

Registered AD

HZL/CLZS/ENV/33/2020-21/

16.11.2020

To,

Shri V K Singh, IFS  
Additional Principal Chief conservator of forest ( C)  
Ministry of Environment and Forests and climate change  
Regional officer( CZ) Kendjya Bhawan,  
5 Floor, Sector H – Aliganj,  
LUCKNOW – 226024,

Sub : Six monthly Environmental compliance report.

Ref :

Environmental Clearance Letter No. J-11011/279//2006-IA.II(I) DATED, 06.12.2006  
Environment Clearance Letter No. J-11011/279/2006-I A II (I) DATED 05.10.2015

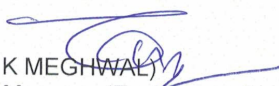
Sir,

Please find enclosed herewith the six monthly compliance report with reference to above Environmental Clearances for Hydro II & 100 MW CPP CLZS location in including Fumer Plant for Period 01.04. 2020 to 30.09.2020

With all the enclosures.

Thanking you,

Yours faithfully,



(T K MEGHWAL)  
Sr.Manager (Environment)

**Hindustan Zinc Limited**

Sensitivity: Internal (C3)

Chanderiya Lead Zinc Smelter P.O. Putholi, Chittorgarh (Rajasthan) - 312 021  
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CIN : L27204RJ1966PLC001208

# HYDRO 2 PLANT & 100 MW CPP

**Environment Compliance Report of Chanderiya Lead Zinc Smelter, Chittorgarh with reference to Environmental Clearance letter No No. J-11011/279//2006-IA.II(I) DATED, 06.12.2006 for 250,000 TPA Zinc & 100 MW CPP**

No	Condition	Compliance Status
1.0	This has reference to your letter No. HZL/CLZS/ENV/MoEF/06/9586 dated 24th July, 2006 along with application, EIA/EMP and related project documents and subsequent clarifications furnished by you vide your letters dated 7 <sup>th</sup> August, 2006 and 4th September, 2006 for seeking environmental clearance of the above mentioned project under the EIA Notification, 1994.	<ol style="list-style-type: none"> <li>1) After EIA &amp; Public hearing we obtained environment clearance from MoEF.</li> <li>2) Comply all conditions imposed by MoEF.</li> <li>3) Strictly follow EIA Notification, 1994.</li> </ol>
2.0	The Ministry of Environment and Forests has examined your application. It is noted that the proposal involves expansion of Zinc smelter 2,50,000 TPA (2,10,000 TPA Zinc smelter and 40,000 TPA by de-bottlenecking of existing 1,70,000 TPA Zinc smelter) and Captive Power Plant (100 MW) at Putholi, Gangrar, Chittorgarh, Rajasthan. No additional land will be required since the expansion project will be set up in 26.5 ha out of existing 335.85 ha. land available. Zinc concentrates will be sourced from the captive mines of HZL viz. Rampura Agucha Mines, Rajpura Dariba Mines, Zawar Mine, Sindesar Khurd Mines. Calcine will be sourced from other zinc smelters (captive/imported).	<ol style="list-style-type: none"> <li>1) All expansion carried out as per EIA Notification. Expansion of Zinc smelter 2,50,000 TPA (2,10,000 TPA Zinc smelter and 40,000 TPA by de-bottlenecking of existing 1,70,000 TPA Zinc smelter) and Captive Power Plant (100 MW) at Putholi, Gangrar, Chittorgarh, Rajasthan.</li> <li>2) No additional land is being required for the said expansion project</li> <li>3) It was set up in 26.5 ha out of existing 335.85 ha. land available.</li> <li>4) Zinc concentrates is a source from the captive mines of HZL viz. Rampura Agucha Mines, Rajpura Dariba Mines, Zawar Mine, Sindesar Khurd Mines. Calcine will be sourced from other zinc smelters (captive/imported )</li> </ol>
3.0	Bag filters and ESP will be installed to control dust and air emissions. Total water requirement from Gosunda Dam will be 11,000 m <sup>3</sup> /d and permission accorded by the Govt. of Rajasthan. The effluent will be treated in the ETP followed by Reverse Osmosis. The waste water generated from CPP will be recycled and used for dust suppression in coal and ash handling areas. The	<ol style="list-style-type: none"> <li>1) Agreed and complied during operation.</li> <li>2) Process effluents being treated in a separate ETP (175m<sup>3</sup>/hr) followed by reverse osmosis plant (160m<sup>3</sup>/hr) and 3<sup>rd</sup> stage RO (42 m<sup>3</sup>/hr) Zero discharge is being maintained.</li> </ol>

	RO rejects, ETP sludge, Cobalt cake, cooler cake, anode mud, enrichment cake, and spent catalyst etc. will be sent to existing secured landfill. Waste / used oil will be sold to registered recyclers. Ash will be given to cement / brick manufacturers.	<ol style="list-style-type: none"> <li>3) For better management of RO reject and further water reclamation a new 3<sup>rd</sup> stage RO plant commissioned .</li> <li>4) The effluent generation from the CPP is being recycled and used for dust suppression in coal and ash handling areas.</li> <li>5) The hazardous wastes generated from the process are stabilized and disposed in the existing secured landfill.</li> <li>6) Ash is being disposed to cement/brick manufacturers.</li> <li>7) Waste and used oil is being sold to registered recyclers.</li> </ol> <p><b>ETP Treated water results annexed as annexure 1.</b></p>
4.0	Public hearing panel has recommended the project in the meeting held on 29 <sup>th</sup> June, 2006. 'No Objection Certificate' has been accorded by the Rajasthan State Pollution Control Board vide letter No.12 (CII-78) RPCB/G.III/1432 dated 3 <sup>rd</sup> August, 2006. Total cost of the project is Rs. 970.00 Crores.	<ol style="list-style-type: none"> <li>1) Our project cleared all steps as EIA notification.</li> <li>2) Total Project Cost was 970 crore.</li> </ol>
5.0	The Ministry of Environment & Forests hereby accords environmental clearance to the above project under the provisions of EIA Notification dated 14 <sup>th</sup> September, 2006 subject to strict compliance of the following specific and general conditions.	<ol style="list-style-type: none"> <li>1) Comply all condition imposed in EC letter.</li> <li>2) Strictly follow EIA notification</li> </ol>
<b>A. SPECIFIC CONDITIONS:</b>		
i	The gaseous emissions from various process units shall conform to the standards prescribed by the concerned authorities from time to time. The Rajasthan State Pollution Control Board (RSPCB) may specify more stringent standards for the relevant parameters keeping in view the nature of the industry and its size and location. At no time, the emissions level shall go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit shall not be restarted until the control measures are rectified to achieve the desired efficiency.	<ol style="list-style-type: none"> <li>1) Is Being complied for all relevant standards.</li> <li>2) Pollution control systems are interlocked with process and it is being ensured that emission levels are well below prescribed limit at any time.</li> <li>3) In the event of failure of any pollution control system adopted by the unit, the respective unit is being shutdown until the control measures are rectified to achieve the desired efficiency.</li> </ol>

ii	<p>The company shall install on-line stack emission monitoring equipments for continuous monitoring of SO<sub>2</sub>, NO<sub>x</sub>, SPM and O<sub>2</sub> and all the pollution control measures shall be interlocked. The company shall install fume extractors and bag filters to control the emissions from all melting &amp; casting units. Electrostatic precipitators (ESP) in Captive Power Plant (CPP), Gas Cleaning Plant (GCP) and Sulphuric acid plant shall be installed to control dust and SO<sub>2</sub> emissions within the stipulated limits of 50 mg/Nm<sup>3</sup>. The low NO<sub>x</sub> burners shall be installed to control the NO<sub>x</sub> emissions.</p>	<ol style="list-style-type: none"> <li>1) Being complied with all the conditions.</li> <li>2) Online SO<sub>2</sub> analyzer installed at Sulphuric Acid plant stack.</li> <li>3) Online analyzers installed in the CPP stack to measure SO<sub>2</sub>, NO<sub>x</sub>, PM. In CPP, low NO<sub>x</sub> burners installed to control the NO<sub>x</sub> emissions.</li> </ol> <p><b>Stack Monitoring results annexed as annexure II</b></p>
iii	<p>Impact of SO<sub>2</sub> emissions from H<sub>2</sub>SO<sub>4</sub> plant and CPP in ambient air shall be assessed by the project proponent and a detailed report submitted to the Ministry including its Regional Office at Lucknow, CPCB and RSPCB</p>	<ol style="list-style-type: none"> <li>1) SO<sub>2</sub> is measured in Ambient air through manual monitoring &amp; continuous ambient air monitoring analyzers and report is submitted to MOEF, CPCB &amp; RSPCB.</li> </ol> <p><b>Acid Stack Monitoring results annexed as annexure III</b></p>
iv	<p>All the recommendations made in Charter for Corporate Responsibility for Environment Protection (CREP) shall be strictly followed and SO<sub>2</sub> emission limit shall be controlled less than 2 kg/ton of H<sub>2</sub>SO<sub>4</sub> produced and acid mist limit of 50 mg/Nm<sup>3</sup> shall be achieved by December, 2006.</p>	<ol style="list-style-type: none"> <li>1) CREP is strictly followed.</li> <li>2) SO<sub>2</sub> emission from acid plant kept within limit of 2 kg/ton of H<sub>2</sub>SO<sub>4</sub> produced and acid mist limit of 50 mg/Nm<sup>3</sup>.</li> </ol>
v	<p>Fugitive emissions, acid mist vapours, fumes and SO<sub>2</sub> shall be controlled and work environment monitored for prevailing contaminants regularly. Fugitive dust emissions in the handling area and at various transfer points shall be minimized by provision of dust suppression system. Bag filters shall be installed in the Roaster, Calcine handling &amp; storage section, Zinc atomizing unit, Dross milling section to control fugitive emissions. The Company shall improve overall house keeping by asphaltting the internal roads and to reduce the generation of fugitive dust from vehicle movements</p>	<ol style="list-style-type: none"> <li>1) In order to minimize fugitive emissions, Zn concentrate containing 8-10% moisture is being used.</li> <li>2) Provision of water sprinkling at Zn concentrate stock yard is being provided.</li> <li>3) Dust control system is being provided at material transfer points.</li> <li>4) All the internal roads are concreted to reduce the dust emission.(4)</li> <li>5) Mobile vacuum dust sweeping system on roads and vacuum dust cleaning system for plant area is being provided at smelter to control airborne dust due to the vehicle movements.</li> <li>6) Regular road washing will be done on roads.</li> </ol>
vi	<p>Total water requirement from Gosunda dam shall not exceed 34,000 m<sup>3</sup>/d as allocated by the</p>	<ol style="list-style-type: none"> <li>(1) Total water requirement is not exceeding 34000 m<sup>3</sup>/day for the</li> </ol>



	<p>Energy Department, Govt. of Rajasthan and water shall also be released from the Gosunda Dam for the use by the public as per the agreement signed. It shall be ensured that irrigation in the surrounding areas is not affected due to non-release of water by HZL. No ground water will be used. As reflected in the EIA/EMP, all the effluent generated shall be treated in the ETP followed by feeding to Reverse Osmosis (RO) plant. The water treated in RO Plant shall be recycled in the process and rejects of RO plant shall be evaporated in solar evaporation pond. The RO rejects and ETP sludge shall be sent to existing secured landfill. The wastewater generated from CPP shall be recycled and used for dust suppression in coal and ash handling areas. The treated effluent shall conform to the prescribed standards and recycled to maintain the zero discharge.</p>	<p>operation of CLZS location</p> <p>(2) Process effluents being treated in a separate ETP (175m<sup>3</sup>/hr) followed by reverse osmosis plant (160m<sup>3</sup>/hr) and 3<sup>rd</sup> stage RO (42 m<sup>3</sup>/hr)</p> <p>(3) The quality of the treated water is within the prescribed limits. Zero discharge is being maintained.</p> <p>(4) RO reject is being evaporated in solar evaporation pond and also used for spraying on waste disposal areas For better management of RO reject and further water reclamation a new 3<sup>rd</sup> stage RO plant at location was commissioned.</p> <p>(5) The effluent generated from the CPP is used for dust suppression in coal and ash handling areas and treated in RO plant.</p>															
vii	<p>The solid waste generated in the form of Jarosite shall be stabilized as Jarofix and disposed off in Jarofix disposal yard inside the plant premises. Cobalt cake, cooler cake, anode mud, enrichment cake, ETP sludge and spent catalyst etc. shall be disposed off in secured landfill (SLF). Waste/used oil shall be sold to registered recyclers. Ash shall be given to cement / brick manufacturing units.</p>	<p>1) Jarosite is being stabilized as Jarofix and then disposed in lined Jarofix disposal yard.</p> <p>2) Cobalt cake, cooler cake, enrichment cake, ETP sludge and spent catalyst etc. is disposed off in captive secured landfill (SLF) after stabilization.</p> <p>3) Anode mud is being recycled back in to the process. Surplus, if any, disposed in SLF after stabilization.</p> <p>4) Ash generated from Power Plant is given to Cement plants/brick manufacturing.</p>															
viii	<p>Canopy based green belt of adequate width and density in and around the around the periphery of plant, township and captive power plant in 142 ha. shall be developed as per CPCB guidelines.</p>	<table border="1"> <thead> <tr> <th data-bbox="964 1675 1101 1745">Particulate</th> <th data-bbox="1105 1675 1198 1745">CLZS</th> <th data-bbox="1203 1675 1312 1745">Zinc colony</th> <th data-bbox="1317 1675 1442 1745">Total</th> </tr> </thead> <tbody> <tr> <td data-bbox="964 1751 1101 1864">Total Area (in hectares)</td> <td data-bbox="1105 1751 1198 1864">335.89</td> <td data-bbox="1203 1751 1312 1864">61</td> <td data-bbox="1317 1751 1442 1864">396.89</td> </tr> <tr> <td data-bbox="964 1871 1101 1896">Area</td> <td data-bbox="1105 1871 1198 1896">121.7</td> <td data-bbox="1203 1871 1312 1896">25.84</td> <td data-bbox="1317 1871 1442 1896">147.61</td> </tr> </tbody> </table>				Particulate	CLZS	Zinc colony	Total	Total Area (in hectares)	335.89	61	396.89	Area	121.7	25.84	147.61
Particulate	CLZS	Zinc colony	Total														
Total Area (in hectares)	335.89	61	396.89														
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		under plantation (in hectares)	7		+ 7.0 (secondary growth)
		% Green Belt	33.60	42.36	

**B. GENERAL CONDITIONS:**

i	The project authorities must strictly adhere to the stipulations made by the Rajasthan State Pollution Control Board and the State Government.	All the conditions stipulated by RSPCB and state Govt is strictly complied.
ii	No expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	No modifications has been done. For Fumer we obtained EC from MoEF.
iii	Adequate number of ambient air quality-Monitoring stations shall be established in the downward direction as well as where maximum ground level concentration of SPM, SO <sub>2</sub> and NO <sub>x</sub> are anticipated in consultation with the Rajasthan State Pollution Control Board. Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional Office at Lucknow and the CPCB / RSPCB once in six months.	1) Four Nos. of ambient air quality monitoring stations installed in the plant upward and downward direction, report regularly sent to RSPCB. 2) State pollution control board also monitored the same periodically.  <b>AAQ Monitoring results annexed as annexure 4</b>
iv	Industrial waste water shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 <sup>th</sup> May, 1993 and 31 <sup>st</sup> December, 1993 or as amended form time to time. The treated wastewater shall be recycled in the plant as well as utilization for plantation purposes.	1) Industrial waste water properly treated to confirm all the prescribed norms and recycled back in to process plants. 2) Continue to maintain Zero discharge.
v	The project authorities must strictly comply with the rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management and Handling) Rules, 2003. Authorization from the State Pollution Control Board must be obtained for collection, storage, treatment and disposal of hazardous wastes.	All the conditions of Hazardous waste (management and handling) rules 2003, 2008 are followed. (2) Hazardous waste authorization is obtained from RSPCB and is valid till 2019.
vi	The overall noise levels in and around the plant area shall be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient	Regular monitoring is being done and control measures are being taken.

	noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).	
vii	Occupational Health Surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	Occupational health monitoring is regularly carried out.
viii	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA / EMP /risk analysis and DMP report.	As per EMP 1) For air emission control- we have installed ESP, bag house, Venturi, cyclone and gas wash tower for Air emission control. 2) For Effluent management we have integrated water management system in place with ETP, RO and 3 <sup>rd</sup> stage RO. 3) For Hazadous waste management we have adopted best available technology and have captive secured landfill.
ix	The project authorities shall provide Rs. 111.50 Crores and Rs. 12.00 Crores towards capital cost and recurring cost/annum for environmental pollution control measures to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government and submit an implementation schedule for all the conditions stipulated herein to this Ministry and its Regional Office at Lucknow. The funds so provided shall not be diverted for any other purposes.	All pollution control measures has been installed and checked by RSPCB. (2) Approx. Recurring cost of CLZS was approx Rs 30 Cores to maintain ETP, RO,ESP, Venturi, Gas cleaning system, Bag houses, and online analyzers etc.
x	The Regional Office of this Ministry at Lucknow, CPCB / RSPCB shall 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 Environment clearance compliance report submitted on regular basis to MOEF.
xi	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 the State Pollution Control Board/ Committee and may also be seen at Website of the Ministry of Environment and Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a> . This shall be advertised within seven days from the date of issue of the clearance letter at least in two local	Accordance of Environment clearance advertised in two local newspapers that are widely circulated and a copy of the same is sent to your good office.

	newspaper that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the Regional office.	
xii	The Project Authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	In case of closure, closure plan will be submitted to Ro MOEF
6	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Noted and agreed
7	The Ministry reserves the right to stipulate additional conditions if found necessary. The company in a time bound manner will implement these conditions.	Noted
8	The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Hazardous Wastes (Management and Handling) Rules, 2003 and the Public Liability Insurance Act, 1991 along with their amendments and rules.	Noted

# FUMER PLANT

**Environment Compliance Report of Chanderiya Lead Zinc Smelter, Chittorgarh with reference to Inclusion of Fumer Plant (Pyro metallurgical Process) within the existing Zinc Smelter (2,50,000 TPA) and CPP (100MW) plant to convert Jarosite to slag At Village- Putholi, District, Chittorgarh, Rajasthan by M/s Hindustan Zinc Ltd.**

The Ministry of Environment, Forest and Climate Change (MoEF & CC) on recommendations of the EAC (I), decided to grant Environmental Clearance to Include Fumer Plant to convert Jarosite to slag under provisions of EIA Notification dated 14<sup>th</sup> September 2006, subject to strict compliance of the following Specific and General conditions:

A.	Specific Conditions	Status
i	The project proponent should install 24x7 air monitoring devices to monitor air emission as provided by CPCB and submit report to Ministry and its Regional Office.	1) We have total 4 CAAQM station installed at up wind and down wind direction of plant 2) One at archaeological important location Chittorgarh Fort. 3) Operation of all instrument are as per CPCB Guidelines. Reports are regularly sent to statutory authority.
ii	The Committee observed that the piezometer samples have shown very high sulphate content upto 3158 mg/l. this indicate seepage of leachate from the jarofix in the landfill. This needs to be investigated and an action plan for remedial action needs to be submitted to the ministry within 6 months.	M/s Vimta Lab Hyderabad was engage to carry out the study for identification and causes and remedial action report was already submitted .
iii	All the slag from the Fumer plant should be utilized in the cement plant.	Agreed, agreement between cement plant and HZL for Fumer plant slag, dully sign by both parties.
iv	All the existing jarofix landfill site should be scientifically capped as per CPCB guideline	1) We have already covered exhausted Jarofix disposal yard with HDPE liner 2) Current and active site is also being covered with HDPE liner regularly 3) Jarosite is excluded from the Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016.Dated 04.04.2016.
V	The PP should install piezometer on the northern side of the new landfill site.	Complied, installed as per guidelines.

<b>B.</b>	<b>General Conditions</b>	<b>Status</b>
i	The project authorities must strictly adhere to the stipulations made by the RSPCB and GoR	Agreed
ii	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF & CC)	No further expansion or modifications in the plant is being carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF & CC)
iii	At least four ambient air quality monitoring stations should be established in the downward direction as well as here maximum ground level concentration of PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> and NO <sub>x</sub> are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission shall be regularly submitted to this Ministry including its Regional Office at Luck now and the SPCB/CPCB once in six months.	1) Six monthly report regularly submitted to CPCB/RSPCB/ MoEF & CC. 2) All stack are attached with online monitoring system and on line data transmitted to CPCB/RSPCB servers.
iv	Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 <sup>th</sup> May, 1993 and 31 <sup>st</sup> December, 1993 or as amended from time to time. The treated wastewater shall be utilized for plantation purpose.	Industrial wastewater is properly collected, treated at ETP followed by RO.  The treated wastewater is utilized for Process purpose.
v	The overall noise levels in and around the plant area shall be kept well within the standards (85 dBA) 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 EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (night time).	1) The overall noise levels in and around the plant area kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. 2) The ambient noise levels always within the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (night time).
vi	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	Occupational health surveillance of the workers are carried out on a regular basis and records maintained as per the Factories Act.
vii	The company shall develop rain water harvesting structures to harvest the rain water for utilization in the lean season besides recharging the ground water table.	(1) The company has developed rain water harvesting system in colony (Zinc Nagar) with Cost around 16.0 lac (2) No. of Anicut developed through our CSR activity for the recharging of ground water and also recharged the abandoned well in the near by villages..
viii	The project proponent shall also comply with all the environmental protection	(1) Complied, all the environmental protection measures and safeguards recommended

	measures and safeguards recommended in the EIA/EMP report. Further, the company must undertake socio-economic development activities in the surrounding villages like community development programmes, educational programmes, drinking water supply and health care etc.	in the EIA/EMP report. (2) We have also under taken socio-economic development activities in the surrounding villages like community development programmes, educational programmes, drinking water supply and health care etc.
ix	Requisite funds shall be earmarked towards capital cost and recurring cost/annum for environment pollution control measures to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change (MoEFCC) as well as the State Government. An implementation schedule for implementing all the conditions stipulated herein shall be submitted to the Regional Office of the Ministry at Lucknow. The funds so provided shall not be diverted for any other purpose.	(1) Requisite funds allotted towards capital cost and recurring cost/annum for environment pollution control measures to comply the stipulated conditions. Ministry of Environment, Forest and Climate Change (MoEFCC) as well as the State Government. (2) An implementation schedule for implementing all the conditions stipulated will be submitted to the Regional Office of the Ministry at Lucknow as per requirement The funds so provided shall not be diverted for any other purpose.
x	A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent	(1) Complied, EC letter already sent to concerned Panchayat, Zila Parishad /Municipal Corporation, Urban Local Body etc. (2) EC letter will be put on Web site.
xi	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MoEFCC at Lucknow. The respective Zonal Off of CPCB and the SPCB. The criteria pollutant levels namely; PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> , (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain	Shall be complied after commissioning of the Fumer plant which is under process. Consent to Operate received from SPCB Jaipur.
xii	The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results	Six monthly compliance reports regularly sent to all the concerned regulatory authorities for existing operations,

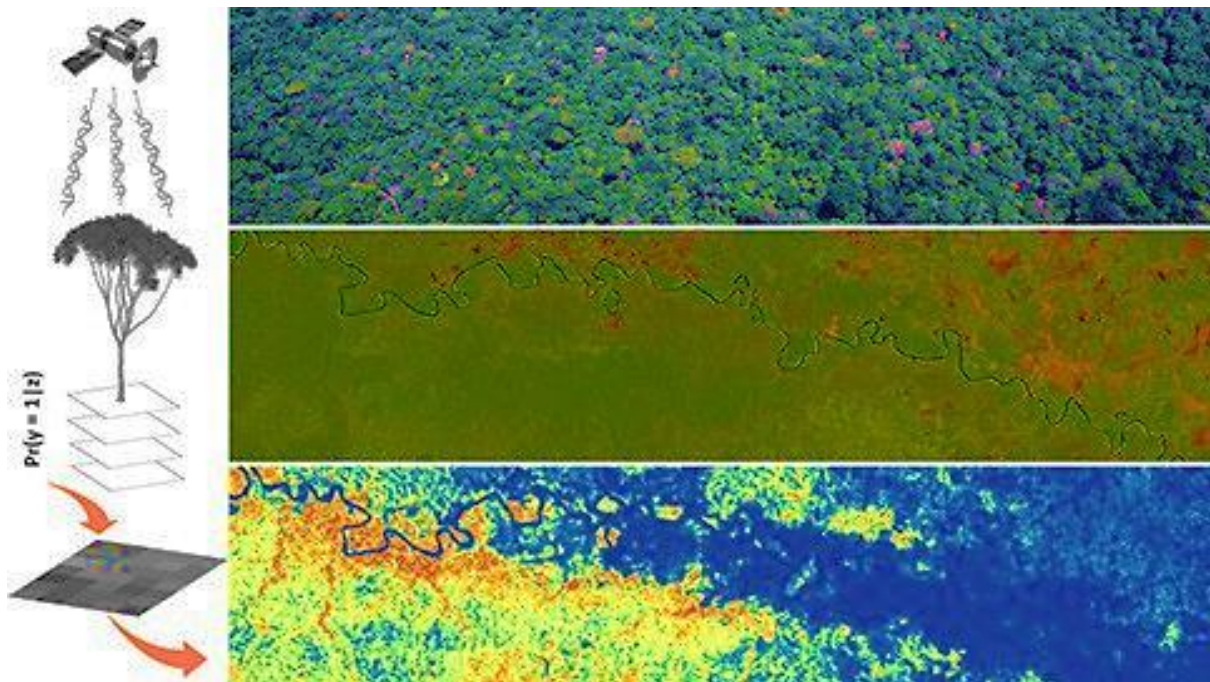
	of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEFCC, the respective Zonal Office of CPCB and the SPCB. The regional Office of this Ministry at Lucknow / CPCB/SPCB shall monitor the stipulated conditions.	We will send as per requirement for Fumer plant also after commissioning.
xiii	The environmental statement for each financial year ending 31 <sup>st</sup> March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental conditions and shall also be sent to the respective Regional Office of the MOEFCC at Lucknow by e-mail.	The environmental statement for each financial year ending 31 <sup>st</sup> March in Form-V. Regularly submitted to RSPCB Jaipur and RO office Chittorgarh.  New requirement for the Fumer plant will be complied after commissioning of the plant.
xiv	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 the SPCB and may also be seen at Website fo the Ministry of Environment, Forests and Climate Change (MoEFCC) as <a href="http://envfor.nic.in">http://envfor.nic.in</a> . this shall be advertised within seven days form the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional office at Lucknow	(1) Informed to all concerned. (2) Already, Advertised in two local newspapers that are widely circulated in the region of which one was in the vernacular language of the locality concerned .
xv	Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	Shall be complied
8	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Noted
9	The Ministry reserves the right to stipulate additional conditions if found necessary. The company in a time bound manner shall implement these conditions.	Noted



10	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous Waste (Management, Handling and Trans boundary Movement) Rules, 2008 and the Public (Insurance) Liability Act, 1991 along with their amendments and rules.	Noted and shall be complied.
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# Greenbelt Estimation using GIS

## Chanderiya Lead Zinc Smelter, HZL



November 2020



**Terracon Ecotech Private Limited**

202, Kingston, Tejpal Road, Vile Parle (East), Mumbai, Maharashtra 400057

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## Acknowledgement

We are thankful to Mr. Sachin Samar, Head, Environment, Chanderiya Lead Zinc Smelter (CLZS) for assigning us this opportunity to estimate greenbelt using GIS. We express our gratitude to thanks his unrelenting support, coordination, invaluable inputs and active involvement in the Project.

This project also involved various staff members from CLZS, we thank each and every one of them for their active involvement leading to successful and timely completion of the project.

A handwritten signature in blue ink that reads "Ashok Jain".



**Ashok Jain**  
Managing Director  
Terracon Ecotech Private Limited

## Executive Summary

A systematic mass plantation of pollution tolerant trees in order to mitigate air pollution by filtering, intercepting or absorbing air pollutants is known as ‘Greenbelt’. A greenbelt around industrial areas aims at creating pollution free, sustainable environment.

Greenbelt can be mapped using either remotely sensed data obtained from satellite, drones, or aircraft or digitization of green areas using GIS software like ArcGIS, ERDAS, QGIS, etc. The satellite data in form of multispectral imagery consist of data obtained on different wavelengths in an electromagnetic spectrum. These data can be used to calculate vegetation indices for obtaining the amount of green cover and tree cover.

For the estimation of green cover in Chanderia Lead Zinc Smelter (CLZS), Modified Soil Adjusted Vegetation Index (MSAVI-2), a modified version of the NDVI index was used. For calculation of Modified MSAVI-2, Pléiades 1 satellite imagery (29<sup>th</sup> February 2020) was procured. Pléiades 1 product has a spatial resolution of 0.5m. ‘Indices’ tool in unsupervised classification tab in ERDAS software was used.

Class	Area in Hectares	Percentage
Green cover	166	37

The total area of CLZS is 437 hectares. The MSAVI-2 analysis revealed that the total green cover area is 166 hectares i.e. 37% of total CLZS area. Out of 166 hectares, 34 hectare area has a new plantation of around 1-2 years old. The balance 132 hectares accounts to trees, shrubs, herbs and lawns.



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## Introduction

A systematic mass plantation of pollution tolerant trees in order to mitigate air pollution by filtering, intercepting or absorbing air pollutants is known as **'Greenbelt'**. A greenbelt around industrial areas aims at creating pollution free, sustainable environment.

Green belts are often recommended for Industries as a part of Environment management strategies. Green belt is recognized to provide multifunctional services and aid in sustainable development. Industrialized areas often face air pollution problems and higher atmospheric temperatures due to anthropogenic activities. The ambient air quality of an industrialized area can be restored by creating an effective greenbelt design. Many times, industries are located near settlements. In such scenario, restriction of pollutants near its source by creating vegetation buffer is the most suitable practice. Creation of such buffer zone needs systematic plantation of trees and shrubs.

Green belt is essential; in many ways that eventually lead to conservation of biodiversity. They are often safeguarded in the sense that developmental activities are prohibited in these selected areas and these locations will only be used for growing vegetation. An ideal greenbelt consists of diverse woody plants that aid in pollution mitigation as well as maintain the ecological balance of the surrounding environment, along with lawns, herbs and shrubs. Greenbelt development provides benefits such as –

- Overall improvement of the environmental conditions of a region.
- Mitigation of air pollution as well as enhancement of biodiversity and aesthetic value of a particular area
- Prevention of soil erosion and ultimately, land degradation
- Attenuates noise pollution as plants are efficient absorbers of noise
- Provides regulatory and supporting ecosystem services such as micro-climate regulation, carbon sequestration, etc.

## Greenbelt Benefits



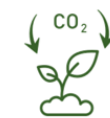
Environment  
condition  
improvement



Noise control



Soil erosion  
control



Carbon  
Sequestration



Air pollution  
control



## Profile for Study area

Chanderiya Lead Zinc Smelter (CLZS) is world's largest integrated smelter located in the Chittorgarh district of Rajasthan. CLZS, hereafter called study area, is situated on an area of 437 hectares. There are various units of hydro and pyro smelting processes. It also has several administrative buildings. A small residential colony, CSF is located near the main entrance.



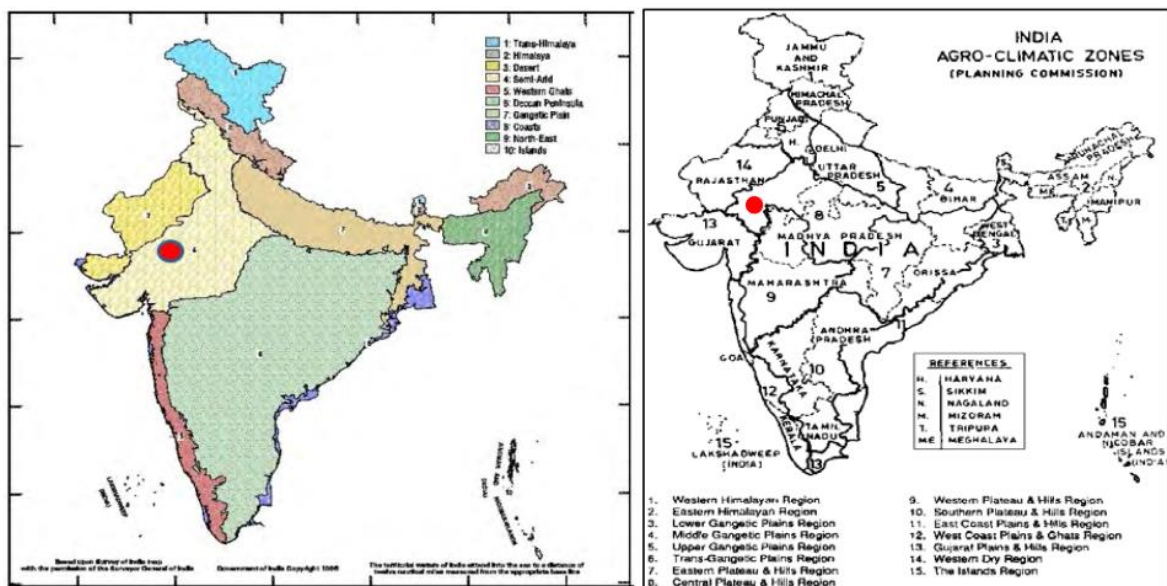
**Study area boundary**

The study area has an existing greenbelt zone which forms the major green cover of the factory area. It is surrounded by settlements like Billiya Khera, Putholi, agricultural fields, and other small marble industries. Vedanta formally began its commitment to biodiversity protection in 2011 by drafting its Biodiversity Policy. The current study has been carried out to observe the progress of the greenbelt developmental efforts and to monitor the extent of the increase in green cover.

## Geographical Details

The study area is located in the south-eastern part of Rajasthan. The major land use in this locality is agricultural fields and is followed by settlements and industries. It lies in the Central Plateau and Hills Agro-climatic zone.

<b>Agro climatic zone</b>	Central plateau and hills
<b>Biogeographic zone</b>	Semi-arid
<b>Biotic province</b>	Gujarat, Rajputana



Bio-geographic map (left) and agro-climatic zone map (right) of India with the factory area location

The Land-use map indicates that the study area is highly industrialized with around 58% built-up barren land area and areas covered by industrial operations. There are also some waterbodies present forming to around 3.20% of the total area. The table for landuse areas is given below.

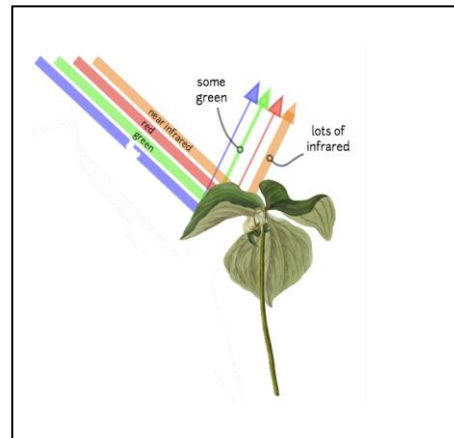
Class	Area in Ha
<b>Built-up/barren land</b>	257
<b>Waterbody</b>	14
<b>Green cover</b>	166



## Methodology

Green cover or Greenbelt can be mapped using either remotely sensed data obtained from satellite, drones, or aircraft or digitization of green areas using GIS software like ArcGIS, ERDAS, QGIS, etc. The satellite data in form of multispectral imagery consist of data obtained on different wavelengths in an electromagnetic spectrum. These data can be used to calculate vegetation indices for obtaining the amount of green cover.

Vegetation indices are combinations or transformations of spectral bands in remote sensing to give prominence to spectral properties of plants and other types of vegetation. This makes them stand out from other features allowing us to calculate the cover of vegetation in a particular area. Vegetation indices are capable of providing us information like % green cover, biomass, and leaf area index. The calculations of these indices depend upon the difference between the reflectance and absorption capabilities of plants. Since plants reflect more in the near-infrared region and green region of the electromagnetic spectrum and absorb the rest of wavelengths like red, blue, the difference between NIR and red bands allowing us to extract vegetation features. Temporal analysis of vegetation indices allows us to track changes in the amount of green cover as well as its health. For the estimation of green cover in CLZS, MSAVI, a modified version of the NDVI index was used. MSAVI- 2 minimizes the effects of soil spectral signatures this assist in extraction of only vegetation pixel rather than mixed pixels of soil and vegetation which sometimes happens in case of NDVI.



For calculation of MSAVI-2, Pléiades 1 satellite imagery was procured. Pléiades 1 product has a spatial resolution of 0.5m dated 29<sup>th</sup> February 2020. ERDAS has a tool called as indices in its unsupervised classification tab. It has a collection of different vegetation indices among which MSAVI-2 will be selected. The input in the processing box was .img file of Pléiades 1 with required bands RED and NIR. The formula for the index is already integrated into the tool.

The formula for MSAVI-2 is as follows

$$MSAVI2 = \frac{(2 * NIR + 1 - \sqrt{(2 * NIR + 1)^2 - 8 * (NIR - RED)})}{2}$$

*Disclaimer: The green cover was calculated using 0.5m satellite imagery using vegetation indices. Due to travel restriction on account of covid situation the ground truthing has not been carried out to verify the results on the ground.*

## Green Cover of CLZS

A green cover is natural or planted vegetation covering a certain area of the terrain, functioning as protection against soil erosion, protecting the fauna, and balancing the temperature.

Green cover consists of total tree cover and total green cover. Total tree cover can be calculated by measuring the tree attributes but area occupied by lawns, herbs and shrubs cannot be estimated by the same method. Green cover of a greenbelt is carried out using Vegetation indices. It predicts the percentage of total area of the unit that is under vegetation. According to the CPCB guidelines, there is a prescribed percentage of green cover for a healthy society and determining the green cover allows understanding where the unit stands in developing its greenbelt.

The Green cover of study area is as follows:

<b>Green Cover in Hectares</b>	<b>166</b>
<b>Total study area in Hectares</b>	<b>437</b>



The total area of CLZS is 437 hectares. The MSAVI-2 analysis revealed that the total green cover area is 166 hectares i.e. 37% of total CLZS area. Out of 166 hectares, 34 hectare area has a new plantation of around 1-2 years old (Refer to 2<sup>nd</sup> map below). The balance 132 hectares accounts to trees, shrubs, herbs and lawns. This 1-2-year-old samplings will gradually grow to an extent which will get converted into thick vegetation.

## Green cover map

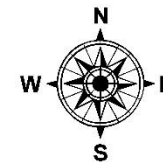


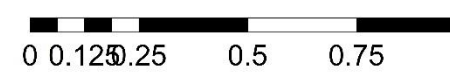
### Legend

 Project area

### Category

 Green cover



 Kilometers  
0 0.125 0.25 0.5 0.75 1

SATELLITE IMAGE : PLÉIADES-1. 29TH FEBRUARY 2020

# Green cover and new plantation map



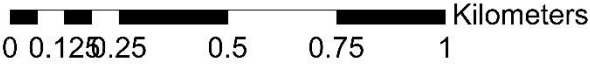
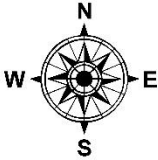
### Legend

Project area

### Category

Green cover

New Plantation area





SATELLITE IMAGE : PLÉIADES-1. 29TH FEBRUARY 2020

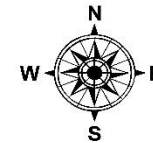


## False colour composite image with 1km buffer



### Legend

- FCC- False colour composite image
-  1km Buffer around project area
-  Project area



SATELLITE IMAGE : PLÉIADES-1, 29TH FEBRUARY 2020

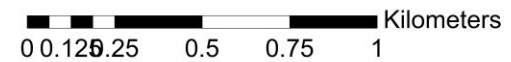
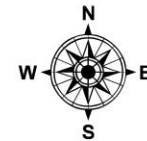
## False colour composite image



### Legend

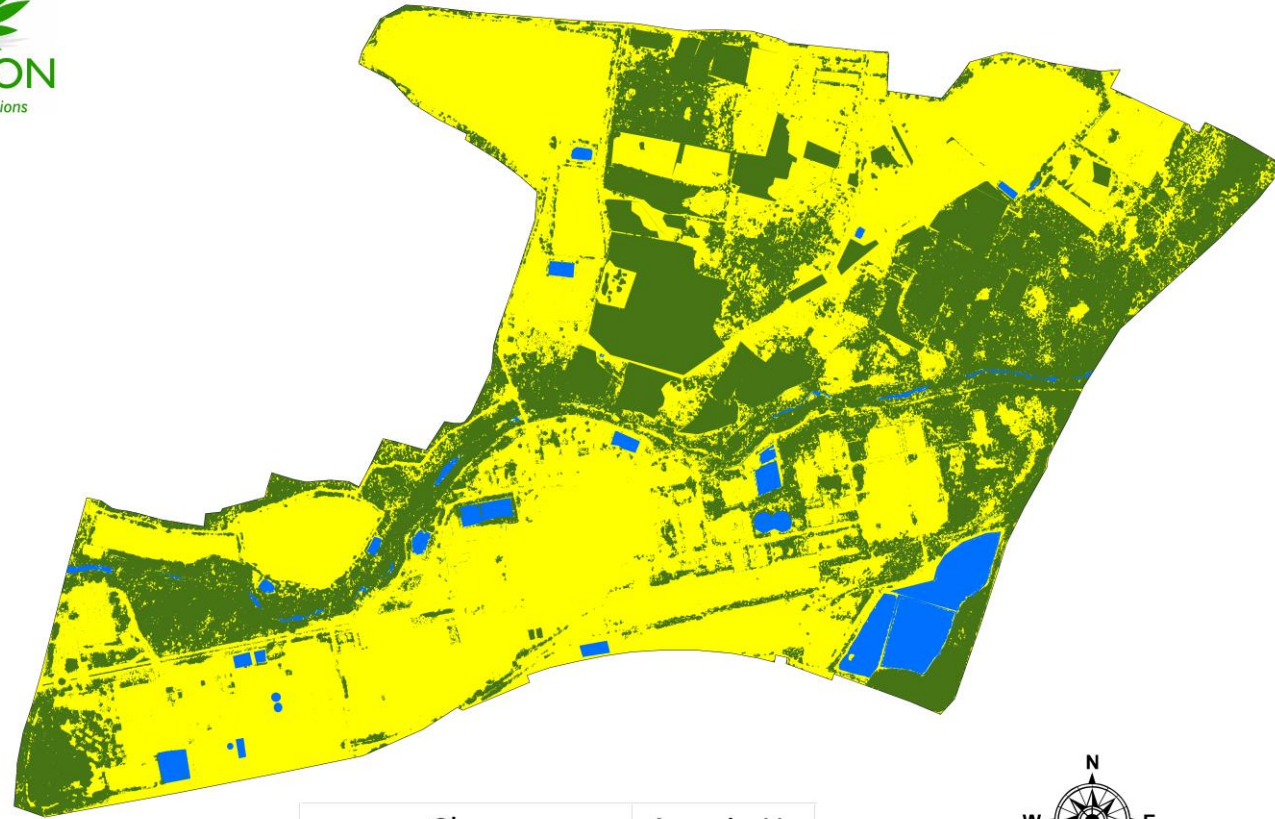
FCC- False colour composite image

Class	Area in Ha
Builtup/Barren land	257
Waterbody	14
Green cover	166






SATELLITE IMAGE : PLÉIADES-1, 29TH FEBRUARY 2020

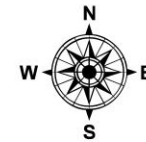
## Land use map



### Legend

-  Waterbody
-  Green cover
-  Builtup/ Barrenland

Class	Area in Ha
Builtup/Barren land	257
Waterbody	14
Green cover	166



0 0.125 0.25 0.5 0.75 1 Kilometers

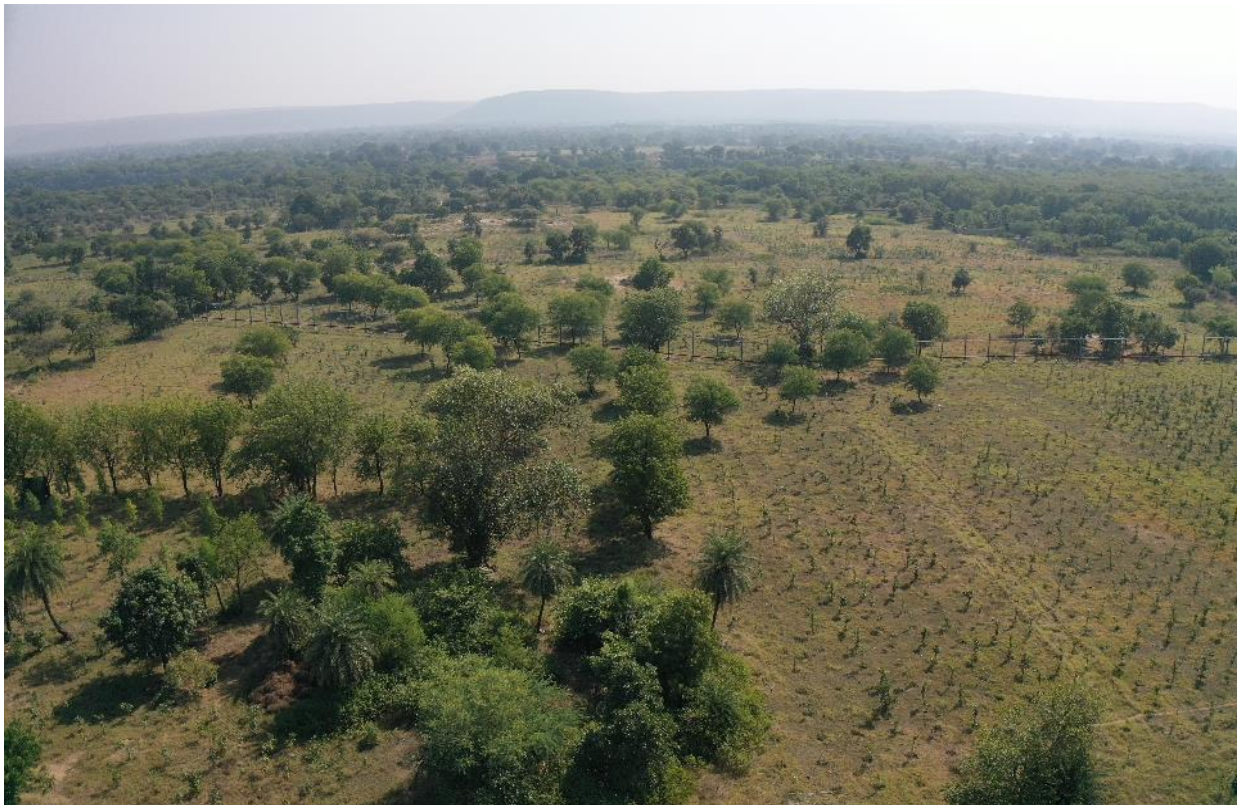
SATELLITE IMAGE : PLÉIADES-1, 29TH FEBRUARY 2020




## Plantation efforts by CZLS









<b>Project Name</b>	<b>Greenbelt Estimation Using GIS</b>
<b>Client</b>	<b>CHNADERIYA LEAD ZINC SMETLER, HINDUSTAN ZINC LIMITED</b>
<b>Contact Person</b>	<b>MR. SACHIN SAMAR</b>
<b>Consultant</b>	<b>Terracon Ecotech Private Limited 202, Kingston, Tejpal Road, Vile Parle (East), Mumbai 400057 www.terraconindia.com</b>
<b>Consultant Team</b>	<b>Dr. Ninad Raut, Lead, Ecology and Biodiversity Mr. Akshay Nachane, Co-Lead, Ecology and Biodiversity Ms. Pratiksha Chalke, Analyst, Biodiversity (GIS)</b>
<b>Project Co-ordinator</b>	 <b>Mr. Akshay Nachane Co-Lead, Ecology and Biodiversity Terracon Ecotech Private Limited</b>



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**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**CHANDERIA LEAD ZINC SMELTER**  
**Work Zone (8 - Hours) Environment Monitoring Results**  
**(Apr'20 - Sept'20)**

Month Location	Parameters/Unit	Prescribed Standards*	Apr'20	May'20	Jun'20	Jul'20	Aug'20	Sep'20
<b>Pyro, CPP, H-1 &amp; H-2 Plant</b>								
Pyro RMH	SPM mg/m3	10	0.728	0.410	0.666	0.577	0.600	0.666
	SO <sub>2</sub> mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	5	0.134	0.124	0.131	0.125	0.189	0.196
Pyro Sinter Area	SPM mg/m3	10	0.575	0.501	0.600	0.615	0.615	0.662
	SO <sub>2</sub> mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	5	0.123	0.109	0.199	0.163	0.166	0.162
H -1 Purification Section	SPM mg/m3	10	0.625	0.666	0.487	0.443	0.509	0.531
	SO <sub>2</sub> mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	5	0.112	0.117	0.081	0.178	0.087	0.083
H - 1 Cell House	SPM mg/m3	10	0.152	0.176	0.221	0.153	0.136	0.150
	SO <sub>2</sub> mg/m3	5	0.349	0.537	0.354	0.288	0.298	0.266
	Zn mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
LRP Casting Area	SPM mg/m3	10	0.602	0.556	0.659	0.552	0.527	0.491
	SO <sub>2</sub> mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Pb mg/m3	0.15	BDL	BDL	BDL	BDL	BDL	BDL
LRP K-5 Dross Area	SPM mg/m3	10	0.583	0.618	0.549	0.637	0.637	0.615
	SO <sub>2</sub> mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Pb mg/m3	0.15	BDL	BDL	BDL	BDL	BDL	BDL
H-2 Cell House	SPM mg/m3	10	0.164	0.155	0.120	0.111	0.116	0.110
	SO <sub>2</sub> mg/m3	5	0.452	0.590	0.341	0.232	0.264	0.288
	Zn mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
CPP Coal Yard	SPM mg/m3	10	0.444	0.424	0.396	0.466	0.531	0.400
	SO <sub>2</sub> mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	5	BDL	BDL	BDL	BDL	BDL	BDL

  
**Tarun Kumar Meghwal**

Environment Head  
Chanderia Lead Zinc Smelter



**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**CHANDERIA LEAD ZINC SMELTER**  
**Work Zone (15 – Minute) Environment Monitoring Results**  
**(Apr'20 - Sept'20)**

Month Location	Parameters/Unit	Prescribed Standards*	Apr'20	May'20	Jun'20	Jul'20	Aug'20	Sep'20
<b>Pyro, CPP, H-1 &amp; H-2 Plant</b>								
Pyro RMH	SPM mg/m3	-	3.00	5.33	4.66	6.33	5.00	3.66
	SO <sub>2</sub> mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	0.051	0.063	0.07	0.03	0.07	0.05
Pyro Sinter Area	SPM mg/m3	-	4.33	4.66	5.33	4.66	4.00	3.66
	SO <sub>2</sub> mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	0.092	0.058	0.08	0.07	0.05	0.04
H -1 Purification Section	SPM mg/m3	-	3.66	2.66	4.00	5.00	2.00	3.00
	SO <sub>2</sub> mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	0.05	0.02	0.05	0.05	0.02	0.02
H – 1 Roster Area	SPM mg/m3	-	4.33	3.33	3.66	4.00	3.66	4.66
	SO <sub>2</sub> mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	0.03	0.05	0.05	0.05	0.04	0.06
LRP Casting Area	SPM mg/m3	-	4.66	5.00	4.66	3.66	4.00	5.33
	SO <sub>2</sub> mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Pb mg/m3	-	BDL	BDL	BDL	BDL	BDL	BDL
LRP K-5 Dross Area	SPM mg/m3	-	3.66	3.33	4.33	5.33	3.66	5.00
	SO <sub>2</sub> mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Pb mg/m3	-	BDL	BDL	BDL	BDL	BDL	BDL
H-2 Roaster Area	SPM mg/m3	-	4.33	3.66	3.00	4.33	3.00	4.66
	SO <sub>2</sub> mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	0.16	0.06	0.04	0.06	0.03	0.05
CPP Coal Yard	SPM mg/m3	-	2.66	4.33	3.66	3.33	4.33	4.00
	SO <sub>2</sub> mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL
	Zn mg/m3	10	BDL	BDL	BDL	BDL	BDL	BDL



**Tarun Kumar Meghwal**


Environment Head

Chandera Lead Zinc Smelter



**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**Chandera Lead Zinc Smelter**  
**STACK HEIGHT – PYRO PLANT**

S. No.	Stack Attached to	Height(m)
<b>Ausmelt</b>		
1	Dust extraction system of feed handling	35
2	Hygeine and ventilation system	30
3	Ausmelt furnace	52
4	SO2 absorption tower	55
<b>Hydro 1</b>		
1	Zinc dross milling bag filter	30
2	Zinc atomizing bag filter	30
3	Zinc melting furnace bag filter (1st stack)	30
4	Zinc melting furnace bag filter (2nd stack)	30
5	Acid plant	100
<b>Pyro</b>		
1	Sinter venturi	45
2	Sinter main	75
3	Crusher venturi	75
4	Crusher bag filter	75
5	ISF slagging floor	75
6	ZRP fume extraction	35
7	ZRP ventilation stack	75
8	LRP	75
9	Copper recovery plant	30
10	Copper drossing	34
11	TGT (Acid plant)	75
<b>Hydro 2</b>		
1	Zinc melting furnace bag filter	30
2	Zinc dross milling bag filter	30
3	Zinc atomizing bag filter	30
4	Acid plant	100
<b>CPP</b>		
1	Captive power plant	165
2	Captive power plant-Phase-II	165
3	16 MW DG SET	30


  
**Tarun Kumar Meghwal**

Environment Head  
Chandera Lead Zinc Smelter



**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**Chandaria Lead Zinc Smelter**  
**Stack Monitoring Results (PM & LEAD)**  
**(APR'20 - SEPT'20)**

Location	Parameters	Limit	Unit	Result Apr-Jun'20	Result Jul-Sept'20
Sinter Main	PM	150	Mg/nm <sup>3</sup>	15.76	47.58
	Lead	10	Mg/nm <sup>3</sup>	BLQ(LOQ 0.005)	4.12
Sinter Venturi	PM	150	Mg/nm <sup>3</sup>	11.40	37.74
	Lead	10	Mg/nm <sup>3</sup>	BLQ(LOQ 0.005)	3.58
Crusher Main	PM	150	Mg/nm <sup>3</sup>	28.70	32.48
	Lead	10	Mg/nm <sup>3</sup>	BLQ(LOQ 0.005)	3.22
Crusher Venturi	PM	150	Mg/nm <sup>3</sup>	11.16	27.45
	Lead	10	Mg/nm <sup>3</sup>	BLQ(LOQ 0.005)	2.89
LRP Main	PM	150	Mg/nm <sup>3</sup>	6.16	15.25
	Lead	10	Mg/nm <sup>3</sup>	BLQ(LOQ 0.005)	0.80
ZRP Main	PSD				
ZRP Fume	PSD				

  
**Tarun Kumar Meghwal**  
 Environment Head  
 Chandaria Lead Zinc Smelter



**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**Chandera Lead Zinc Smelter**  
**Stack Monitoring Results (PM & LEAD)**  
**(APR'20 - SEPT'20)**

Location	Parameters	Limit	Unit	Result Apr-Jun'20	Result Jul-Sept'20
LRP Copper Drossing	PM	150	Mg/nm3	35.0	23.65
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	2.74
ISF Slagging Floor	PM	150	Mg/nm3	35.57	42.63
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	3.01
CRP Milling	PM	150	Mg/nm3	26.85	29.95
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	1.44
Ausmelt RMH	PM	50	Mg/nm3	15.09	35.56
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	1.01
Ausmelt Hygiene	PM	50	Mg/nm3	11.73	29.65
	Lead	10	Mg/nm3	BLQ(LOQ 0.005)	1.38

**Tarun Kumar Meghwal**


Environment Head

Chandera Lead Zinc Smelter



**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**Chandera Lead Zinc Smelter**  
**Stack Monitoring Results (PM)**  
**(APR'20 - SEPT'20)**

Location	Parameters	Limit	Unit	Result Apr-Jun'20	Result Jul-Sept'20
H-1 ZMC – 1st	PM	50	Mg/nm3	26.80	21.48
H-1 ZMC - 2nd	PM	50	Mg/nm3	13.07	23.69
H-1 Zinc Dust	PM	50	Mg/nm3	14.04	28.85
H-2 ZMC in side	PM	50	Mg/nm3	20.19	22.39
H-2 Zinc Dross	PM	50	Mg/nm3	20.92	37.78
H-2 Zinc Dust	PM	50	Mg/nm3	30.28	31.84
CPP Unit - 1 & 2	PM	50	Mg/nm3	30.75	29.85
CPP Unit - 3	PM	50	Mg/nm3	34.19	42.56

  
**Tarun Kumar Meghwal**  
Environment Head  
Chandera Lead Zinc Smelter



**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**Chandaria Lead Zinc Smelter**  
**Treated Water Monitoring Results**  
**(Apr'20 - Sept'20)**

**ETP Out Let - (Hydro - 2)**

Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
pH	-	5.5 - 9.0	7.21	7.28
Chloride	Mg/l	1000	144	479.85
Oil & Grease	Mg/l	10.0	BDL	3.0
Total Residual Chlorine	Mg/l	1.0	BDL	BDL
Ammonical Nitrogen	Mg/l	50.0	9.09	2.80
Nitrate Nitrogen	Mg/l	10.0	BDL	1.20
BOD	Mg/l	30	5.00	5.2
COD	Mg/l	250	16.1	36
TSS	Mg/l	100	BDL	12
Fluoride	Mg/l	2.0	0.9	0.85



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Environment Head


Chandaria Lead Zinc Smelter



**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**Chandera Lead Zinc Smelter**  
**Treated Water Monitoring Results**  
**(Apr'20-Sept'20)**

**ETP Out Let – (Hydro – 2)**

Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
Phosphate	Mg/l	5.0	0.03	BDL
Cyanide	Mg/l	0.2	BDL	BDL
Cadmium	Mg/l	2.0	BDL	BDL
Chromium	Mg/l	2.0	BDL	BDL
Copper	Mg/l	3.0	BDL	BDL
Iron as Fe	Mg/l	Not Specified	0.14	BDL
Lead as Pb	Mg/l	0.1	BDL	0.02
Nickel	Mg/l	3.0	BDL	BDL
Zinc	Mg/l	5.00	BDL	0.37

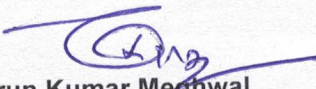
  
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Chandera Lead Zinc Smelter



**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**Chanderia Lead Zinc Smelter**  
**Treated Water Monitoring Results**  
**(Apr'20-Sept'20)**

**ETP Out Let – (PYRO)**

Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
pH	-	5.5 - 9.0	7.26	8.12
Chloride	Mg/l	1000	141.00	541.75
Oil & Grease	Mg/l	10.0	BDL	5
Total Residual Chlorine	Mg/l	1.0	BDL	BDL
Ammonical Nitrogen	Mg/l	50.0	8.81	3.40
Nitrate Nitrogen	Mg/l	10.0	BDL	2.25
BOD	Mg/l	30	7.40	10.7
COD	Mg/l	250	28.20	62.47
TSS	Mg/l	100	BDL	15
Fluoride	Mg/l	2.0	0.9	1.08

  
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Chanderia Lead Zinc Smelter



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**HINDUSTAN ZINC LIMITED**  
**Chandaria Lead Zinc Smelter**  
**Treated Water Monitoring Results**  
**(Apr'20-Sept'20)**

**ETP Out Let – (PYRO)**

Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
Phosphate	Mg/l	5.0	0.04	0.15
Cyanide	Mg/l	0.2	BDL	BDL
Cadmium	Mg/l	2.0	BDL	BDL
Chromium	Mg/l	2.0	BDL	BDL
Copper	Mg/l	3.0	BDL	BDL
Iron as Fe	Mg/l	Not Specified	0.11	BDL
Lead as Pb	Mg/l	0.1	BDL	0.03
Nickel	Mg/l	3.0	BDL	BDL
Zinc	Mg/l	5.00	BDL	0.35

  
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Chandaria Lead Zinc Smelter



Annexure -  
HINDUSTAN ZINC LIMITED  
Chandaria Lead Zinc Smelter  
Water Monitoring Results  
(Apr'20-Sept'20)

Bearach River Up Stream Report

Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
pH	-	6.5 – 8.5	8.32	7.66
Zinc	Mg/l	15.0	0.353	1.96
Lead	Mg/l	0.1	BDL	BDL
Cadmium	Mg/l	0.01	0.05	0.038
Copper	Mg/l	1.5	BDL	BDL
Iron	Mg/l	5.0	BDL	BDL
Hardness	Mg/l	600	604	652
Chloride	Mg/l	600	277.95	218.37
Sulphate	Mg/l	1000	102.80	115.23


  
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Chandaria Lead Zinc Smelter



**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**Chandera Lead Zinc Smelter**  
**Water Monitoring Results**  
**(Apr'20-Sept'20)**

**Bearach River Down Stream Report**

Parameter	Unit	Limit	Result (Apr-Jun'20)	Result (Jul-Sept'20)
pH	-	6.5 – 8.5	8.37	7.58
Zinc	Mg/l	15.0	0.067	1.58
Lead	Mg/l	0.1	BDL	0.27
Cadmium	Mg/l	0.01	BDL	.073
Copper	Mg/l	1.5	BDL	BDL
Iron	Mg/l	5.0	BDL	BDL
Hardness	Mg/l	600	456	636
Chloride	Mg/l	600	207.02	241.06
Sulphate	Mg/l	1000	106.60	105.32

  
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Chandera Lead Zinc Smelter



**Annexure -**  
**Hindustan Zinc Limited**  
**Chandera Lead Zinc Smelter Complex**  
**Putholi, Chandera , Dist. Chittorgarh, Rajasthan.**

**ACID PLANT MONITORING**  
**Quarterly Monitoring (Apr'20-Sept'20)**

Month Location	Parameters	Prescribed Limits	Apr-June'20	July-Sept'20
Acid Plant* ( Hydro-1)	SO <sub>2</sub> (2 Kg/T of H <sub>2</sub> SO <sub>4</sub> Production)=224 PPM	224 ppm	106.00 ppm 0.97 kg/T	77.49 ppm 0.97 kg/T
	ACID MIST	50 (mg/nm <sup>3</sup> )	35.80	26.38
Acid Plant* ( Hydro-2)	SO <sub>2</sub> (2 Kg/T of H <sub>2</sub> SO <sub>4</sub> Production)=224 PPM	224 ppm	110.00 ppm 1.10 kg/T	92.35 ppm 1.10 kg/T
	ACID MIST	50 (mg/nm <sup>3</sup> )	23.00	34.28
TGT Stack (Pyro Plant)	SO <sub>2</sub> (2 Kg/T of H <sub>2</sub> SO <sub>4</sub> Production)=224 PPM	224 ppm	86.00 ppm 1.10 kg/T	54.50 ppm 1.10 kg/T
	ACID MIST	50 (mg/nm <sup>3</sup> )	29.10	29.95
Cansolve (Ausmelt Plant)	SO <sub>2</sub> (2 Kg/T of H <sub>2</sub> SO <sub>4</sub> Production)=224 PPM	224 ppm	96.00 ppm 0.99 kg/T	91.05 ppm 0.99 kg/T
	ACID MIST	50 (mg/nm <sup>3</sup> )	33.03	35.52

  
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**Meghwal**

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**HINDUSTAN ZINC LIMITED**

**Chandera Lead Zinc Smelter**

**Ambient Air Quality Monitoring Results**

**Quarterly Monitoring (Apr-June'20)**

Name of Monitoring Station	Parameters (Values are in $\mu\text{g}/\text{m}^3$ )				
	PM (2.5)	PM (10)	CO	NO <sub>x</sub>	SO <sub>2</sub>
Limit	60 $\mu\text{g}/\text{m}^3$	100 $\mu\text{g}/\text{m}^3$	4000 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$
Near CISF Colony C1	48.65	88.16	0.50	27.47	7.95
Near LOCO Shed C2	49.21	92.45	0.63	23.92	7.50
Near Slag Gate	47.85	86.58	0.75	30.55	8.30
Near DM Plant	36.52	73.01	0.50	25.32	8.75

**Ambient Air Quality Monitoring Results**

**Quarterly Monitoring (Jul-Sept'20)**

Name of Monitoring Station	Parameters (Values are in $\mu\text{g}/\text{m}^3$ )				
	PM (2.5)	PM (10)	CO	NO <sub>x</sub>	SO <sub>2</sub>
Limit	60 $\mu\text{g}/\text{m}^3$	100 $\mu\text{g}/\text{m}^3$	4000 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$	80 $\mu\text{g}/\text{m}^3$
Near CISF Colony C1	36.62	65.48	320	27.71	28.87
Near LOCO Shed C2	36.52	70.84	370	32.39	31.26
Near Slag Gate	37.49	71.27	410	33.50	35.14
Near DM Plant	37.74	72.10	380	29.38	33.20

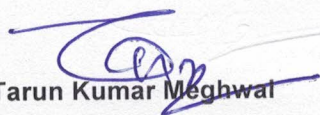
  
Tarun Kumar Meghwal

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Chandera Lead Zinc Smelter



**Annexure**  
**HINDUSTAN ZINC LIMITED**  
**CHANDERIA LEAD ZINC SMELTER**  
**Ambient Air Quality Monitoring Report (Outside Plant)**  
**Quarterly Monitoring (Apr'20 - Sept'20)**

Month	Parameters	Limit	(Apr-Jun'20)	(Jul-Sept'20)
Village		Unit		
Putholi	PM-10	100 µg/m <sup>3</sup>	84.32	69.95
	PM-2.5	60 µg/m <sup>3</sup>	42.13	28.74
	SO <sub>2</sub>	80 µg/m <sup>3</sup>	6.56	15.56
	NO <sub>x</sub>	80 µg/m <sup>3</sup>	31.11	26.35
	Pb	1.0 µg/m <sup>3</sup>	0.01	0.19
Munga ka khera	PM-10	100 µg/m <sup>3</sup>	94.78	64.78
	PM-2.5	60 µg/m <sup>3</sup>	35.25	27.79
	SO <sub>2</sub>	80 µg/m <sup>3</sup>	8.61	22.14
	NO <sub>x</sub>	80 µg/m <sup>3</sup>	36.01	15.54
	Pb	1.0 µg/m <sup>3</sup>	0.01	0.16
Nagari	PM-10	100 µg/m <sup>3</sup>	92.24	66.58
	PM-2.5	60 µg/m <sup>3</sup>	40.70	32.85
	SO <sub>2</sub>	80 µg/m <sup>3</sup>	6.77	14.68
	NO <sub>x</sub>	80 µg/m <sup>3</sup>	26.26	18.57
	Pb	1.0 µg/m <sup>3</sup>	0.002	0.18
Biliya	PM-10	100 µg/m <sup>3</sup>	78.24	62.57
	PM-2.5	60 µg/m <sup>3</sup>	50.12	30.28
	SO <sub>2</sub>	80 µg/m <sup>3</sup>	6.96	24.40
	NO <sub>x</sub>	80 µg/m <sup>3</sup>	29.65	16.89
	Pb	1.0 µg/m <sup>3</sup>	0.002	0.14

  
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 Chanderia Lead Zinc Smelter



Ajoliya Ka Khera	PM-10	100 $\mu\text{g}/\text{m}^3$	72.41	63.48
	PM-2.5	60 $\mu\text{g}/\text{m}^3$	37.55	27.74
	SO <sub>2</sub>	80 $\mu\text{g}/\text{m}^3$	8.61	15.14
	NO <sub>x</sub>	80 $\mu\text{g}/\text{m}^3$	30.65	16.59
	Pb	1.0 $\mu\text{g}/\text{m}^3$	0.01	0.09
Anwalhera	PM-10	100 $\mu\text{g}/\text{m}^3$	62.78	62.11
	PM-2.5	60 $\mu\text{g}/\text{m}^3$	33.45	28.87
	SO <sub>2</sub>	80 $\mu\text{g}/\text{m}^3$	7.15	14.58
	NO <sub>x</sub>	80 $\mu\text{g}/\text{m}^3$	29.91	17.76
	Pb	1.0 $\mu\text{g}/\text{m}^3$	0.005	0.18
Zinc Nagar	PM-10	100 $\mu\text{g}/\text{m}^3$	86.33	58.60
	PM-2.5	60 $\mu\text{g}/\text{m}^3$	39.65	28.57
	SO <sub>2</sub>	80 $\mu\text{g}/\text{m}^3$	9.43	10.33
	NO <sub>x</sub>	80 $\mu\text{g}/\text{m}^3$	26.08	14.41
	Pb	1.0 $\mu\text{g}/\text{m}^3$	0.008	0.12

  
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Chandaria Lead Zinc Smelter




**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**Chandaria Lead Zinc Smelter**  
**Ambient NOISE Monitoring Results**  
**(Apr'20 - Sept'20)**

**April to June - 2020**

S.No.	Testing Protocol	Parameters	Point of Collection	Observed Value	Observed Value
			<b>Noise Standard(dB)</b>	<b>DAY - 75</b>	<b>Night - 70</b>
1	IS 9989	Noise Level (dB)	Near Loco shade C2	53.2	48.9
2	IS 9989	Noise Level (dB)	Near Slag gate	58.2	53.6
3	IS 9989	Noise Level (dB)	Near DM Plant	58.3	53.7
4	IS 9989	Noise Level (dB)	Near CISF Colony C1	52.2	47.6

**July to Sept - 2020**


S.No.	Testing Protocol	Parameters	Point of Collection	Observed Value	Observed Value
			<b>Noise Standard(dB)</b>	<b>DAY - 75</b>	<b>Night - 70</b>
1	IS 9989	Noise Level (dB)	Near Loco shade C2	67.2	57.6
2	IS 9989	Noise Level (dB)	Near Slag gate	64.8	55.0
3	IS 9989	Noise Level (dB)	Near DM Plant	72.4	64.5
4	IS 9989	Noise Level (dB)	Near CISF Colony C1	66.7	56.5

  
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 Environment Head  
 Chandaria Lead Zinc Smelter



**Annexure -**  
**HINDUSTAN ZINC LIMITED**  
**Chandera Lead Zinc Smelter**  
**Ambient Air Quality (CAAQM) Report**

AMBIENT AIR QUALITY STATUS OF CLZS								
Direction	CAAQMS NO.1 Near C1 Office							
West	LOCATION							
	Parameter	Standard of AAQ	APRIL	MAY	JUNE	JULY	AUGUST	SEPT
	PM 10	100	84	87	74	50	34	68
	SOX	80	19.66	21.13	20.09	20.32	22.60	23.90
	NOX	80	16.6	16.8	14.3	12.3	14.5	16.4
Direction	CAAQMS NO.2 DM Plant – CPP							
East	LOCATION							
	Parameter	Standard of AAQ	APRIL	MAY	JUNE	JULY	AUGUST	SEPT
	PM 10	100	76	83	75	45	29	59
	SOX	80	36.3	47.3	41.1	36.5	29.8	27.9
	NOX	80	17.8	25.1	23.8	19.5	15.5	18.5
Direction	CAAQMS NO.3 Chittorgarh Fort							
South	LOCATION							
	Parameter	Standard of AAQ	APRIL	MAY	JUNE	JULY	AUGUST	SEPT
	PM 10	100	66	62	55	48	44	51
	SOX	80	8.3	7.6	10.1	10.6	10.4	10.7
	NOX	80	22.5	17.9	23.8	23.5	21.7	22.4
Direction	CAAQMS NO.4 Pond No 1 (New Station )							
North	LOCATION							
	Parameter	Standard of AAQ	APRIL	MAY	JUNE	JULY	AUGUST	SEPT
	PM 2.5	60	37	27	40	35	24	34
	PM 10	100	77	71	84	80	55	71
	SOX	80	29.5	25.2	22.3	23.4	23.2	22.1
	NOX	80	7.6	7.4	4.4	4.5	4.7	3.7

  
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# ROAD SWEEPING BY VACCUM ROAD SWEEPER

