Env. clearance - 6.825 MTPY from MOEF

No.J-11015/49/2008-IA.II(M)
Government of India
Ministry of Environment and Forests

Paryavaran Bhawan
CGO Complex, Lodi Road,
New Delhi-110003

Dated the 20th February, 2009

To

M/s National Aluminium Company Limited
NALCO Bhawan,
P/1,Nayapalli,
Bhubneswar-751 013
E-mail: jmahapatra@nalcoindia.co.in

Subject: Expansion of Panchpatmali Bauxite Mining Project of M/s National Aluminium Company Limited (NALCO) located in Village Damanjodi, Tehsil Pottangi, District Koraput, Orissa- environmental clearance regarding

Sir,

This has reference to your letter No. NBC/SH&E/ENV/74/72 dated 22.01.2008 and subsequent letters dated 11.08.2008, 05.09.2008, 05.11.2008 and 11.11.2008 on the subject mentioned above. The proposal is for enhancement of production of bauxite from 6.3million tonnes per annum (million TPA) to 6.825 million TPA to meet the additional requirement of their alumina refinery. The Ministry of Environment and Forests had earlier granted environmental clearance to this project vide letter No. J-11015/09/2000-IA.II (M) dated 30.07.2004 for a production capacity of 6.3million TPA of bauxite involving lease area of 2414.263ha, out of which 1032ha is forestland and 1382.263ha is wasteland.

2. The additional requirement of 0.525million TPA of bauxite is proposed to be mined from the Central Block-I. This expansion will involve generation of about 3.2million TPA of over burden. The mine will work for 365days. The excavated over burden will be backfilled concurrently in the mined out area. The Panchpatmali Hill is an elongated plateau about 21km long, rising about 150-300m above the adjoining region. The general RL at plateau top varies from 1200m to 1300m AMSL. The mine working will be upto 30m from the top. Working will not intersect the groundwater table. The transportation of mineral from mine to the alumina plant will be through a 14.5km long conveyor. There is no change in the area of mining, technology used and in the lease area.

3. The Ministry of Environment and Forests has examined the application in accordance with para 7(ii) of the EIA Notification 2006 and has dispensed with the requirement of public hearing and detailed Environmental Impact Assessment report, it being an expansion project which was earlier accorded environmental clearance by the Ministry vide letter No. J-11015/09/2000-IA.II (M) dated 30.07.2004 and hereby accords environmental clearance under the provisions thereof to the above mentioned Panchpatmali Bauxite Mining Project

of M/s National Aluminium Company Limited (NALCO) for annul production 6.825million tonnes of bauxite by opencast mechanized method involving total lease area 2414.263ha, subject to implementation of the following conditions and environmental safeguards.

A. Specific conditions

(i) The environmental clearance is in continuation to the environmental clearance earlier accorded to this project by the Ministry vide letter No. J-11015/09/2000-IA.II (M) dated 30.07.2004. The lease area shall remain unchanged.

(ii) The project proponent shall obtain Consent to Establish from the State Pollution Control Board and effectively implement all the conditions stipulated therein.

(iii) The environmental clearance is subject to grant of forestry clearance. The project proponent shall obtain requisite prior forestry clearance under the Forest (Conservation) Act, 1980 for working in the forest area.

(iv) The mining operations shall be confined to the hill tops only and restricted to above ground water table and it should not intersect the groundwater table. In case of working below the ground water table, prior approval of the Ministry of Environment and Forests and the Central Ground Water Authority shall be obtained, for which a detailed hydro-geological study shall be carried out.

(v) The project proponent shall ensure that no natural watercourse and/or water resources are obstructed due to any mining operations. Adequate measures shall be taken while diverting seasonal channels emanating from the mine lease, during the course of mining operation.

(vi) The top soil shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation.

(vii) The over burden (OB) generated shall be concurrently backfilled. There shall be no external over burden dump. The entire backfilled area shall be progressively afforested. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar on six monthly basis.

(viii) Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, soil and mineral dumps to prevent run off of water and flow of sediments directly into the water bodies. The water so collected shall be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted, particularly after the monsoon, and maintained properly.

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Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed around the mine pit, topsoil dumps and the mineral dumps to prevent run off of water and flow of sediments directly into the water bodies and sump capacity shall be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals.

(ix) Dimension of the retaining wall at the OB benches within the mine to check run-off and siltation should be based on the rainfall data.

(x) The project proponent shall develop a 7.5m wide green belt in the safety zone all around the mining lease. In addition, plantation shall be raised in the backfilled and the reclaimed area, around void, roads etc. by planting the native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.

(xi) Regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of SPM and RSPM such as around crushing and screening plant, loading and unloading point and all transfer points. Extensive water sprinkling shall be carried out on haul roads. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.

(xii) Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintained.

(xiii) The project authority shall implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.

(xiv) Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring shall be carried out four times in a year, pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional Office, Bhubaneswar, the Central Ground Water Authority and the Regional Director, Central Ground Water Board. If at any stage, it is observed that the groundwater table is getting depleted due to the mining activity, necessary corrective measures shall be carried out.

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(xv) Appropriate mitigative measures shall be taken to prevent pollution of the Indravati River, the Nagavalli River, Bansadhara River and Kerandi River in consultation with the State Pollution Control Board.

(xvi) The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) required for the project.

(xvii) Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, Central Ground Water Board.

(xviii) Vehicular emissions shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral within the lease up to the stockyard. The mineral transportation within the mine lease shall be carried out through the covered trucks only and the vehicles carrying the mineral shall not be overloaded.

(xix) No blasting shall be carried out after the sunset. Blasting operation shall be carried out only during the daytime. Controlled blasting shall be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented.

(xx) Drills shall either be operated with dust extractors or equipped with water injection system.

(xxi) Mineral handling area shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.

(xxii) Consent to operate shall be obtained from the State Pollution Control Board, Orissa prior to start of enhanced production from the mine.

(xxiii) Sewage treatment plant shall be installed for the colony. ETP shall also be provided for the workshop and wastewater generated during the mining operation.

(xxiv) Pre-placement medical examination and periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly.

(xxv) Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

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(xxvi) The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered flora and fauna found in the study area. Action plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Department. Necessary allocation of funds for implementation of the conservation plan shall be made and the funds so allocated shall be included in the project cost. All the safeguard measures brought out in the Wildlife Conservation Pan so prepared specific to the project site shall be effectively implemented. A copy of action plan shall be submitted to the Ministry of Environment and Forests and its Regional Office, Bhubaneswar.

(xxvii) Digital processing of the entire lease area using remote sensing technique shall be carried out regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment and Forests and its Regional Office, Bhubneswar.

(xxviii) A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.

B. General conditions

(i) No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.

(ii) No change in the calendar plan including excavation, quantum of mineral bauxite and waste should be made.

(iii) Alteast four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RSPM, SPM, SO_2 & NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.

(iv) Data on ambient air quality (RSPM, SPM, SO_2 & NOx) should be regularly submitted to the Ministry of Environment and Forests including its Regional office located at Bhubaneswar and the State Pollution Control Board / Central Pollution Control Board once in six months.

(v) Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.

(vi) Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.

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(vii) Industrial waste water (workshop and waste water from the mine) sh be properly collected, treated so as to conform to the standar prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.

(viii) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.

(ix) A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.

(x) The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry of Environment and Forests and its Regional Office located at Bhubaneswar.

(xi) The project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.

(xii) The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.

(xiii) The project proponent shall submit six monthly report on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Bhubaneswar, Central Pollution Control Board and State Pollution Control Board. The proponent shall upload the status of compliance of the environmental clearance conditions on their website and update the same periodically.

(xiv) A copy of clearance letter shall be marked to concerned Panchayat / local NGO, if any, from whom suggestion / representation has been received while processing the proposal.

(xv) The State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and the Collector's office/ Tehsildar's Office for 30 days.

(xvi) The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution

P.T.O./-

6.825 MTPY from MOEF

Control Board and also at web site of the Ministry of Environment and Forests at **http://envfor.nic.in** and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubaneswar.

4. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

5. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of the Environment (Protection) Act, 1986.

6. 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 and the Public Liability Insurance Act, 1991 along with their amendments and rules made thereunder and also any other orders passed by the Hon'ble Supreme Court of India/ High Court of Orissa and any other Court of Law relating to the subject matter.

7. Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Authority Act, 1997.

(SATISH C. GARKOTI)
Additional Director (S)

Copy to:

(i) The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.

(ii) The Secretary, Department of Environment, Government of Orissa, Secretariat, Bhubaneswar.

(iii) The Secretary, Department of Mines and Geology, Government of Orissa, Secretariat, Bhubaneswar.

(iv) The Secretary, Department of Forests, Government of Orissa, Secretariat, Bhubaneswar.

(v) The Chief Wildlife Warden, Government of Orissa, Bhubaneswar.

(vi) The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.

(vii) The Chief Conservator of Forests, Regional Office (EZ), Ministry of Environment and Forests, A-3 Chandrashekharpur, Bhubaneshwar-751023.

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(viii) The Chairman, Orissa State Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneshwar-751012.

(ix) The Member Secretary, Central Ground Water Authority, A2, W3 Curzon Road Barracks, K.G. Marg, New Delhi-110001.

(x) The District Collector, Koraput District, Government of Orissa.

(xi) EI Division, Ministry of Environment & Forests, EI Division, New Delhi.

(xii) Monitoring File.

(xiii) Guard File.

(xiv) Record File.

नालको NALCO

NATIONAL ALUMINIUM COMPANY LIMITED
(A Public Sector Undertaking)
Panchpatmali Bauxite Mine
D A M A N J O D I – 763008
Dist. KORAPUT (ORISSA)
Ph-06853-268001

Ref-NAL/MIN/GGM(Mines)/2023/ 89 Date: 01.12.2023

To,

The Deputy Director General of Forests (C),
Ministry of Environment, Forest and Climate Change, Regional Office,
A/3, Chandersekharpur, Bhubaneswar – 751023

Sub : Submission of six monthly compliance status report on Environmental Clearance conditions for the period 1st April 2023 to 30th September 2023 in respect of Panchpatmali Central & North Block Bauxite Mine, NALCO

Ref.: Env. Clearance Letter No. J-11015/49/2008-IA.II(M), Dtd. 20-2-2009 from MoEF&CC, GOI.

Dear Sir,

Please find enclosed herewith the six monthly compliance reports against the conditions of above referred Environmental Clearances for the period 1st April 2023 to 30th September 2023 in respect of Panchpatmali Central & North Block Bauxite Mine, NALCO. This is for your kind information and perusal please.

Thanking you,

Yours' faithfully,
01/12/23
(Rasheed Waris)
Group General Manager(Mines)

Encl- As stated

Copy-(1) The Additional Secretary (IA) -for kind information
Ministry of Environment, Forests
& Climate Change, Govt of India,
Indira ParyavaranBhawan,Aliganj,
Jorbagh Road, New Delhi-110 003
(2) The Member Secretary, -for kind information
State Pollution Control Board, Odisha
A/118, Nilakantha Nagar,
Bhubanewar- 751 012
(3) The D.F.O. -for kind information
Koraput Division,Koraput

RASHEED WARIS
Group General Manager(Mines)
NALCO Mines, Damanjodi

STATUS OF COMPLIANCE TO THE CONDITIONS STIPULATED IN ENV. CLEARANCE FOR BAUXITE PRODUCTION @ 6.825 MTPY WITH RESPECT TO PANCHPATMALI CENTRAL & NORTH BLOCK BAUXITE MINE,NALCO

(Ministry Letter No. J-11015/49/2008-IA. II(M) Dt. 20-02-2009)

<table>
<tr><th>Sl.No.</th><th>A. SPECIAL CONDITIONS</th><th>Status of Compliance as on 30.9.2023</th></tr>
<tr><td>i</td><td>The environmental clearance is in continuation to the environmental clearance earlier accorded to this project by the Ministry vide letter No. J-11015/09/2000-IA.II (M) dated 30.07.2004. The lease area shall remain unchanged.</td><td>The lease area remains unchanged.
At present the lease area of Central and North Block = 1315.264 hectares.</td></tr>
<tr><td>ii</td><td>The project proponent shall obtain Consent to Establish from the State Pollution Control Board and effectively implement all the conditions stipulated therein.</td><td>The consent to establish for 6.825 MTPY production capacity for Central-North Block was obtained from SPCB, Odisha vide letter no. 16213/Ind-II-NOC-5666, DTD. 4-9-2013.</td></tr>
<tr><td>iii</td><td>The environmental clearance is subject to grant of forestry clearance. The project proponent shall obtain requisite prior forestry clearance under the Forest (Conservation) Act,1980 for working in the forest area</td><td>Forest Clearance exists vide MoEF&CC letter No- F.No.8-40/1993-FC(PT-I) Dt.15th September 2014 for the entire forest land of 1294.283 ha of forest land.</td></tr>
<tr><td>iv</td><td>The mining operations shall be confined to the hill tops only and restricted to above ground water table and it should not intersect the groundwater table. In case of working below the ground water table, prior approval of the Ministry of Environment and Forests and the Central Ground Water Authority shall be obtained, for which a detailed hydro-geological study shall be carried out</td><td>It is revealed from a study by RAMKY (in Yr 2010) that the ground water table exists below 80 mtr. from the plateau top, where the mining activities are going on. As the Mining activities limited to 35 Mtrs only from the surface, there is no impact of Mining operation on the ground water / aquifers.</td></tr>
<tr><td>v</td><td>The project proponent shall ensure that no natural watercourse and / or water resources are obstructed due to any mining operations. Adequate measures shall be taken while diverting seasonal channels emanating from the mine lease, during the course of mining operation.</td><td>No Natural water course exists on hilltop/ plateau top. As such, mining operation which is confined to hill top does no way obstruct natural water course. No rain water from the mining area is allowed to flow down below the valley by constructing peripheral barriers.
.</td></tr>
<tr><td>vi</td><td>The top soil shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation.</td><td>Top soil is being separately removed and is concurrently used in backfilling of mined out area.
The top soil generated and utilized in reclamation for the last five years are as follows.
<table>
<tr><th>Year</th><th>Top soil generated (MT)</th><th>Top soil utilized (MT)</th><th>Top soil stored (MT)</th></tr>
<tr><td>2018-19</td><td>1,04,070</td><td>1,04,070</td><td>Nil</td></tr>
<tr><td>2019-20</td><td>1,22,410</td><td>1,22,410</td><td>Nil</td></tr>
<tr><td>2020-21</td><td>1,07,560</td><td>1,07,560</td><td>Nil</td></tr>
<tr><td>2021-22</td><td>115000</td><td>115000</td><td>Nil</td></tr>
<tr><td>2022-23</td><td>133490</td><td>133490</td><td>Nil</td></tr>
<tr><td>2023-24 upto Sep 2023</td><td>171930</td><td>171930</td><td>Nil</td></tr>
</table></td></tr>
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<td>vii</td>
<td>The overburden (OB) generated shall be concurrently backfilled. There shall be no external over burden dump. The entire backfilled area shall be progressively afforested. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment and Forest and its Regional Office located at Bhubaneswar on six monthly basis.</td>
<td>OB generated is being concurrently backfilled. Reclamation programme for the mined out area goes on concurrent to mining operation.

The OB generated (including top soil) and utilized in reclamation for the last five years are as follows.

<table>
<tr><th>Year</th><th>OB generated (MT)</th><th>OB utilized (MT)</th><th>OB stored (MT)</th></tr>
<tr><td>2018-19</td><td>8,19,300</td><td>8,19,300</td><td>Nil</td></tr>
<tr><td>2019-20</td><td>6,84,690</td><td>6,84,690</td><td>Nil</td></tr>
<tr><td>2020-21</td><td>7,64,205</td><td>7,64,205</td><td>Nil</td></tr>
<tr><td>2021-22</td><td>798225</td><td>798225</td><td>Nil</td></tr>
<tr><td>2022-23</td><td>788300</td><td>788300</td><td>Nil</td></tr>
<tr><td>2023-24 upto Sep 2023</td><td>477420</td><td>477420</td><td>Nil</td></tr>
</table>

The plantation in the rehabilitated area is maintained till the vegetation becomes self sustaining. Compliance status is submitted to MOEF every six months.</td>
</tr>
<tr>
<td>viii</td>
<td>Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, soil and mineral dumps to prevent run off of water and flow of sediments directly into the water bodies. The water so collected shall be utilized for watering the mine area, roads, green belt development etc. the drains shall be regularly desilted, particularly after the monsoon, and maintained properly.Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed around the mine pit, topsoil dumps and the mineral dumps to prevent run off of water and flow of sediments directly into the water bodies and sump capacity shall be designed keeping 50 % safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals</td>
<td>Siltation ponds of adequate size are provided to collect sediments from the mineral stock pile area near crusher house during rain through drains. Rain water accumulated in the sedimentation ponds cannot go out due to peripheral barrier and percolates down through porous mined out surface. The mine is a elongated strip of land with peripheral barriers on the western and eastern sides which prevent any rain water from going outside. Inside the mine sedimentation pits of adequate size have been kept which collect water through drains with natural gradient. Due to porous nature of the mined out surface, the rain water percolates down to recharge the ground water. There are no waste dumps or OB dumps as concurrent reclamation method has been adopted. The sedimentation pits are cleaned periodically to maintain the sump capacity to hold water. There are no active dumps and hence there is no question of washouts from dumps.</td>
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<tr>
<td>ix</td>
<td>Dimension of the retaining wall at the OB benches within the mine to check run-off and siltation should be based on the rainfall data.</td>
<td>The overburden material is concurrently reused in backfilling of mined out area. The runoff generated inside mining area cannot go out as there are in-situ peripheral barrier all around the mining area. All the runoff are diverted to the sedimentation tanks inside the mining area where the collected water percolates into the ground.</td>
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<td>x</td>
<td>The project proponent shall develop a 7.5 m wide green belt in the safety zone all around the mining lease. In addition, plantation shall be raised in the backfilled and the reclaimed area, around void roads etc. by planting the native species in consultation with the local DFO / Agriculture Department.</td>
<td>A green belt having minimum width of 7.5 mtr has been developed all around the Mined out area in the safety zone. This green belt is developed/ maintained 500M ahead of Mining operation. Native species like Jamun,Rose Apple, Guava, Mangos, Jackfruit ,Tamarind , Karanj, etc are being planted at the rate of 2500 plants /ha for development of the green belt. In addition to that plantation has also been carried out in the backfilled/reclaimed area.</td>
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<tr><td></td><td>The density of the trees should be around 2500 plants per ha.</td><td>As on 31.3.2023 the plantation carried out in different areas in Central and North Block are as follows.
(i) Mining area including peripheral barrier :15,57,327
(ii) Conveyor corridor: 89,300
(iii)Auxiliary facilities: 72,800
(iv) Water supply and powerline: 5,000
(v)Around explosive magazine: 1,70,000
(vi)Unused area: 68,956.
(vi)Outside lease area: 13,95,354.

Total trees planted in Central and North Block as on 31.3.2023 is 33, 58,737.</td></tr>
<tr><td>xi</td><td>Regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of SPM and RSPM such as around crushing and screening plant, loading and unloading point and all transfer point. Extensive water sprinkling shall be carried out on haul roads. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.</td><td>Regular water sprinkling is being done using 06 nos of self propelled mobile water tankers.

Provision of PLC controlled Auto sprinkling system installed over Permanent haul roads (4.5 km).

The AAQ quality monitoring is done every month. The monitoring locations are A1(Baiguda village) , A2(Bitiarguda Village), A3(Goudguda village), A4(Kakriguma village), A5(Upper Meeting village), A6(Near Main Haul Road Area), A7(Near Crusher HouseA8(Roof of the HEMM main building), A9(Roof of Panchpatmali Bhavan), A10(Near SMCP North Block). The latest results of ambient air analysis are given at Annexure-I.</td></tr>
<tr><td>xii</td><td>Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintained.</td><td>NALCO has been measuring water flow rate of perennial streams at the foot hill in 17 locations on four specific periods during the month of Jan, April, Aug and Nov every year.
For 2023-24, the stream flow has been measured at 17 locations during April 2023 & August 2023, The locations are 1.Litiguda,2.Jholaguda,3.Bhitara Bhejaput, 4.Barigurha,5.Kapsiput,6.Litaputta, 7.Murdagurha, 8.Gaurhaguda, 9.Tenguligurha, 10.Kakirguma, 11.Tentulipadar, 12.Keler, 13.Kusumagurha, 14.Kirajhola, 15.Rangapani, 16.Pansaputa and 17.Balipeta. For 23-24, the results are given at Annexure-II.</td></tr>
<tr><td>xiii</td><td>The project authority shall implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.</td><td>The plateau top, where the mining operation is confined, stands out about 300 mtr above the surrounding valley areas. The ground water exists at a depth of about 80mtr.

At present, 3 no. of rain water harvesting reservoirs have been developed atop the mines. The capacity of the three nos of ponds are as follows.

<table>
<tr><th>Sl No.</th><th>Description</th><th>Capacity of storage in cum.</th></tr>
<tr><td>1</td><td>Pond no-1</td><td>19800</td></tr>
<tr><td>2</td><td>Pond no-2</td><td>23625</td></tr>
<tr><td>3</td><td>Pond no-3</td><td>10000</td></tr>
</table>
Also, rooftop rainwater harvesting structures for the Administration Building , Mine Manager's Building and MVT centre has been completed by 2014 to augment ground water recharging.

Further, the method of Mining & the peripheral barrier all around does not allow the storm water from within the mining area to go outside valley areas. The water thus trapped, percolates down & recharges the ground water.

Further as per advice of CGWB, Bhubaneswar , a suitable agency (M/s Geoenvitech Research & Services Pvt Ltd , Bhubaneswar) was appointed for carrying out a hydro-geological study for suggesting measures for rain water harvesting and augmentation of ground water resources. The recommendations are implemented.</td></tr>
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<tr><td>xiv</td><td>Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring shall be carried out four times in a year, pre-monsoon (April-May) , monsoon (August), Post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to the Ministry of Environment and Forest and its Regional Office, Bhubaneswar, the Central Ground Water Authority and the Regional Director, Central Ground Water Board. If at any stage, it is observed that the ground water table is getting depleted due to the mining activity, necessary corrective measures shall be carried out.</td><td>The ground water level was monitored by M/s RAMKY (in Yr 2010) by construction of borewells. It was found that the ground water table exists at a great depth i.e. below 80 mtr. from the plateau top.

The ground water quality monitoring is done during April, August, November and January every year. The monitoring locations are (15 nos) Metingi Village,Chhatamba Village, Jharhiapadar Village, Tentulipadar Village, Ichhapur Village, Mundagarhati Village, Bijaghati Village, Putraghati Village, Putraghati Village, Chararha Village, Kapsiput Village, Jambagurha Village, Shriguda Village, Kakiriguma Village,and Sorisha padar Village. The parameters being monitored are as per IS 10500:2012 specified for drinking water. For 23-24, the results are given at annexure-III.

One no of piezeometer has been constructed for monitoring of ground water level.</td></tr>
<tr><td>xv</td><td>Appropriate mitigative measures shall be taken to prevent pollution of the Indravati River, the Vagabvalli river, Banadehar River and Kerandi River in consultation with the State Pollution Control Board.</td><td>Appropriate mitigative measures have been taken to prevent pollution of rivers in consultation with SPCB, Odisha. They have specified conditions in CTO to treat the waste water streams and not to discharge runoff from mining area into water bodies.

The actions taken- (1) There is no mine drainage water generated at Mines (2) rain water (with sediment) is also not allowed to go out of Mining areas because of the insitu- peripheral barrier existing all around the mining pit. 21 check dams have been constructed to retain the washouts if any from the mining area going downhill and contaminating water bodies. (3) The rain water around stockpiles are diverted to sedimentation basins where solid particle settle down and water percolates into the ground. (4)Effluent from toilets are treated in septic tanks. (5) The mine being a zero discharge mine, has got adequate facility to treat wash water from Workshop & Canteen & the treated water is completely reused for dust suppression and plantation purpose and no waste water is discharged outside. As already explained, Further the perennial streams emanating from the Panchpatmali hill slopes are being monitored regularly and all parameters are within prescribed norms. As such in no way the mining operation affects the river basins which are any way situated at least 30 KM away..</td></tr>
<tr><td>xvi</td><td>The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) required for the project</td><td>Permission for drawal of surface water from Jholaguda streams upto 0.5MGD is available vide letter No. 15986, dtd.13-6-2018.</td></tr>
<tr><td>xvii</td><td>Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, Central Ground Water Board</td><td>At present, 3 no. of rain water harvesting reservoirs have been developed atop the mines. The capacity of the three nos of ponds are as follows.

<table>
<tr><th>Sl No.</th><th>Description</th><th>Capacity of storage in cum.</th></tr>
<tr><td>1</td><td>Pond no-1</td><td>19800</td></tr>
<tr><td>2</td><td>Pond no-2</td><td>23625</td></tr>
<tr><td>3</td><td>Pond no-3</td><td>10000</td></tr>
</table>

Also, rooftop rainwater harvesting structures for the Administration Building ,Mine Manager's Building and MVT centre has been completed by 2014 to augment ground water recharging.</td></tr>
</table>

		Further, the method of Mining & the peripheral barrier all around does not allow the storm water from within the mining area to go outside valley areas. The water thus trapped, percolates down & recharges the ground water. Further as per advice of CGWB, Bhubaneswar , a suitable agency (M/s Geoenvitech Research & Services Pvt Ltd , Bhubaneswar) was appointed for carrying out a hydro-geological study for suggesting measures for rain water harvesting and augmentation of ground water resources. The recommendations are implemented.
xviii	Vehicular emissions shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral within the lease up to the stockyard. The mineral transportation within the mine lease shall be carried out through the covered trucks only and the vehicles carrying the mineral shall not be overloaded	Monitoring of exhaust emission of all the vehicles operating at mine is conducted once in six months through an outside agency authorized by SPCB, Odisha. Bauxite ore is transported in the mine area in an environmentally safe manner by limiting the speed limit of transporting equipment and also by maintaining proper road conditions.
xix	No blasting shall be carried out after the sunset. Blasting operation shall be carried out only during the daytime. Controlled blasting shall be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented.	Blasting has been stopped since April 2022. Whenever it will be done in future , it will be done during shift change over between 1.15PM to 2PM .No blasting will be done beyond day light hours .Further, controlled blasting will be practiced with use of NONELs for sequential blasting to reduce fly rocks, boulders & ground vibration.
xx	Drills shall either be operated with dust extractors or equipped with water injection system	All drills are operated with vacuum dust extraction system with provision of water injection for dust suppression.
xxi	Mineral handling area shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.	All transfer points in crushing & Conveying system are provided with efficient dry fog system to suppress dust at source.
xii	Consent to operate shall be obtained from the State Pollination Control Board, Orissa prior to start of enhanced production from the mine.	At present Mine is operating with consent to operate for 6.825 MTPA production capacity vide order No. 4162/Ind-I-Con-92, Dtd. 17-3-2022/CONSENT ORDER NO.58, which is valid upto 31.3.2024.
xxiii	Sewage treatment plant shall be installed for the colony. ETP shall also be provided for the workshop and wastewater generated during the mining operation	The Mine & Refinery combined township exists 20KM away at Damanjodi where sewerage treatment plant is provided whereas The mine is operating a zero discharge system for effluents where all the waste water is treated,analysed and reused for sprinkling on the haul road for dust suppression and plantation. Effluents from the Mechanical Workshop area is being channelized through well-designed oil-water separation tank where oil is collected and the clear water is collected in zero discharge sump. There is a canteen waste water disposal system (biological treatment unit) designed, constructed and maintained to treat the canteen waste water. All the treated waste water from canteen and HEMM workshop is used for horticulture & dust suppression.
xxiv	Pre-placement medical examination and periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers	All employees and contract workers are provided with protective devices. For all employees of NALCO, periodical medical examinations are done & records thereof maintained. During April 2023-Sep 2023 , 278 nos of employees have undergone periodical medical testing. No occupational diseases have been detected so far.

	should be drawn and following accordingly.	
xxv	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. the housing may be in the form of temporary structures to be removed after the completion of the project.	No labour camp exists on plateau top. All construction laborers /workers come from Damanjodi & surrounding villages at the foothill of Panchpatmali hill.
xxvi	The project proponent shall take all precautionary measure during mining operation for conservation and protection of endangered flora and fauna found in the study area. Action plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Department. Necessary allocation of funds for implementation of the conservation plan shall be made and the fund so allocated shall be included in the project cost. All the safeguard measures brought out in the Wildlife Conservation Pan so prepared specific to the project site shall be effectively implemented. A copy of action plan shall be submitted to the Ministry of Environment and Forest and its Regional Office, Bhubaneswar.	A Site Specific Wildlife Management plan as prepared by NALCO has been approved by PCCF(Wildlife), Odisha, Bhubaneswar vide Memo No. 4011/1 WL(C) SSP-397/2013 Dt. 19th May 2014, On the basis of the above stated approval, DFO, Koraput had raised a demand note No.1838 Dt. 26-05-2014 for payment of Rs. 2011.50 lakhs. With reference to the above stated demand note, NALCO has made a payment of Rs. 2011.50 lakhs in Orissa CAMPA account in Corporation Bank, Lodhi Road, New Delhi through RTGS on Dt.04-06-2014. Besides the above, a total amount of Rs 7, 62, 85,312/- have been deposited in different phases as per demand letters of DFO,Koraput in Orissa CAMPA by NALCO towards Regional Wildlife Management Fund for implementation by State Forest Department. The conservation measures suggested are under process of implementation. The copy of action plan has been submitted to MoEF&CC vide letter No- NAL/MIN/GM(Mines)2017/677, Dtd. on 12-10-2017. The status of implementation of conservation measures are given in **Annexure-IV.**
xxvii	Digital processing of the entire lease area using remote sensing technique shall be carried out regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment and Forests and its Regional Office, Bhubaneswar	A digital land-use map (shape file) as on 31.3.2021 has been submitted to MoEF&CC, Bhubaneswar on 1st July 2021 vide mail.
xxviii	A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure of approval.	Final mine closure plan shall be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure.
	GENERAL CONDITIONS	
i	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests	The user agency (NALCO) undertakes that there shall be no change in technology and scope of work without prior approval from MoEF.
ii	No change in the calendar plan including excavation, quantum of mineral bauxite and waste should be made	The user agency (NALCO) undertakes that there shall be no change in calendar plan including excavation, quantum of Bauxite, Waste/OB generation of work without prior approval from competent authority.
iii	At least four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RSPM, SPM, SO2 & NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecological sensitive targets and frequency of monitoring should be	At present 10 air quality monitoring stations are established in and around Mines based on the mentioned factors and measurements are being done once in every month for parameters as per the latest MOEF notification of September 2009. The location of monitoring stations has been fixed in consultation with SPCB, Odisha.

	undertaken in consultation with the State Pollution Control Board.	
iv	Data on ambient air quality (RSPM, SPM, and SO2 & NOx) should be regularly submitted to the Ministry of Environment and Forests including its Regional office located at Bhubaneswar and the State Pollution Control Board / Central Pollution Control Board once in six month.	Data on air quality is being collected once in every month. Records submitted to statutory authorities once in six months. The AAQ quality monitoring is done every month. The monitoring locations are A1(Baiguda village) , A2(Bitiarguda Village), A3(Goudguda village), A4(Kakriguma village), A5(Upper Meeting village), A6(Near Main Haul Road Area), A7(Near Crusher HouseA8(Roof of the HEMM main building), A9(Roof of Panchpatmali Bhavan), A10(Near SMCP North Block). The latest results of ambient air analysis are given at **Annexure-I.**
v	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.	Water spraying on haul road is carried out both with fixed (4.5 km long) and mobile sprinklers (6 nos) . Loading points of crusher house is provided with dry fog system. One no of fog cannon has also been deployed in the stock pile area to suppress dust. Transportation of Bauxite ore is carried out through a cable belt conveyor of 14.6KM long, provided with hood all along.
vi	Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs	Noise monitoring in work zone is taken up once in every quarter. Equipment selection is done keeping noise reduction features in view. Workers are provided with ear plugs /muffs. Besides ambient noise level is being monitored at 10 locations in and around the mine. Noise level monitoring for the period Apr23 to Sep 2023 is available at **annexure-V.**
vii	Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.	The mine is operating a zero discharge system for effluents where all the waste water is treated, analysed and reused for sprinkling on the haul road for dust suppression and plantation. Effluents from the Mechanical Workshop area is being channelized through well-designed oil-water separation tank where oil is collected and the clear water is collected in zero discharge sump. There is a canteen waste water disposal system (biological treatment unit) designed, constructed and maintained to treat the canteen waste water. All the treated waste water from canteen and HEMM workshop is used for horticulture & dust suppression. The treated waste water from canteen and HEMM workshop area are analysed before being reused. The parameters are analysed every month.The analysis results for Apr23-Sept 2023 are available at **Annexure-VI**. The above treated water is completely reused without discharging outside.
viii	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed	All employees and contract workers are provided with protective devices. Regular training programmes are held in MVT center on health and safety aspects for contract workers as well as employees. For all employees of NALCO, periodical medical examinations are done & records thereof maintained. During April 2023-Sept 2023 , 278 nos of employees have undergone periodical medical testing. No occupational diseases have been detected so far.
ix	A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report	A Separate Environmental Management Cell, being headed by GM(Env) who is reporting directly to GGM (Mines), exists for management of environment.

<table>
<tr><td></td><td>directly to the Head of the Organization.</td><td></td></tr>
<tr><td>x</td><td>The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry of Environment and Forests and its Regional Office located at Bhubaneswar</td><td>Being a public sector, the system does not allow for creating a separate account for environmental protection measures. However adequate fund is provided under the budget of executing departments for installation and maintaining various pollution control measures. The fund earmarked for environmental protection measures is never diverted for any other purpose. Adequate fund is always allocated to meet the capital & recurring expenses to implement the environmental control measures inclusive of plantation. Many expenditures for Central and North Block and South Block on environment are carried out through common contracts. The capital expenditure till date and the recurring expenditure for protection of environment at Panchpatmali Bauxite Mine for the last three years are as follows

a. Capital Cost for Environmental Pollution control incurred during 2022-23 - Rs. 400.00 Lakh
b. Recurring cost
<table>
<tr><th>S. No</th><th>Activity</th><th>2020-21 (Rs)*</th><th>2021-22 (Rs)*</th><th>2022-23 (Rs)**</th></tr>
<tr><td>1.</td><td>Backfilling and land reclamation*</td><td>4,74,00,990</td><td>7,44,68,438</td><td>76,667,560.04</td></tr>
<tr><td>2.</td><td>Environmental Pollution Control</td><td>22,78,520</td><td>40,41,193</td><td>60,26,649.00</td></tr>
<tr><td>3.</td><td>Plantation and Horticulture</td><td>67,36,291</td><td>94,23,930</td><td>84,73,229.00</td></tr>
<tr><td>4</td><td>Operation and maintenance of Water Sprinkling system & zero discharge system</td><td>12,00,000</td><td>15,48,846</td><td>9,95,482.00</td></tr>
<tr><td></td><td>Total</td><td>5,76,15,801 .00</td><td>8,94,82,407.00</td><td>9,21,62,920.07</td></tr>
</table>
Note- Backfilling and land reclamation cost is calculated based on the proportionate cost for diesel incurred in handling of overburden material as compared to the total excavation.
* The values contain combined expenditure for South Block and Central and North Block.
* * The values contain expenditure for Central and North Block only.</td></tr>
<tr><td>xi</td><td>The project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work</td><td>The MoEF Regional Office shall be kept informed as required.</td></tr>
<tr><td>xii</td><td>The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extnd full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports</td><td>NALCO undertakes that all co-operations will be extended to the officers of the Regional Office of the Ministry located at Bhubaneswar by furnishing requisite data, information/ monitoring reports.</td></tr>
<tr><td>xiii</td><td>The project proponent shall submit six monthly report on the status of the implementation of the stipulated</td><td>Six monthly report on the status of the implementation of the stipulated environmental safeguards is being submitted to MoEF, Govt. of India and State Pollution Control Board regularly.</td></tr>
</table>

	environmental safeguards to the Ministry of Environment and Forests, its Regional Office Bhubaneswar, Central Pollution Control Board and State Pollution Control Board. The proponent shall upload the status of compliance of the environmental clearance conditions on their website and update the same periodically.	
xiv	A copy of clearance letter shall be marked to concerned Panchyat /local NGO, if any, from whom suggestion / representation has been received while processing the proposal	No such suggestions / representation has been received from the Panchayat / local NGO, while processing the clearance proposal.
xv	The State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and the Collector's office / Tahsildar's Office for 30 days	The clearance letter has been displayed at the required places.
xvi	The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forest at http://envfor.nic.in and a copy of the same should be forwarded to the Regional Office of the Ministry located at Bhubaneswar.	The accordance of Environmental clearance has been advertised in two local news papers.

(Rasheed Waris)
Group General Manager(Mines)

RASHEED WARIS
Group General Manager(Mines)
NALCO Mines, Damanjodi

ANNEXURE-I

AMBIENT AIR QUALITY ANALYSIS AT PANCHPATMALI CENTRAL & NORTH BLOCK BAUXITE MINE NALCO (2023-24)

Sl. No.	Monitoring station	Parameter	Norm	Apr'23	May'23	Jun'23	Jul'23	Aug'23	Sep'23	Oct'23	Nov'23	Dec'23	Jan'24	Feb'24	Mar'24	Avg
1	A1 (Baiguda village)	RPM (µg / m3)														
		PM 2.5(60µg / m3)	60	29.41	28.47	27.98	18.69	22.53	24.59							25.28
		PM10(100µg / m3)	100	51.64	49.69	48.55	30.51	40.62	40.35							43.56
		NRPM (µg /m3)		56.46	54.85	55.03	34.28	44.54	41.71							47.81
		SPM(µg /m3)		108.1	104.54	103.58	64.79	85.16	81.06							91.21
		SO_2 (80 µg /m3)	80	9.28	9.48	10.22	5.61	6.25	7.34							8.03
		NO_X (80µg /m3)	80	17.51	17.43	18.05	8.57	9.87	11.45							13.81
		CO (2 mg /m3)	2	0.38	0.34	0.42	0.24	0.23	0.28							0.32
2	A2 (Bitiarguda Village)	RPM (µg / m3)														
		PM 2.5(60µg / m3)	60	30.27	29.19	29.06	17.26	24.31	26.41							26.08
		PM10(100µg / m3)	100	52.42	50.15	50.2	28.47	43.75	44.52							44.92
		NRPM (µg /m3)		58.23	56.34	56.09	32.52	46.91	46.25							49.39
		SPM(µg /m3)		110.65	106.49	106.29	60.99	90.66	90.77							94.31
		SO_2 (80 µg /m3)	80	8.47	8.64	8.45	6.29	6.04	7.08							7.50
		NO_X (80µg /m3)	80	15.29	14.57	14.4	10.21	10.62	10.34							12.57
		CO (2 mg /m3)	2	0.34	0.32	0.41	0.26	0.22	0.24							0.30
3	A3 (Goudguda village)	RPM (µg / m3)														
		PM 2.5(60µg / m3)	60	28.52	27.14	26.93	19.38	20.85	27.39							25.04
		PM10(100µg / m3)	100	50.23	48.98	49.03	32.26	38.29	45.67							44.08
		NRPM (µg /m3)		56.19	52.71	53.01	35.71	42.83	48.64							48.18
		SPM(µg /m3)		106.42	101.69	102.04	67.97	81.12	94.31							92.26
		SO_2 (80 µg /m3)	80	9.19	9.13	9.06	6.78	7.12	8.04							8.22
		NO_X (80µg /m3)	80	19.37	16.25	17.22	10.43	11.53	12.87							14.61
		CO (2 mg /m3)	2	0.35	0.4	0.39	0.23	0.2	0.26							0.31
4	A4 (Kakriguma village)	RPM (µg / m3)														
		PM 2.5(60µg / m3)	60	31.79	30.86	30.75	16.24	23.74	25.14							26.42
		PM10(100µg / m3)	100	54.18	51.34	51.09	27.18	41.58	43.76							44.86
		NRPM (µg /m3)		59.37	54.29	54.06	31.45	43.25	47.82							48.37
		SPM(µg /m3)		113.55	105.63	105.16	58.63	84.83	90.58							93.06
		SO_2 (80 µg /m3)	80	9.05	9.25	10.75	7.24	6.41	6.75							8.24
		NO_X (80µg /m3)	80	16.29	18.41	17.96	11.32	9.35	10.52							13.98
		CO (2 mg /m3)	2	0.32	0.36	0.35	0.25	0.24	0.27							0.30
5	A5 (Upper Meeting village)	RPM (µg / m3)														
		PM 2.5(60µg / m3)	60	34.82	32.41	32.09	21.72	27.32	29.83							29.70
		PM10(100µg / m3)	100	55.91	53.42	52.98	35.49	47.31	51.87							49.50
		NRPM (µg /m3)		58.41	57.12	57.22	39.69	52.79	52.39							52.94
		SPM(µg /m3)		114.32	110.54	110.2	75.18	100.1	104.26							102.43
		SO_2 (80 µg /m3)	80	10.54	9.34	10.22	8.13	7.03	8.24							8.92
		NO_X (80µg /m3)	80	21.46	16.29	16.99	12.89	10.64	13.48							15.29
		CO (2 mg /m3)	2	0.4	0.46	0.38	0.31	0.26	0.34							0.36
6	A6 (Near Main Haul Road Area)	RPM (µg / m3)														
		PM 2.5(60µg / m3)	60	38.95	38.54	37.22	31.68	32.51	34.51							35.57
		PM10(100µg / m3)	100	58.47	58.71	59.02	56.23	55.83	54.28							57.09
		NRPM (µg /m3)		65.48	65.38	66.06	59.13	58.37	56.47							61.82
		SPM(µg /m3)		123.95	124.09	125.08	115.36	114.2	110.75							118.91
		SO_2 (80 µg /m3)	80	14.61	12.41	13.96	10.41	9.38	9.12							11.65
		NO_X (80µg /m3)	80	27.57	23.41	22.56	17.32	14.81	16.25							20.32
		CO (2 mg /m3)	2	0.66	0.74	0.85	0.39	0.39	0.42							0.58

1/12/2023
SANJAYA KUMAR PATNAIK
General Manager(Env.)
Panchpatmali Bauxite Mine
NALCO, Damanjodi-763008

Sl. No.	Monitoring station	Parameter	Norm	Apr'23	May'23	Jun'23	Jul'23	Aug'23	Sep'23	Oct'23	Nov'23	Dec'23	Jan'24	Feb'24	Mar'24	Avg
7	A7 (Near Crusher House)	RPM (µg / m3)														
		PM 2.5(60µg / m3)	60	39.1	39.42	38.96	38.43	36.48	39.78							38.70
		PM10(100µg / m3)	100	59.1	59.27	60.09	58.61	58.47	59.41							59.16
		NRPM (µg /m3)		69.33	67.91	68.23	62.39	61.12	63.54							65.42
		SPM(µg /m3)		128.43	127.18	128.32	121	119.59	122.95							124.58
		SO_2 (80 µg /m3)	80	13.73	11.57	12.03	9.64	8.45	9.33							10.79
		NO_X (80µg /m3)	80	25.41	20.54	21.55	14.29	13.93	14.67							18.40
		CO (2 mg /m3)	2	0.58	0.58	0.62	0.36	0.32	0.4							0.48
8	A8 (Roof of the HEMM main building)	RPM (µg / m3)														
		PM 2.5(60µg / m3)	60	32.51	31.56	30.95	24.64	26.95	32.91							29.92
		PM10(100µg / m3)	100	52.35	50.96	50.99	40.64	46.59	51.96							48.92
		NRPM (µg /m3)		57.14	54.42	53.96	46.38	50.73	54.86							52.92
		SPM(µg /m3)		109.49	105.38	104.95	87.02	97.32	106.82							101.83
		SO_2 (80 µg /m3)	80	10.42	10.36	9.86	9.29	7.26	8.69							9.31
		NO_X (80µg /m3)	80	19.24	18.25	19.06	15.31	10.47	12.78							15.85
		CO (2 mg /m3)	2	0.41	0.81	0.75	0.28	0.28	0.32							0.48
9	A9 (Roof of Panchpatmali Bhavan)	RPM (µg / m3)														
		PM 2.5(60µg / m3)	60	35.46	32.17	32.22	30.4	30.69	36.27							32.87
		PM10(100µg / m3)	100	56.29	55.68	54.19	53.81	56.71	55.87							55.43
		NRPM (µg /m3)		62.42	59.71	58.94	59.63	59.81	58.29							59.80
		SPM(µg /m3)		118.71	115.39	113.13	113.44	116.52	114.16							115.23
		SO_2 (80 µg /m3)	80	13.28	12.05	11.25	10.27	9.17	9.06							10.85
		NO_X (80µg /m3)	80	26.35	21.6	22.55	18.61	15.79	15.84							20.12
		CO (2 mg /m3)	2	0.54	0.67	0.69	0.38	0.35	0.41							0.51
10	A10 (Near SMCP North Block)	RPM (µg / m3)														
		PM 2.5(60µg / m3)	60	30.24	29.85	29.62	26.49	27.13	30.54							28.98
		PM10(100µg / m3)	100	51.83	51.74	51.26	44.87	50.23	48.57							49.75
		NRPM (µg /m3)		54.29	56.96	55.92	46.27	54.38	52.78							53.43
		SPM(µg /m3)		106.12	108.7	107.18	91.14	104.61	101.35							103.18
		SO_2 (80 µg /m3)	80	10.56	10.41	9.46	9.41	8.59	8.78							9.54
		NO_X (80µg /m3)	80	20.17	18.98	19.32	14.57	13.68	12.64							16.56
		CO (2 mg /m3)	2	0.49	0.39	0.46	0.26	0.24	0.35							0.37

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ANNEXURE-II
FLOW RATES (Sl 25) OF SPRINGS AROUND PANCHPATMALI CENTRAL & NORTH BLOCK BAUXITE MINE (2023-24)

Stream water Quality Analysis April 2023

SL. NO	Parameters	Sampling Station Code																
		G-1	G-2	G-3	G-4	G-5	G-6	G-7	G-8	G-9	G-10	G-11	G-12	G-13	G-14	G-15	G-16	G-17
		Litiguda	Jholaguda	Bhitara Bhejaput	Barigurha	Kapsiput	Litaputta	Murdaguda	Gaurhagud a	Tenguligur ha	Kakirgum a	Tentulipad ar	Keler	Kusumagur ha	Kirajhola	Rangapani	Pansaputa	Balipeta
1	Temp (^{0}C)	32^{0}C.	32^{0}C	33^{0}C	33^{0}C	34^{0}C	34^{0}C	34^{0}C	32^{0}C	32^{0}C	30^{0}C	30^{0}C	30^{0}C	30^{0}C	32^{0}C	32^{0}C	32^{0}C	34^{0}C
2	pH Value	7	7	7	6.9	6.9	7	7	6.9	6.9	6.8	6.9	7	7	70	6.9	6.9	6.9
3	Dissolve Oxygen, mg/l	3.4	3.8	3.9	3.8	3.7	4	4	3.8	4.1	3.9	4	4	4	3.9	4	4.1	4
4	Total Dissolved Solids, mg/l	44	52	46	44	29	41	27	40	41	26	26	39	40	40	26	39	40
5	Total Hardness, (as $CaCO_3$), mg/l	24	40	36	28	16	32	16	36	32	24	20	32	32	32	16	48	44
6	Suspended solids mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	41	26	26	39	40	40	26	39	40
7	B.O.D mg/l 3 days at 27°C	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
8	Nitrate (as NO3), mg/l	3.9	4.2	2.8	4.1	4.5	3.2	3.9	4.1	2.8	1.6	1.4	2.8	3.6	3,8	2,1	3.9	4
9	Chloride as Cl – mg/l	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
10	Sulphate (as SO4), mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	<1.0	<1.0	1.8
11	Calcium (as Ca), mg/l	4.8	8	9.6	8	6.4	8	6.4	8	9.6	6.4	6.4	8	9.6	8	6.4	6.4	12.8
12	Magnesium (as Mg), mg/l	2.9	4.86	2.9	1.9	<0.243	2.9	<0.243	3.9	1.94	1.94	0.972	2.92	1.94	2.92	<0.243	7.77	2.9
13	Turbidity,(N.T.U.)	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	1.7	<1.0	<1.0	<1.0	<1.0	1	<1.0	<1.0	1.9
14	Fluoride as F , mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
15	Phenolic Compounds, (as C_6H_5OH) ,mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
16	Arsenic (as As), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
17	Mercury (as Hg), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
18	Lead (as Pb), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
19	Cadmium (as Cd), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
20	Chromium (as Cr^{+6}), mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Copper (as Cu), mg/l	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
22	Zinc (as Zn) mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
23	Iron (as Fe), mg/l	<0.05	0.0826	0.1148	0.076	0.3113	0.1028	0.2886	0.1017	0.4132	0.1178	0.0922	<0.05	<0.05	<0.05	0.0901	<0.05	0.0788
24	STREAM FLOW RATE (m^3/sec)	3.77	1.2	0.563	0.9	1.252	0.651	1.671	1.734	0.902	0.964	0.541	1.103	0.664	1.014	1.131	0.815	0.297

1/12/2023

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Stream water Quality Analysis August 2023

SL. NO	Parameters	Sampling Station Code																
		G-1	G-2	G-3	G-4	G-5	G-6	G-7	G-8	G-9	G-10	G-11	G-12	G-13	G-14	G-15	G-16	G-17
		Litiguda	Jholaguda	Bhitara Bhejaput	Barigurha	Kapsiput	Litaputta	Murdagurha	Gaurhagurha	Tenguligurha	Kakirgumma	Tentulipadar	Keler	Kusumagurha	Kirajhola	Rangapani	Pansaputa	Balipeta
1	Temp (°C)	28°C	28°C	28°C	28°C	28°C	28°C	30°C	30°C	30°C	30°C	30°C	30°C	28°C	28°C	28°C	28°C	28°C
2	pH Value	6.8	6.8	7	7	7	7	6.9	6.9	6.9	6.9	7	7	7	7	6.8	6.9	6.9
3	Dissolve Oxygen, mg/l	4.5	4.6	4.4	4.5	4.4	4.3	4.8	3.8	3.7	4	3.9	4.1	3.8	3.8	4.4	4.3	4.2
4	Total Dissolved Solids, mg/l	6	6	5	5	6	6	6	5	9	9	5	6	6	6	6	9	5
5	Total Hardness, (as $CaCO_3$), mg/l	12	20	16	8	20	8	12	16	20	16	8	8	8	16	8	8	8
6	Suspended solids mg/l	3	5	4	6	5	4	7	4	8	8	2	4	5	5	4	7	4
7	B.O.D mg/l 3 days at 27°C	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
8	Nitrate (as NO3), mg/l	4.5	4.2	4.8	5.9	3.8	2.6	3.8	1.8	1.5	2.5	1.2	2.4	2.9	5	5	1.3	2
9	Chloride as Cl – mg/l	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
10	Sulphate (as SO4), mg/l	<1.0	<1.0	<1.0	6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2	<1.0	<1.0	<1.0	<1.0	<1.0
11	Calcium (as Ca), mg/l	4.8	3.2	6.4	3.2	4.8	3.2	3.2	4.8	3.2	6.4	3.2	4.8	3.2	3.2	3.2	3.2	3.2
12	Magnesium (as Mg), mg/l	<0.243	2.916	<0.243	0.243	1.944	<0.243	0.972	<0.243	2.916	<0.243	<0.243	1.944	<0.243	0.972	<0.243	<0.243	<0.243
13	Turbidity,(N.T.U.)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0
14	Fluoride as F , mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
15	Phenolic Compounds, (as C_6H_5OH) ,mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
16	Arsenic (as As), mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
17	Mercury (as Hg), mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
18	Lead (as Pb), mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
19	Cadmium (as Cd), mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
20	Chromium (as Cr^{+6}), mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
21	Copper (as Cu), mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
22	Zinc (as Zn) mg/l	0.015	0.017	<0.01	0.015	0.013	<0.01	0.022	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
23	Iron (as Fe), mg/l	0.42	0.3	0.52	0.2	0.3	0.19	0.26	0.22	0.19	0.22	0.2	0.29	0.28	0.58	0.58	0.26	0.22
24	STREAM FLOW RATE (m^3/sec)	3.944	1.304	0.608	0.976	1.348	0.87	1.808	1.729	0.811	1.258	0.426	1.217	0.692	0.805	0.932	0.635	0.334

1/9/2023
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ANNEXURE-III

GROUND WATER QUALITY ANALYSIS AROUND PANCHPATMALI CENTRAL & NORTH BLOCK BAUXITE MINE (2023-24)

For April 2023

Sl. No	Name of Tests	Permissible Limits	GW-1 Metingi Village	GW-2 Chhatamba Village	GW-3 Panasaput	GW-4 Jhariapadar	GW-5 Tentulipadar	GW-6 Ichhapur	GW-7 Mundagadati	GW-8 Bijaghati Village	GW-9 Putraghati Village	GW-10 Chararha Village	GW-11 Kapsiput Village	GW-12 Jambagurha Village	GW-13 Shriguda Village	GW-14 Kakirigumа Village	GW-15 Sorishapadar Village
1	pH at 30°C	6.5-8.5	6.9	6.9	6.8	6.8	6.8	6.8	6.9	6.9	6.9	6.8	6.7	6.8	6.8	6.9	6.8
2	D.O. (mg/l)	-	3.5	3.8	3.6	3.9	4	3.9	3.8	3.5	3.7	3.5	3.9	3.6	3.7	3.8	3.9
3	T.D.S (mg/l)	2000	205	93	89	260	85	79	329	205	107	120	137	14	73	138	68
4	Total Hardness. as $CaCo_3$	600	100	56	64	92	40	72	108	100	48	84	84	56	44	84	44
5	Total Alkalinity (as $CaCo_3$) (mg/l)	600	36	56	44	88	40	48	76	36	36	92	32	72	48	44	48
6	B.O.D.	30	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
7	Nitrate as No_3 (mg/l)	45	3.2	1.2	1	2.8	1.2	1.1	2.3	3.2	2.8	1.9	4.6	2.3	1.9	1.8	1.2
8	Chlorides as Cl (mg/l)	1000	40	4	8	48	4	4	72	40	20	4	16	28	4	20	4
9	Sulphate as SO_4 (mg/l)	400	18	3	2	10	4	3	45	18	2	<1.0	12	<1.0	<1.0	7	<1.0
10	Calcium as Ca (mg/l)	200	24	11.2	12.8	25.6	11.2	11.2	28.8	24	11.2	19.2	20.8	22.4	11.2	27.2	17.6
11	Magnesium as Mg (mg/l)	100	9.72	6.8	7.77	6.8	2.916	10.69	8.748	9.72	4.86	8.748	7.776	<0.243	3.88	3.88	<0.243
12	Turbidity (NTU)	10	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	<1.0
13	Fluoride as F (mg/l)	1.5	0.095	0.093	0.088	0.091	<0.1	<0.1	<0.1	0.095	<0.1	0.495	<0.1	<0.1	<0.1	0.206	<1.0
14	Phenlic compounds as C_6H_5OH (mg/l)	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
15	Arsenic as As (mg/l)	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
16	Mercury as Hg (mg/l)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Lead as Pb (mg/l)	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
18	Cadmium as Cd (mg/l)	0.01	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
19	Chromium Cr^{+6} (mg/l)	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Copper as Cu (mg/l)	1.5	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.0541	<0.04
21	Zinc as Zn (mg/l)	15	<0.01	<3.2312	0.025	<0.01	0.0347	0.0596	0.7824	<0.01	0.0151	0.1995	<0.01	0.0226	0.1893	0.1055	<0.01
22	Iron as Fe (mg/l)	1	<0.05	0.774	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.4034	<0.05	<0.05	0.2178	<0.05	<0.05
23	Temperature in 0C	-	30°C	30°C	30°C	30°C	30°C	30°C	32°C	30°C	31°C	32°C	30°C	31°C	30°C	32°C	30°C
24	Coliform (MPN)	ND in 100ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Norm as per IS 10500:2012

For August 2023

Sl. No	Name of Tests	Permissible Limits	GW-1 Metingi Village	GW-2 Chhatamba Village	GW-3 Panasaput	GW-4 Jhariapadar	GW-5 Tentulipadar	GW-6 Ichhapur	GW-7 Mundagadati	GW-8 Bijaghati Village	GW-9 Putraghati Village	GW-10 Chararha Village	GW-11 Kapsiput Village	GW-12 Jambagurha Village	GW-13 Shriguda Village	GW-14 Kakirigumа Village	GW-15 Sorisha padar Village
1	pH at 30°C	6.5-8.5	6.9	6.9	6.8	6.8	6.9	6.9	6.9	6.8	6.8	6.9	6.9	6.9	6.8	6.8	6.8
2	D.O. (mg/l)	-	3.8	3.9	3.2	3.9	3.8	3.6	4	3.9	3.8	3.8	4	3.5	3.6	3.9	3.9
3	T.D.S (mg/l)	2000	372	75	72	384	88	155	383	43	310	145	117	57	131	49	216
4	Total Hardness. as $CaCo_3$	600	52	96	12	84	100	180	104	16	188	84	16	28	128	132	132
5	Total Alkalinity (as $CaCo_3$) (mg/l)	600	64	64	40	64	36	68	28	32	80	28	68	48	48	44	20
6	B.O.D.	30	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
7	Nitrate as No_3 (mg/l)	45	2.4	2.8	2.6	2.5	2.2	2.3	2.8	3	1.6	1.2	4	1.8	1.1	1.4	1.2
8	Chlorides as Cl (mg/l)	1000	100	4	4	84	4	8	96	8	64	28	12	4	20	4	68
9	Sulphate as SO_4 (mg/l)	400	4	25	2	8	26	96	20	2	30	8	2	2	28	30	28
10	Calcium as Ca (mg/l)	200	9.6	22.4	3.2	16	27.2	48	24	4.8	44.8	17.6	3.2	6.4	28.8	33.6	22.7
11	Magnesium as Mg (mg/l)	100	6.8	9.7	0.972	10.69	7.76	14.58	10.69	0.972	18.46	9.72	1.94	2.91	13.6	13.6	13.6
12	Turbidity (NTU)	10	<1.0	2.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
13	Fluoride as F (mg/l)	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
14	Phenlic compounds as C_6H_5OH (mg/l)	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
15	Arsenic as As (mg/l)	0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
16	Mercury as Hg (mg/l)	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
17	Lead as Pb (mg/l)	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
18	Cadmium as Cd (mg/l)	0.01	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
19	Chromium Cr^{+6} (mg/l)	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
20	Copper as Cu (mg/l)	1.5	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
21	Zinc as Zn (mg/l)	15	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.48	<0.01	4.728	<0.01	0.23	<0.01	< 0.01	< 0.01	< 0.01
22	Iron as Fe (mg/l)	1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
23	Temperature in 0C	-	28°C	28°C	28°C	28°C	26°C	26°C	26 °C	26°C	28 °C	28 °C	26 °C	28 °C	26°C	26°C	28 °C
24	Coliform (MPN)	ND in 100ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Norm as per IS 10500:2012

SANJAYA KUMAR PATNAI
General Manager(Env.
Panchpatmali Bauxite M
NALCO, Damanjodi-76

1/12/2023

ANNEXURE-IV

STATUS OF COMPLIANCE OF MEASURES TO BE TAKEN UP BY NALCO WITHIN THE PROJECT AREA OF PANCHPATMALI BAUXITE MINE (CENTRAL & NORTH BLOCK ML) AS PER APPROVED WILD LIFE MANAGEMENT PLAN

Sl.No.	Para ref.	Item of Work	Status as on 30.9.2023
1	3. b) i) 1.	Soil and moisture conservation in the ML area	Top soil excavated is used in concurrent reclamation of mined out area and is 100% utilised. All the rainfall in mined out area percolates into the ground without being discharged outside due to presence of in-situ barrier all around the mine. Besides rich growth of plantation and grass in the mined out area helps the soil to retain optimum moisture.
2	3. b) i) 2.	Grass seeding in hill slopes one year prior to plantation	Every year grass turfing with local grass is done in slopes in ML area. Grass turfing carried out during 2023-24 is 7000 sqr.mtr.
3	3. b) i) 3.	Water harvesting structure in the Central Location of the lease where normally stray cattle congregate 40 m length x 30 m width x 3 m depth at the central point.	Three Nos of water harvesting structures do exist over Panchpatmali Bauxite Mine to take care of the need of stray cattle and other wildlife.
4	3. b) i) 4.	Fire line inside already reclaimed areas prior to commencement of the season (January to June) 20 km	Every year lemon grass @75000 sq.mtr appx. is being removed inside the reclaimed area as total area clearance to prevent spread of fire.
5	3.b) i) 5.	Watch and ward (10 nos) to prevent spread of fire will be looked after by NALCO	Watch and ward @14 nos per day are being deployed to prevent spread of fire.
6	3. b) i) 6.	Signage depicting messages to workers to protect the planted species / their vernacular name and usages and their medicinal value.	Signage board on plantation & Environmental issues have been provided.
7	3 b) i) 7	Awareness campaign amongst the workers regarding the ecological / ethnic values of forest	Every year awareness campaign is being organised to spread awareness among employees regarding ecological / ethnic values of forest through World Environment Day , Vana Mahotsav Week , MEMC Week, etc.
8	3. b)i) 8.	Solar Fencing around Red Mud Pond over 3.0 Kms.	The red mud pond is located beyond the buffer zone of Panchpatmali Bauxite Mine. Further no elephant habitat exists in the core or buffer zone of Panchpatmali Bauxite Mine.

01/12/23

(Rasheed Waris)
Group General Manager(Mines)

RASHEED WARIS
Group General Manager(Mines)
NALCO Mines, Damanjodi

ANNEXURE-V

AMBIENT NOISE LEVEL MEASUREMENT IN AND AROUND PANCHPATMALI CENTRAL & NORTH BLOCK BAUXITE MINE FOR 2023-24

Sl.	Monitoring station code & its direction	Date	Noise level dB(A)		Date	Noise level dB(A)		Date	Noise level dB(A)		Date	Noise level dB(A)	
			Day	Night		Day	Night		Day	Night		Day	Night
1	Baiguda Village-SW	25.04.2023	50.3	33.9	26.08.2023	48.1	33.1						
2	Bitiarguda Village-W	25.04.2023	47.2	36.6	26.08.2023	53.26	37.1						
3	Goudgida Village-NW	25.04.2023	51.8	39.2	26.08.2023	45.6	41.6						
4	Kakriguma Village-N	25.04.2023	46.6	30.1	26.08.2023	49.9	30						
5	Upper Meeting Village- NE	25.04.2023	47.3	33.2	26.08.2023	50.1	33.1						
6	Near Main Haul Road- E	25.04.2023	48.9	36.9	26.08.2023	45.8	37.1						
7	Near Crusser House- SE	25.04.2023	50.3	30.8	26.08.2023	47.6	40.1						
8	Near Hemm Main Building- SW	25.04.2023	54.1	33.2	26.08.2023	52.3	34.8						
9	Roof Of Panchpatmali Bhawan- S	25.04.2023	48.3	36.1	26.08.2023	47.1	39.2						
10	Near Smcp North Block-NE	25.04.2023	47.1	38.2	27.08.2023	49.2	43.8						

Norm

Category of area/zone		Limits in dB(A) Leq	
		Day time	Night time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence zone	50	40

1/12/23

SANJAYA KUMAR PATNAIK
General Manager(Env.)
Panchpatmali Bauxite Mine
NALCO, Damanjodi-763008

ANNEXURE-VI

WASTE WATER ANALYSIS AT PANCHPATMALI CENTRAL & NORTH BLOCK BAUXITE MINE

(2023-24)

Sl. No.	Parameter	NORM	WW1												WW2												Average	
			Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	WW1	WW2
1	Temperature (ºC)	-	32	28	30	31	28	24							32	28	30	30	26	24							28.833	28.333
2	pH Value	5.5-9.0	7	7	7	6.92	7.1	7							7	7	7	6.99	7.2	7							7.003	7.032
3	Dissolve Oxygen, mg/l	-	3.4	3.5	3.6	3.7	3.9	3.8							3.8	3.8	3.8	3.8	3.5	3.4							3.650	3.683
4	Total Dissolved Solids, mg/l	-	244	207	119	128	94	113							223	220	115	120	30	107							150.833	135.833
5	Total Hardness (as $CaCO_3$), mg/l	-	80	80	72	80	36	48							96	112	56	70	28	52							66.000	69.000
6	Suspended Solids mg/l	100	1	6	2	8	6	5							1	<1.0	1.5	12	4	10							4.667	5.700
7	B.O.D mg/l 3 days at	30	23	12.6	20	16	15.6	<3.0							18	9.4	10	10	16.2	<3.0							17.44	12.72
8	C.O.D mg/l	-	104	80	60	50	9	37							80	56	46	38	11	33							56.667	44.000
9	Nitrate (as NO3), mg/l	-	4.9	4.5	6.5	5.8	2.8	3.6							4.2	5.4	4.9	4.2	3.9	2							4.683	4.100
10	Chloride as Cl – mg/l	-	72	74	36	38	16	28							72	90	32	35	17	34							44.000	46.667
11	Sulphate (as SO4), mg/l	-	6.2	1.091	8	6	5	16							6	<1.0	6	5	4	18							7.049	7.800
12	Calcium (as Ca), mg/l	-	27.2	28.8	14.4	15	7	14							25.6	24	14.4	15	8	14							17.733	16.833
13	Magnesium (as Mg), mg/l	-	2.92	1.94	8.75	10.3	4.5	3							7.776	12.63	4.86	7.9	1.9	4							5.234	6.511
14	Fluoride as F , mg/l	2	0.92	0.483	0.46	0.5	<0.1	<0.1							0.936	0.328	0.23	0.23	<0.1	<0.1							0.589	0.431
15	Phenolic Compounds, (as C_6H_5OH) ,mg/l	1	<1.0	<1.0	<0.01	<0.1	<1.0	<0.002							<1.0	<1.0	<0.01	<0.1	<1.0	<0.002							<1.0	<1.0
16	Arsenic (as As), mg/l	0.2	<0.01	<0.2	<0.05	<0.05	<0.01	<0.05							<0.01	<0.2	<0.05	<0.05	<0.01	<0.05							<0.1	<0.1
17	Mercury (as Hg), mg/l	0.01	<0.001	<0.01	<0.001	<0.01	<0.01	<0.001							<0.001	<0.01	<0.001	<0.01	<0.01	<0.001							<0.001	<0.001
18	Lead (as Pb), mg/l	0.1	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01							<0.01	<0.1	<0.01	<0.01	<0.01	<0.01							<0.01	<0.01
19	Cadmium (as Cd), mg/l	2	<0.01	<2.0	<0.01	<0.1	<0.01	<0.01							<0.01	<2.0	<0.01	<0.1	<0.01	<0.01							<0.01	<0.01
20	Chromium (as Cr^{+6}), mg/l	0.1	<0.05	<0.1	<0.05	<0.05	<0.1	<0.05							<0.05	<0.1	<0.05	<0.05	<0.1	<0.05							<0.05	<0.05
21	Copper (as Cu), mg/l	3	<0.04	<3.0	<0.04	<0.04	<0.04	<0.04							<0.04	<3.0	<0.04	<0.04	<0.04	<0.04							<0.04	<0.04
22	Zinc (as Zn) mg/l	5	0.02	<0.1	<0.01	<0.01	<0.01	<0.01							<0.01	0.206	<0.01	<0.01	<0.01	<0.01							<0.01	<0.01
23	Iron (as Fe), mg/l	3	0.29	0.135	1.6	2.09	0.42	0.56							<0.05	0.06	0.35	0.56	0.73	0.24							0.8491	0.388
24	Oil and grease	10	4	3	2.9	3.2	3	3.6							2	2	<0.1	1.8	2	1.6							3.2833	1.880

WW1-treated water from Canteen

WW2-treated water from HEMM area

HEMM area

* Parameters are within permissible norms

NT- Not traceable

1/12/2023

SANJAYA KUMAR PATNAIK
General Manager(Env.)
Panchpatmali Bauxite Mine
NALCO, Damanjodi-763008

नालको NALCO
NATIONAL ALUMINIUM COMPANY LIMITED
(A Public Sector Undertaking)
Panchpatmali Bauxite Mine
D A M A N J O D I – 763008
Dist. KORAPUT (ORISSA)
Ph-06853-268001

Ref-NAL/MIN/GGM(Mines)/ 2023/ 76 Date: 30/09/2023

To,
The Member Secretary,
State Pollution Control Board, Orissa
PariveshBhawan,
A/118, Nilakantha Nagar,
Unit-VIII, Bhubaneswar – 751012.

Sub: Submission of Environmental Statement for the financial year ending with 31st March 2023 in respect of Panchpatmali Central & North Block Bauxite Mine, NALCO

Sir,

Please find enclosed herewith the "Environmental Statement for the financial year ending with 31st March 2023" in respect of Panchpatmali Central & North Block Bauxite Mine, NALCO in the prescribed format.

Thanking you.

Yours' faithfully,

30.09.23
(S.C.Samal)
Group General Manager (O&M) I/c
S.C. SAMAL
Group General Manager (O&M) I/c
NALCO Mines, Damanjodi-763008

Encl: As above.

Copy- The Regional Officer,- - for kind information
Regional Office,
State Pollution Control Board,Odisha
Koraput,
Ground Floor, Door Sanchar Bhawan, BSNL, Koraput Odisha

FORM-V
(See Rule 14)

Environmental Statement for the Financial Year ending 31st March 2023

PART-A

i.	Name & address of the Owner/Occupier of the industry Operation or process	:	Sri Pankaj Kumar Sharma Director (Production), National Aluminium Co.Ltd. P/1, Nayapalli, Bhubaneswar-751061
ii.	Industry Category	:	
	- Primary - (STC Code) - Secondary - (STC Code)		
iii.	Production capacity - Units	:	Central & North Block -68.25 lakh Ton /Year
iv.	Year of Establishment	:	1986
v.	Date of the last Environmental Statement submitted	:	30.09.2022

PART – B

Water and Raw Material Consumption:

i. **Water Consumption m3/day**

Process	:	
Cooling (Dust suppression and washing Of equipments)	:	1094.547 m3/day
Domestic	:	729.715 m3/day
Others	:	Nil

Name of the Products	Process Water consumption per unit of product output	
	During the Current Financial year 2021-2022 (KL/MT)*	During the Current Financial year 2022-2023 (KL/MT)*
1. Bauxite Ore	0.09	0.103
2. ----	--	--
3. --	--	--

ii. **Raw Material Consumption**:

Name of the Raw Materials	Name of Products	Consumption of raw material per unit output	
	Bauxite Ore	During Current Financial year 2021-2022	During Current Financial year 2022-2023
a) Explosive		59.59 gm/t	Nil (No blasting)
b) Diesel		0.82 L/t	0.77 L/t
c) Power		1.80 KWH/t	1.83 KWH/t
d) Lubricant		22.55 ml/t	16.4 ml/t

PART- C

Pollution Discharge to Environment/Unit of Output :

(Parameter as specified in the consent issued)

(I)	Pollution	Quantity of pollutant discharge (Mass/Day)	Concentration of pollutant discharges (Mass/Day)	% of variation from prescribed standards with reasons
(a)	Water*	Nil	Nil	Nil
(b)	Air**	Nil	Nil	Nil

* No water pollutant is being discharged, as it is not a process unit.

** No point source emission is there.

PART- D

Hazardous Wastes

[As specified under Hazardous & other Wastes (Management & Transboundary Movement) Rules,2016 and amendments]

Hazardous Wastes	Total Quantity (Kg)			Quantity	
(a) Form process	Sl no	Description	Unit	2021-22*	2022-23*
	1	Oily sludge	MT	Nil	Nil
	2	Oil filter and filter materials	MT	4.3	6.7
	3	Waste containing oil (cotton waste)	MT	1.5	3.12
	4	Used oil	KL	94.28	81.695
	5	Discarded containers/ barrels of used oil	Nos.	Nil	Nil
	6	Incinerator ash	MT	0.022	0.15
(b) From pollution control facilities	NA		NA		

PART- E

SOLID WASTES

Solid Wastes	Total Quantity (In Lakh Tonnes)	
	During the current financial year 2021-2022	During the current financial year 2022-2023
a) From process	7.98	7.88
b) From pollution control facilities	Nil	Nil
c) 1. Quantity recycled or re-utilised within the unit	7.98*	7.88*
2. Sold	Nil	Nil
3. Disposed	Nil	Nil

* Lateritic overburden and Topsoil

PART- F

Please specify the characterisation (in terms of composition and quantum) of Hazardous as well as solid wastes and indicate disposal practice adopted for both these categories of wastes.

A. Hazardous waste

Sl.no.	Description of waste	Characterisation	Disposal practice
1	Oily sludge	Major constituent-oil	Oily sludge generated during cleaning of oil-water separator are stored temporarily on concrete floor under shed. Oily sludge is burnt in the hazardous waste incinerator and the ash is disposed to authorised TSDF of M/s RE Sustainability Ltd.
2	Oil filter and filter materials	Major constituent-oil	Oil filter and filter Materials generated during maintenance of HEMMs are stored temporarily in bins on concrete floor under shed. Used filter elements are stacked in oil collecting trays. The oil thus collected on self draining by gravity is transferred to a barrel which is finally sent to oil disposal yard at Central Store, whereas filter elements almost dried up of oil are taken to a hazardous waste incinerator for control burning. The residual metallic parts after burning are sent as scrap to Central Store for disposal action. The ash is disposed to authorised TSDF of M/s RE Sustainability Ltd.

3	Waste containing oil (cotton waste)	Major constituent-oil	The cotton waste in HEMM is stored in designated bins under shed. The waste containing oil like cotton waste are incinerated in the hazardous waste incinerator. The ash is disposed to authorised TSDF of M/s RE Sustainability Ltd.
4	Used oil	Major constituent-oil	Used/waste oil (as drained out from equipment and vehicles) is collected in the barrels and stored at a place earmarked in specified waste/used oil disposal area. The floor of the storage area is concreted and bunds have been made surrounding the area in order to prevent the oil contamination to the landmass. In order to collect spilled oil from barrels (whatever little might be there) the said flooring of the disposal area has been given suitable gradient so as to collect the spilled oil in a pit. The oil from the pit is also collected back in barrel by use of hand pumps. These are disposed to authorized recyclers.
5	Discarded containers/ barrels of used oil	Major constituent-oil	Discarded containers i.e used oil storage barrels whenever generated are kept in the used oil storage yard. Empty used oil barrels whenever they are generated are reused for storage of used oil and disposed to authorized recyclers.
6	Incinerator ash	Major constituent-Silica	Disposed to TSDF of M/s RE Sustainability Ltd authorized for disposal of hazardous waste.

B. Solid Waste

Sl.no.	Description of waste	Characterisation	Disposal practice
1	Overburden material	Top Soil and Laterite	This is used for backfilling of mined out area as a part of land reclamation programme concurrent to mining operation/production.

PART- G

Impact of the pollution abatement measures taken on conservation of natural resources on the cost of production.

1. **Measures against Soil erosion and land slides**.

After complete exploitation of bauxite, the overburden from the advancing faces are dumped for back filling, for restoring landscape by providing proper benches, slopes and depressions (basins) matching the natural topography. The backfilled area basins act as suitable water

reservoir in arresting wash out materials from going to the valley. The back filled area is levelled followed by top dressing with preserved top soil before plantation. Afforestation is carried out with selected forest and fruit bearing species in these back filled areas as well as on the slopes to prevent soil erosion. Inclined benches are suitably covered with grass turfs to prevent soil erosion.

2. **Measures against Water pollution**:

Peripheral garland drains and catch drains have been developed ahead of the mining area as per plan and these are regularly maintained to avoid surface run off water entering into the mined out area. This pollution free surface run off water is guided to the valley following natural gradient. As a precaution, check dams have been constructed down below the valley to arrest any washouts.

Rain water inside the mines is being collected in sumps within the mining area. Water from the sumps mostly percolates down through thick clay layer which acts as a filtration chamber. Insitu barriers/bunds are constructed on the edges of Mines to prevent water flow from mined out area to the valley/natural water course at foot hill.

The waste water generated in canteen is treated in a biological reactor. The waste water generated in HEMM area from vehicle washing are passed through a series of oil water separators. The treated waste water from canteen and HEMM area are combined together and are reused for dust supression and plantation purpose. There is zero discharge of effluents from Mines.

3. **Measures against Air pollution**:

i. Dust suppression in the mining area is being carried out by water sprinkling using movable tankers. Besides this an auto sprinkling system has been installed/maintained along the central/main haul road.

ii. Drilling machineries are provided with efficient dust extractors and wet drilling system.

iii. In the crusher house, an efficient dry fog system is provided for suppression of dust at ROM hopper and transfer points. Also dust extractors and hoods are provided at transfer points in crushing and conveying system. Fog cannons have been provided at stock piles to suppress dust.

iv. Frequent checking & maintenance is done for all the heavy earth moving machineries to restrict exhaust burnt fuels/gases polluting the atmosphere.

v. Concentration of air borne dust in terms of PM_{10} and $PM_{2.5}$ are measured once in a month and the dust concentration is within permissible limit.

vi. Plantation has been carried out in the periphery of mines to prevent escape of dust into the surroundings.

4. **Measures against Noise pollution:**

Noise and vibration due to operation of heavy earth moving machineries are within the tolerable limit. With the multiple face working the equipment gets scattered over a vast area thereby reducing the concentration of noise and vibration level.

Blasting has been eliminated.

At present noise and vibration are within the permissible limit.

The total expenditure on pollution control activities (inclusive of backfilling of mined out area) during 2022-23 is Rs 13,21,62,920.07.

PART- H

Additional measures investment, proposal for environmental protection including abatement of pollution/prevention of pollution.

Nil

PART- I

Any other particulars for improving the quality of environment:

1. Industrial hygiene survey (Noise, Vibration, Air pollution etc.) is being carried out on regular basis. Corrective measures /recommendations thereof are being implemented for improving quality of environment.

2. Implementation of Environmental Management System under ISO 14001 certified by M/s Bureau Veritas, Kolkata. Corrective measures /recommendations thereof are being implemented for improving quality of environment.
3. Biogas plants have been installed to treat canteen vegetable waste.
4. Solar power plants of 130 kWp capacity have been installed

30.09.23

(S.C.Samal)
Group General Manager (O&M) I/c

S.C. SAMAL
Group General Manager (O&M) I/c
NALCO Mines, Damanjodi-763008