMS-8	N/A	13.16		● CEMS-5	LINE-1 CVRM-2
2017	CEMS-9	N/A	11.23		Threshold:	PM:100.00
					● CEMS-6	LINE-1 CVRM-3
					Threshold:	PM:100.00
					● CEMS-7	LINE-2 KILN REVERSE AIR BH
					Threshold:	NOX:800.00, PM:100.00, SOX:100.00

Year	Station Id.	NOX (avg. Avg)	PM (avg. Avg)	SOX (avg. Avg)
2017	CEMS-1	353.45	20.85	12.31
2017	CEMS-10	211.62	34.56	118.24
2017	CEMS-2	N/A	28.78	
2017	CEMS-3	N/A	21.48	
2017	CEMS-4	N/A	23.49	
2017	CEMS-5	N/A	16.54	
2017	CEMS-6	N/A	32.65	
2017	CEMS-7	370.55	8.56	14.67
2017	CEMS-8	N/A	13.16	
2017	CEMS-9	N/A	11.23	

Station Id. Location

CEMS 1 LINE 1 KILN ESP
 Threshold: NOX:800.00, PM:100.00, SOX:100.00

CEMS 10 CPP
 Threshold: NOX:300.00, PM:100.00, SOX:600.00

CEMS 2 LINE 1 COAL MILL BH
 Threshold: PM:100.00

CEMS 3 LINE 1 COOLER ESP
 Threshold: PM:100.00

CEMS 4 LINE 1 CVRM 1
 Threshold: PM:100.00

CEMS 5 LINE 1 CVRM 2
 Threshold: PM:100.00

CEMS 6 LINE 1 CVRM 3
 Threshold: PM:100.00

CEMS 7 LINE 2 KILN REVERSE AIR BH
 Threshold: NOX:800.00, PM:100.00, SOX:100.00

CEMS 8 LINE 2 COAL MILL BH
 Threshold: PM:100.00

CEMS 9 LINE 2 COOLER ESP
 Threshold: PM:100.00

Real Time Data Acquisition System

LIST VIEW DASH BOARD

Year	Station Id.	PH (mg/l)	TEMP (in °C)	TSS (in mg/l)
2016	EQMS-1	8.72	32.95	29.35
2017	EQMS-1	8.06	25.15	28.44

Station Id. Location
 ● EQMS-1 WTP
 Threshold: PH:9.00, TEMP:50.00, TSS:100.00
 Reset Chart Max To Original