ADITYA BIRLA
UTKAL ALUMINA

Ref-UAIL-MINES/ENV/25/2024 **21st May 2024**

To

The Addl. Principal Chief Conservator of Forest(Central)
Ministry of Environment Forests & Climate Change
Govt. of India
Eastern Regional office, A/3, Chandrasekharpur
Bhubaneswar – 751023

Subject: Submission of six-monthly compliance status report on Environmental Clearance conditions for the period **1st October 2023 to 31st March 2024** in respect of Baphlimali Bauxite Mine of M/s Utkal Alumina International Limited, Rayagada, Odisha with production capacity of 8.5 MTPA.

Ref: **Environment Clearance Letter No. J-11015/650/2007-IA.II (M) dated 19.02.2009 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 from **1st October 2023 to 31st March 2024** in respect of Baphlimali Bauxite Mine of M/s Utkal Alumina International Ltd. having production capacity of 8.5 MTPA. This is for your kind information and perusal please.

Thanking you,

Yours faithfully,
For Utkal Alumina International Limited

Vijaya Chauhan
Head- Mines
Baphlimali Bauxite Mine

Encl: As above
Copy to:

1. The Member Secretary, State Pollution Control Board, Paribesh Bhawan A/118 Nilakantha Nagar Unit-VIII, Bhubaneswar -751012.
2. Regional Office, CPCB, Kolkata
3. Regional Office, OSPCB, Rayagada.
4. The Regional Director, Central Ground Water Board, Southeastern Region, Bhujal Bhawan, Khandagiri, BHUBANESHWAR, PIN- 751030

STATUS OF COMPLIANCE TO THE CONDITION STIPULATED IN ENVIRONMENTAL CLEARANCE FOR ENHANCEMENT OF ANNUAL PRODUCTION CAPACITY OF 8.5 MTPA WITH RESPECT TO BAPHLIMALI BAUXITE MINES M/s UTKAL ALUMINA INTERNATIONAL LTD.

(Ministry Letter No. J-11015/650/2007-IA. II (M) Dt. 19.02.2009).

Name of the Project : **Baphlimali Bauxite Mine, M/s Utkal Alumina International Ltd.**

Environment Clearance No. & date : **F. No. J-11015/650/2007-IA. II (M), dated.19.02.2009.**

Period of compliance Report : **From 1st October 2023 to 31st March 2024.**

Sl. No.	A. Special Conditions	Status of Compliance as on 31.03.2024
i.	All the conditions stipulated by the State Pollution Control Board, Orissa in their consent to establish shall be effectively implemented.	All the conditions are being effectively implemented and complied.
ii.	The project proponent shall effectively address the concerns raised by the locals in the public hearing as well as during consideration of the project while implementing the project.	All the concerns raised in the public hearing are being implemented. The details of points raised, and their compliance is attached as **Annexure- I.**
iii.	The project proponent shall develop fodder plots in the non-mineralized area in lieu of use of grazing land.	However, plantation of fodder species in 3 Ha land has been taken into consideration at the extreme south of mining lease area. The said area has been demarcated and spreading of grass seeds is being carried out. Gradually the fodder plot to be developed on the backfilled area at suitable locations.
iv.	The mining operations shall be restricted to above ground water table, and it should not intersect groundwater table. In case of working below 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.	The lowest working depth of our existing mine pit has gone up to 1004 Mtrs. RL, whereas the presence of ground water table has been estimated to be about 150 to 200 Mtrs. below from the surface (800-850 m RL). As the mining activities limited to 30 Mtrs. only from the surface, there is no impact of mining operation on the ground water/aquifers. In addition to that, the mined-out area has been backfilled for restoration. Therefore, there is no possibility of any Ground Water Intersection thereby.
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	No natural watercourse or water resources are obstructed due to mining operations. Necessary care has been taken during monsoon to channelize run off water to the excavated pits, so that it does not carry any sediment to obstruct / affect the water bodies at the foot hill.

<table>
<tr><td></td><td>mine lease, during the course of mining operation.</td><td></td></tr>
<tr><td>vi.</td><td>The project proponent shall take adequate environmental safeguard measures for control of rolling down of silt and sediments and protection of the catchment area of upper Indrāvati Reservoir during the course of mining operation.</td><td>In addition to as stated in Sl. No. v, to check flow of any silt and sediments, numbers of check dams/siltation ponds have been constructed and ensured by regular cleaning and maintenance. There are also pumps installed in siltation ponds to pump out the collected water to the open and non-working pit area for ground water recharge. The same is also continued concurrently with the running of the mines.

Details of Check Dams, garland drains & Siltation pit attached as Annexure-II & Photo 1, 2, 3 respectively. Siltation pits are being cleaned before monsoon and the photo is attached as Photo 4.

After measures listed in Annexure-II, the run-off confluence with the nearby seasonal nallah & ultimately to River Indrāvati after moving a distance around 9 Km, thus not affecting the quality of Indrāvati.</td></tr>
<tr><td>vii.</td><td>A 3 km stretch on the upstream and 3 Km in the downstream of the river passing through the project area should be taken up by the project authorities for plantation to arrest riverbank erosion and sediment flow into the river.</td><td>There is no such perennial river/nallah that exists at the mining lease.

However, there are small natural depressions, may called as gullies, develops preferably in the rainy days during inflow/outflow of rainwater at the slope of the mining lease, which is a part of project area, are being provided with check dam & plantations of indigenous species to arrest the erosion & sediment flow into the perennial nallah available at the bottom of the mining lease.</td></tr>
<tr><td>viii.</td><td>The topsoil 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>Topsoil is being separately removed and is concurrently used in backfilling of mined out area.

The topsoil generated and utilized in reclamation for the last three years as follows.

<table>
<tr><th>Year</th><th>Topsoil Generated (MT)</th><th>Topsoil Utilized (MT)</th><th>Topsoil Stored (MT)</th></tr>
<tr><td>2021-22</td><td>78795</td><td>78795</td><td>Nil</td></tr>
<tr><td>2022-23</td><td>55466</td><td>55466</td><td>Nil</td></tr>
<tr><td>2023-24</td><td>99,707</td><td>99,707</td><td>Nil</td></tr>
</table>
</td></tr>
<tr><td>ix.</td><td>The over burden (OB) generated during the initial years of the mining operation shall be temporarily stacked at the earmarked dump site(s) only for backfilling. Backfilling shall start from the 4th year onwards of the mining operation and the entire quantity of the waste to</td><td>The overburden of initial years of mining is stacked as per the approved mining scheme and within the earmarked area. Since 01.04.2016 backfilling has been started by utilizing entire quantity of overburden in the voids of the mined-out area</td></tr>
</table>

<table>
<tr><td></td><td>be generated shall be backfilled. There shall be no external over burden dumps after the 8th year of the mining operation. The entire backfilled area shall be 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.</td><td>concurrently as per the proposal given in the Review of Mining Plan.
The OB generated and utilized in reclamation for the last three year are as follows.

<table><tr><td>Year</td><td>OB Generated (MT)</td><td>OB Utilized (MT)</td><td>OB Stored (MT)</td></tr><tr><td>2021-22</td><td>4595645</td><td>4595645</td><td>Nil</td></tr><tr><td>2022-23</td><td>4714425</td><td>4714425</td><td>Nil</td></tr><tr><td>2023-24</td><td>4892203</td><td>4892203</td><td>Nil</td></tr></table>As on 31.03.2024, 141.204 Ha area has been backfilled & 88.75 Ha has been afforested in this backfilled area.

Both the activities are under continuous progress. Monitoring and management are being carried out. Compliance status is being submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar in six months.

Photo of backfilled area with plantation is attached as photo- 5.</td></tr>
<tr><td>x.</td><td>Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and temporary OB dumps to prevent run off of water and flow of sediments directly into the Kandabindha Nallah, the San River, the Indravati River and other 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 dump, temporary over burden dumps and mineral dumps to prevent run off of water and flow of sediments directly into the Kandabindha Nallah, the San River, the Indravati River and other 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</td><td>Details of the measures asked in the enlisted in Annexure-II & photos attached as Photo 1 to 4.

The runoff storage capacity has been designed to keep 50% safety margin over and above peak sudden rainfall. Sump capacity is having adequate retention period to allow proper settling of silt material. However, during rain the run-off water is continuously pumped out from settling ponds to excavated pits which increases the capacity of the ponds. The settling ponds & garland drains are being de-silted and maintained at regular intervals.

The majority of the rainwater of the broken-up area has been channelized & collected in the mine pits during monsoon is not pumped out. Rather, it is allowed to be collected at the lowest level to augment the ground water resources.

There are no waste dumps or OB dumps as concurrent reclamation method has been adopted. There are no active dumps and hence there is no question of washouts from dumps.

In addition to the above, a scientific study was carried out on surface runoff management by</td></tr>
</table>

	pits shall be constructed at the corners of the garland drains and desilted at regular intervals.	deputing NIT, Rourkela and the recommendations of the study report have been implemented and verified. The Verification report of the recommendations is attached as **Annexure-III.**
xi.	Dimension of the retaining wall at the toe of temporary OB dump(s) and the over burden benches within the mine to check run-off and siltation shall be based on the rain fall data	Dimension of the retaining wall at the toe of temporary OB dump(s) within the mine to check run-off & siltation are as follows: - • height 1.00 Mtrs • width 0.80 Mtrs • length 1300.00 Mtrs These dimensions are designed based on the highest rainfall data. As per our proposal in the approved Review of Mining Plan, Dump-I & II has already been re-handled.
xii.	Plantation shall be raised in an area of 680ha including a 7.5m wide green belt in the safety zone around the mining lease, backfilled and 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.	Mining commenced during 2012-13 and as per the approved Scheme of Mining, backfilling of mined out voids has been started from 01.04.2016. Rehabilitation over reclaimed area has been started from 2017-18. As on 31.03.2024 an area **141.204 Ha** is backfilled/reclaimed. In this backfilled area **88.75 Ha** has been afforested/ rehabilitated. However, plantation is being taken up in the Mine slope including a 7.5-meter safety zone since 2012-13. The financial year 2023-24, we have planted around **134188.0 Nos**. saplings which includes safety zone around the mining lease, backfilled area, 15 Mtrs peripheral barrier of plateau boundary, mining lease slope area, around void, roads, avenue plantation etc. The remaining area will be covered progressively in a phase wise manner as per the Review of Mining Plan. Different native saplings are procured from the Forest department in consultation with the local DFO/Agriculture Department. In addition to this, nursery has been developed to germinate, preserve, and cater for the seedlings during plantation period. Photos of plantation & nursery are attached as **Photo- 6 & 7.**

xiii.	The void left unfilled in an area of 250ha shall be converted into the water body. The higher benches of the excavated void/mine pit shall be terraced, and plantation done to stabilize the slopes. The slopes of higher benches shall be made gentler for easy accessibility by the local people to use the water body. Peripheral fencing shall be carried out all along the excavated area.	We will abide by this condition. It will be followed according to the conceptual plan.
xiv.	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.	Regular water sprinkling is being done using 02 no's of self-propelled 28 KL capacity mobile water tanker. Fixed water sprinkling arrangement has been provided on both sides of the arterial road and around the stockpile of 3.1 Km length. Dry fog arrangement has been provided in Crushing and screening plant. Two fog cannons were also deployed at strategic locations to suppress the fugitive dust. Photos of water sprinkling arrangements are attached as **Photo 8 & 9.** Ambient Air Quality is being monitored by establishing four no. of AAQ station each in core and buffer zone of mines lease. In addition to this three CAAQMS have been installed & connected to OSPCB server. The result of ambient air quality monitoring data for the period of October'23 to March'24 of Core & Buffer Zone is enclosed as **Annexure-IV & V.** From the test results, it is evident that all the parameters are within the prescribed standard of national ambient air quality and there is no deviation from NAAQS.
xv.	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.	The flow rate of the small perennial nallahs, which is flowing near the Baphlimali hillock close to the lease boundary, is being monitored regularly and the records are maintained. The flow rate monitoring data during October'23 to March'24 is enclosed as **Annexure-VI.**
xvi.	Regular monitoring of water quality upstream and downstream of the Khandabindha Nallah shall be carried out and record of monitored data should be maintained and submitted to the Ministry of Environment and Forests, its	Regular monitoring of water quality upstream and downstream of the Kandabindha Nallah is being carried out and recorded.

<table>
<tr><td></td><td>Regional Office, Bhubaneswar, the Central Groundwater Authority, the Regional Director, Central Ground Water Board, the State Pollution Control Board and the Central Pollution Control Board.</td><td>The results of surface water quality are enclosed in Annexure-VII.

The same is also being submitted to the Central Groundwater Authority, the Regional Director, Central Ground Water Board, the State Pollution Control Board, and the Central Pollution Control Board with six monthly compliance report.</td></tr>
<tr><td>xvii.</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>At present 3 no’s of settling pit have been developed for rainwater harvesting a top the mines.

The capacity of the three no’s of settling pits 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>Settling Pit-1</td><td>3913</td></tr>
<tr><td>2</td><td>Settling Pit-2</td><td>3072</td></tr>
<tr><td>3</td><td>Settling Pit-3</td><td>2268</td></tr>
</table>

All the three-settling pit water are pumping back to mining pit for groundwater recharge and augmentation of groundwater table.

The following Conservation measures have been taken to augment ground water resources: -

i. Rainwater harvesting is being carried out by collecting the precipitated water through a network of drainage system into the exhaust mining pit for storage and ground recharge.

ii. Movement of mines faces is being carried out systematically as per mine plan following the contour lines such that the faces have self-draining slopes. Precipitated water of the adjacent area is being collected within the mined-out area.

iii. Concreted Weir has been constructed to arrest rainwater resulting in ground water recharge. Also, the Surface water flow near the pit has been diverted towards the pit and this accumulation influences on recharge ground water table.

iv. Arrangement has been made that the mining method and the peripheral barrier all around mining area does not allow the storm water to go outside valley areas. The water thus trapped, percolates down and recharges the ground water.</td></tr>
</table>

xviii.	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 ground water is depleted due to mining activity, necessary corrective measures shall be carried out.	Regular monitoring of ground water level and quality is being carried out in each season of the open wells/ dug wells located around the nearby villages and the data is being submitted to Regional Office, MoEFCC and SPCB, Bhubaneswar once in every six months with this six-monthly compliance report. Two piezometric wells have been constructed inside the lease area and four outside lease to monitor the level of ground water. The monitoring results of Ground water quality & level is done monthly every year. The parameters being monitored are as per IS 10500:2012 specified for drinking water. The six-monthly results for ground water quality and level are enclosed as **Annexure – VIII & IX respectively.** Photograph of piezometer is attached as **Photo-10.**
xix.	Appropriate mitigative measures shall be taken to prevent pollution of the San River and the Indravati River in consultation with the State Pollution Control Board.	The mine being a zero discharge mine has got adequate facility to treat wash from workshop and the treated water is reused for dust suppression and plantation purpose and no wastewater is discharged outside. San River & Indrāvati are flowing at a distant location 12 KMs. & 9 KMs. respectively as such in no way the mining operation affects the river basins. The following measures are being implemented and maintained. 1. Garland drains are constructed to check erratic flow of precipitated water. 2. Check dams are constructed around the slopes of valley to arrest silts and sediments if any. 3. A retaining wall of a height of 1.5 meter has been constructed at the edge of the valley. The naked areas of the valley slopes have been covered by mass afforestation and the same will be continued till full cover.

<table>
<tr>
<td>xx.</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, if any) required for the project.</td>
<td>There is no proposal to withdraw ground water for the project and surface water is being used for mining purposes. To this effect, an agreement was made between M/s Utkal Alumina Int. Ltd & Water Resource Dept. Govt. of Odisha for drawl of 9.0 cusec or 777600 cft/day of water from Govt. water source/ from San River upstream of Indrāvati River.

The copy of agreement is attached as Annexure-X.</td>
</tr>
<tr>
<td>xxi.</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’s of settling pit have been developed for rainwater harvesting a top the mines.

The capacity of the three no’s of settling pits 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>Settling Pit-1</td><td>3913</td></tr>
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</table>

All the three-settling pit water are pumping back to mining pit for groundwater recharge and augmentation of groundwater table.

A unique project of Surface Run off rainwater harvesting has been successfully implemented to use the rainwater run off for domestic purposes without involving any carbon emission. The project is simply working on gravity principle, thus making it a green project.

Surface runoff water harvesting is the collection accumulation, channelization, and treatment of storm water for its eventual reuse.

The design has been made considering the natural mine topography and elevation, so that the runoff water can harvested through gravity flow without supply of any external energy making it a green project.

To minimize the water consumption footprint of mines. To Utilize surface runoff water for domestic use at mine top during the rainy periods without depending on the regular source(San River).</td>
</tr>
</table>

<table>
<tr><td></td><td></td><td>The Rainwater Harvesting for the last four year as below:<table><tr><th>Year</th><th>Rainwater Harvesting in KL</th></tr><tr><td>2020-21</td><td>12970</td></tr><tr><td>2021-22</td><td>30150</td></tr><tr><td>2022-23</td><td>46780</td></tr><tr><td>2023-24</td><td>53040</td></tr><tr><td>Total</td><td>142940</td></tr></table>
Photograph of Surface Rainwater harvesting structure is attached as Photo-11

In addition to this adequate numbers of Concreted Weir have been constructed to arrest rainwater resulting in ground water recharge. Also, the Surface water flow near the pit has been diverted towards the pit and this accumulation influences on recharge ground water table.</td></tr>
<tr><td>xxii.</td><td>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 mine lease. 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.</td><td>Pollution testing certificate of all machinery is being verified regularly to check vehicular emission. Further emission level is kept under control by rigorous maintenance of all engines and changing of lubricants as per the recommendation of the manufacturer. A full fledge workshop is in place for maintenance of vehicles used in mining operation.

Bauxite ore is transported in the mine area in an environmentally safe manner by limiting the speed of transporting Machine and by maintaining proper road conditions.</td></tr>
<tr><td>xxiii.</td><td>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.</td><td>Blasting is being done during shift change over between 1:00 PM to 2:00 PM. No Blasting is done beyond day light hours.

Further, controlled blasting is being practiced with use of NONELs for sequential blasting to reducing ground vibrations and to arrest fly rocks and boulders.</td></tr>
<tr><td>xxiv.</td><td>Drills shall either be operated with dust extractors or equipped with water injection system.</td><td>A drilling machine with in-built vacuum cyclone dust collector & equipped with water spraying system is being used.

Photo of drilling is attached as Photo-12.</td></tr>
<tr><td>xxv.</td><td>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.</td><td>Stockpile area is surrounded by fixed water sprinkling arrangement (Photo 13). Further water sprinkling by mobile water tankers is being carried out for effective dust suppression. Metal hoods are provided at transfer points in Crushing and Conveying System to restrict the dispersion of dust (Photo 14).</td></tr>
</table>

		Dry fog system is installed for suppression of dust at ROM hopper and Transfer points (**Photo 15)**.
xxvi.	Consent to operate shall be obtained from the State Pollution Control Board, Orissa prior to start of production from the mine.	At Present Mine is operating with consent to operate for 7.63 MTPA production capacity vide letter no. 4157/IND-I-CON - 5450 dated 20.03.2023 with consent order No. 2765 which is valid up to 31.03.2027. **Attached as Annexure XI.**
xxvii.	Sewage treatment plant shall be installed for the colony. ETP shall also be provided for the workshop and wastewater generated during the mining operation.	Modular STP of 75 KLD has been installed to treat the domestic wastewater. The treated water has been used in green belt development and sprinkling on haul road. Effluents generated from workshop has been treated by ETP of 15 KLD capacity installed at workshop. The treated water from ETP is reused in vehicle washing. Analysis report of STP & ETP treated water is enclosed in **Annexure-XII & XIII**. Photographs of STP & ETP are attached as **Photo-16 & 17.**
xxviii.	The project authorities shall undertake sample survey to generate data on pre-project community health status within a radius of 1 km from proposed mine.	Complied.
xxix.	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.	Pre-placement medical examination and periodical medical examination of the workers engaged in the project are carried out regularly. The annual Schedule of PME is being made for all eligible employees as per DGMS requirement and necessary PME is carried out. For all employees of Baphlimali bauxite mine periodical medical examinations are done, and records thereof maintained. No Occupational diseases have been detected so far.
xxx.	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.	Work sheds have been provided to the workers at the mine site having all the facilities such as fuel for cooking, permanent toilets followed with septic tanks & soak pits, drinking water, medical health care. Since the mining operation has already commenced, the regular employees & executives are coming from the integrated town ship adjacent to the alumina refinery. Domestic effluents generated are being treated in the sewage treatment plant (STP) of 75 KLD located at mines as well as discharged soak pit via septic tank constructed.
xxxi.	The project proponent shall take all precautionary measures during mining operation for conservation and protection of	The Action Plan for conservation of wildlife i.e., Site Specific Wildlife Conservation Plan exclusively for Mining lease has been approved by PCCF (WL) &

	endangered fauna namely; python, panther, sloth bear, wild dog etc. spotted 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 Plan 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.	Chief wildlife Warden, Odisha vide letter No. 5608/1WL-SSP-80/2016 dated 27.06.2017 with financial forecast of Rs.670.451 Lakhs and an amount of Rs.535.715 Lakhs has been deposited in CAMPA FUND for implementation of the same. Further, as per the demand notice from the Divisional Forest Officer, Rayagada vide letter No. 4168 dated. 04.08.2017, an amount of Rs. 8, 05, 46,920/- has been deposited in CAMPA FUND for implementation of Regional Wildlife Management Plan. The copy of action taken to implement the Regional Wildlife management Plan is attached as **Annexure-XIV** & copy of approval letter as **Annexure-XV.** In addition to that a biodiversity study is being carried out by IUCN.
xxxii.	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.	Digital processing of the entire lease area using the remote sensing technique by the authorized agency from Odisha Space Application Center (ORSAC), Bhubaneswar has been carried out for monitoring the land use pattern. The report has been submitted vide letter no UAIL-MINES/BBM/53/2023 dated 14.10.2023 to the Ministry of Environment and Forests and its Regional Office, Bhubaneswar. The copy of the submission letter is attached as **Annexure- XVI.**
xxxiii	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 closure for approval.	The same will be submitted to the Ministry of Environment & Forests. The final mine closure plan will be submitted 2 years in advance as per MCDR 2017.
A.	**General conditions**	
i.	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.	Agreed & we shall abide by this condition.
ii.	No change in the calendar plan including excavation, quantum of mineral bauxite and waste should be made.	Agreed & we are abiding by this condition.
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 ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.	Eight ambient air quality monitoring stations have been established in both Core & Buffer Zone based on the mentioned factors and measurements are being done in weekly twice for parameters. The location of monitoring station has been fixed in consultation with the State Pollution Control Board, Odisha. Monitoring reports are attached as **Annexure – IV & V**.

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.	The monitored AAQ data is submitted to the concerned authorities along with the half yearly compliance report once in six months. The result of ambient air quality monitoring data for the period of October'23 to March'24 of Core & Buffer Zone is enclosed as **Annexure-IV & V.**
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 roads is carried out both with fixed (3.1 km long) and mobile water sprinklers(2 no's)of having capacity of 28 KL. Loading points of crusher house is provided with dry fog system. The haulage roads are being maintained to avoid ruts and potholes. Two fog cannons are also deployed at strategic locations to arrest the fugitive dust if any. Transportation of Bauxite Ore is carried out through a long-distance conveyor (LDC) of 18.1 km with covered hood all along.
vi.	Measures should be taken for control of noise levels below 85 dB (A) in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.	Noise monitoring is taken up once in every month. The following measures are taken to control noise levels below 85 dB (A) in the work environment. • Maintenance of all machines including checking of silencers regularly, • Controlled blasting using delay detonators, installing immovable machinery on foundations and in closed rooms. • Provision of earplugs/muffs to workers engaged in noise prone areas. • The HEMM operators are provided with AC close cabinets which themselves are acoustic in nature. Noise level analysis report for the period October'23 to March'24 is enclosed as **Annexure-XVII.**
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.	There is no outside discharge of workshop effluents. The mine is operating a zero-discharge system for effluents where all the wastewater is treated , analyzed, and reused for dust suppression and Vehicle washing. Effluents from the mechanical workshop area is being channelized through Effluent Treatment Plant of 15 KL/D capacity. 100% treated water is reused. Analysis report of ETP treated water for the period October'23 to March'24 is enclosed in **Annexure-XIII**.
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.	Personal protective equipment(PPEs) is being provided to all workers respective to the nature of the job. Initial and periodical awareness training is being imparted to all workers in the Company's Vocational

	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.	Training Center located within the lease area on Safety and Health Aspects. Pre-placement medical examination and periodical medical examination as per DGMS guideline of the workers engaged in the project is being carried out and records maintained for corrective measures. 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 directly to the Head of the Organization.	A separate environmental management cell with suitable qualified personnel has been set up under the control of the Agent of Mines, who reports to the Head of the Organization directly. The organization structure is attached **Annexure-XVIII.**
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.	The funds earmarked for environmental protection measures are being utilized for the said purpose only. Adequate fund is always allocated to meet the capital & recurring expenses to implement the environmental control measures inclusive of plantation. The total capital expenditure and recurring annual expenditure during the financial year 2023-24 are as follows: i. Capital Cost for Environmental Pollution Control incurred during 2023-24 is Rs. 107.31 lakh ii. Recurring expenditure incurred during 2023-24 is Rs. 847.89 Lakh The details are Attached in **Annexure XIX.**
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.	Noted & complied.
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.	We are abiding by the condition and shall extend full cooperation to the officer(s) of regional office by furnishing the requisite data / information/monitoring reports during their monitoring of compliance of the stipulated conditions.
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 on their website and shall update the same periodically.	Six monthly reports are being submitted regularly to the Ministry of Environment and Forests, it's Regional Office of the Ministry at Bhubaneswar / Central Pollution Control Board / SPCB, Odisha within stipulated time. However, as per the new notification, six monthly compliance reports are being uploaded in Parivesh portal. The status of compliance is being updated on the website periodically.

		https://hindalco.com/upload/pdf/six-monthly-ec-compliance-April23-Sep-23.pdf
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.	Complied .
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.	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 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 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.	The accordance of environment clearance has been advertised in two local newspapers.

ANNEXURE-I

Compliance Status of the issues raised during Public Hearing

Status of the issues raised in Public Hearing of the Environmental Assessment for expansion of Baphlimali Bauxite Mines of M/s Utkal Alumina International Ltd., from 3.0 MTPA to 8.5 MTPA over an area of 1338.74 Ha at Baphlimali hill of Kashipur Block in the district of Rayagada.

Sl.No.	Issues Raised in Public Hearing	Compliance Status
1	The company shall abide by all rules and regulations of State Pollution Control Board/ central Pollution Control Board, Forest and Environment Department, Government of Orissa or under Environment (protection) Rules to safeguard the environment and safety norms and shall not violate the commitments made in the EIA/EMP report.	We will abide by this condition.
2	Employment shall be made to the local people on priority and the local youths shall be imparted training to suit its requirement. This facility may be given to others only if suitable technical manpower on the higher grade is not locally available. First	Employment has been given to the local peoples on priority according to the skill levels.

	preference for employment will be given to the victims of the project, Displaced persons & land losers.	
3	The project proponent should take sufficient care for improvement of health and education of local villagers and communication network of the areas and provide drinking water facility within its 20 km radius**.**	Utkal Alumina has been striving hard to create and improve healthy environment to enrich the quality of life of the community particularly the underprivileged in the vicinity by sustainable initiatives as follows: **Health Care:** ➢ During covid-19 pandemic situation/announcement has been carried out in 68 peripheral villages to create awareness among the villagers. During public announcement, villagers were distributed with leaflets carrying awareness massages. More than one lakh face masks were supplied to the villagers of 45 peripheral villages including govt. officials and hospitals. To create awareness on frequent hand wash, 1030 soaps were distributed to the villagers. To ensure periphery hygienic, sodium hypochlorite solution was sprayed in public places of Rayagada, Kashipur, Tikiri, Nuapada, Dongasil, Kodipari, Gorakhpur, Sanamtikona and other villages. Fumigation has been carried out in 35 villages to ensure disinfection of the area. Around 900 migrated labors were supplied with grocery items for ten days. Awareness meetings were organized in different villages from time to time. ➢ Diarrhea Control activities such as cleaning of village surroundings, disinfection of water logging areas, chlorination of water sources, providing water cans, installation of new tube wells, distribution of halogen tablets, extending treatment services to the diarrhea affected persons through organizing health camps etc. have been carried out in Diarrhea affected villages. ➢ Functioning of one full-fledged round the clock Health Centre with laboratory facility at Nuapada with regular Doctors & Paramedical Staffs. ➢ Functioning of Utkal Hospital at Oshapada with specialist Doctors, IPD, Operation Theatre, ICU, and well-equipped modern equipment. ➢ Engagement of one Mobile Health Care Unit (MHU) extending services to 38

		remote villages from 10 strategic locations ➢ Round the clock services extended by four Ambulances for referral Patients ➢ Extending financial support for maintenance of one Ambulance donated to CHC, Kashipur. ➢ Extending financial assistance to the poor and needy people of peripheral villages for medical treatment. ➢ Organizing Multispecialty Health Camps at Cluster level. ➢ Creation of Health Awareness through rallies, awareness camps competitions, sanitation drives, and street plays etc. ➢ Disinfection of drains, tube well platforms and water logging areas to guard against the spread of disease. ➢ Organizing Blood Donation Camps in collaboration with Odisha Blood Center, Rayagada ➢ Extended Comprehensive eye care services including cataract surgery to 156 patients. ➢ Facilitated construction of 854 toilets in 16 villages in collaboration with Swachha Bharat Mission ➢ Annual Chlorination of water sources such as tube wells, open wells, water tanks, sanitary wells etc. of all peripheral villages. ➢ 10 TB patients of Kashipur block of Rayagada district are being supplied with Nutrition food baskets by Utkal Alumina under 'TB Mukt Bharat Abhiyaan' of Govt. of India ➢ Two Nirogshalas (Static Health Centers) were established at Andirakanch & Paikakupakhal villages to provide treatment services to the villagers at their doorsteps. **Promotion of Quality Education**: ➢ Running Aditya Birla Public School (English Medium) to provide access to good quality education. ➢ Extending financial assistance to the land loser and economically backward families and meritorious students for Higher Education under Utkal Scholarship.

		➢ Organized special Awareness drives in organizing Prabesh Utshabs for increasing school enrolment. ➢ Conducting Parents Counselling Meets to reduce school dropouts. ➢ Construction of hostel building with drinking water facility, toilet, drainage & field leveling etc. at certain schools. ➢ Construction of Boundary walls, Classrooms, CC Roads, and provision of drinking water through installation of tube wells inside school campus etc. ➢ Repairing and Painting of school Buildings ➢ Supply of study and sports materials and financial support for school functions ➢ Setting up of two libraries at UGME School, Maikanch and Saraswati Sishu Mandir, Kashipur to enhance reading, comprehension, free expression, and there by create a strong academic foundation of students. ➢ Conducted teachers' orientation program on the methodology of teaching in Libraries developed under Pustakalya Project and on the operation of Mini Science Centers promoted in schools. ➢ Setting up of two Mini Science Centers at Maikanch High School and Kashipur High School benefitting 864 students of both the schools. ➢ Supplied Study materials to 352 students of five different schools of Kashipur block. ➢ Provided Desk Benches to the schools of Hatikhaman and Maligaon villages. ➢ Installed Solar System in order to provide consistent electric supply to the High School of Chandragiri. ➢ Running of three Remedial Coaching Centers in two different villages by taking 105 students ➢ Conducting different Competitions such as Sports Competition, Essay Competition & Drawing Competitions in four different peripheral schools. **Provision of drinking water:** ➢ Installation of one Bore well at Tikirapada village to provide drinking water supply for the villagers. ➢ Setting up of ten solar based water supply system at Dwimundi, Dongasil &

		Jogiparitunda villages for drinking water supply. ➢ Installation of Seventy-one tube wells in its peripheral villages to ensure supply of safe drinking water to the villagers. ➢ Repairing of defunct tube wells from time to time as per the request of villagers ➢ Construction of Swajaldhara (Gravity flow) for supply of water in six different villages. (Dwimundi, Pandakapadar, Dhadpas, Badlijharan, Ghatiguda & Tikirapada) ➢ Installation of 07 New tube wells, 2 Solar Based Drinking Water Projects, 1 Swajaldhara & 32 tube well repairing done in peripheral villages to ensure safe drinking water for villagers. ➢ Installation of nine solar based drinking water systems and five tube wells in different mines peripheral villages during the FY 2023-24.
4	Rehabilitation & resettlement package if applicable shall be strictly adhered in accordance to the decision of Government.	There is no displacement in Mines lease area.
5	The mine shall not disturb the streams originating from the hill slopes and foothills and also no mining discharge shall be made to them.	No natural watercourse or water resources are obstructed due to mining operations. Necessary care has been taken during monsoon to divert /channelize run off water to the excavated pits, so that it does not carry any sediment to obstruct / affect the water bodies at the foot hill. There is no such perennial river/nallah exists at the ML especially in the surface plateau. However, there are small natural depressions, may called as gullies, develops preferably in the rainy days during inflow/outflow of rainwater at the slope of the ML, which is a part of project area, are being provided with check dam & plantations of indigenous species to arrest the erosion & sediment flow into the perennial nallah available at the bottom of the ML.
6	The timing of blasting shall be intimated to the villagers in its	Blasting is being done during shift change over between 1:00 PM to 2:00 PM. No

	immediate vicinity through its representatives stationed in the villages.	Blasting is done beyond day light hours. Further, controlled blasting is being practiced with use of NONELs for sequential blasting to reducing ground vibrations and to arrest fly rocks and boulders. Necessary information has been given by sirens and physical guarding through security department during blasting. Notice also has been displayed at the main entrance gate regarding the timing of blasting.
7	The Mines shall intensify development activity in the villages lying on the foothills of the project and in its immediate vicinity i.e. 10 km radius.	Various development activities in the field of Education, Health Care, Sustainable Livelihoods, Village Infrastructure development and social interventions has been undertaken intensively in the villages lying on the foothills of the project and its immediate vicinity. Activities undertaken are as follows: **Education:** ❖ Extending financial assistance to the land loser and economically backward families and meritorious students for Higher Education under Utkal Scholarship. ❖ Supply of 50 sets of furniture (Desks & Benches) to the Upgraded High School Chandragiri and 30 sets to Paikakupakhal PUP School. ❖ Organized Awareness Rallies and Prabesh Utshabs for increasing school enrolment. ❖ Conducted Parents Counselling Meets to reduce school dropouts. ❖ Strengthening School Management Committees ❖ Construction of Boundary walls, additional classrooms, and CC Roads inside the school campus. ❖ Repairing and Painting of school Buildings ❖ Supply of Uniforms, textbooks, School bags, and sports materials to the peripheral schools ❖ Supply of uniforms to the children of Anganwadi Centers. ❖ Supply of furniture's, first-aid boxes & solar home lights to the schools ❖ Creating Education Awareness through street plays, wall writings. ❖ One Remedial Coaching Center is running at Paikakupakhal village by taking

		35 students of that village. ❖ Repairing of roof along with veranda and Painting of one classroom at Maikanch UGME School. ❖ Setting up of two libraries at UGME School, Maikanch and Saraswati Sishu Mandir, Kashipur to enhance reading, comprehension, free expression and there by create a strong academic foundation of students. ❖ Established two Mini Science Centers at Govt. High Schools of Maikanch & Kashipur. ❖ Conducted teachers' orientation program on the methodology of teaching in Libraries developed under Pustakalya Project and on the operation of Mini Science Centers promoted in schools. ❖ Conducted essay & drawing competition on Swachhata among the students of four different peripheral schools. ❖ Running of another two remedial coaching centers at Andirakanch. ❖ Organized Sports competition among the school students of five schools like Maikanch & Chandragiri High Schools and PUP schools of Andirakanch, Paikakupakhal & Karanjkupakhal, ❖ Supplied 20 sets desk and benches to Hatikhaman and Maligaon schools. ❖ Supplied study materials like School bag, umbrella, and water bottle to 350 students of five school of five core village. ❖ Installation of solar system at Chandragiri High School to ensure consistent electric supply. **Health Care**: ❖ During covid-19 pandemic situation/announcement has been carried out in 20 peripheral villages in order to create awareness among the villagers. During public announcement, villagers were distributed with leaflets carrying awareness massages. More than ten thousand face masks were supplied to the villagers of 15 peripheral villages including govt. officials and hospitals. Fumigation has been carried out in five villages to ensure disinfection of the area. Awareness meetings were organized in different villages from time to time.

		❖ Extending treatment services to the villagers of villages lying on the foothills of the project through First Aid center set up at Mines top. ❖ Engagement of one Mobile Health Care Unit (MHU) extending services to 37 remote villages from10 strategic locations ❖ Round the clock services extended by one Ambulance for referral Patients ❖ Extending financial support for maintenance of one Ambulance donated to CHC,Kashipur ❖ Repairing of 62 defunct tube wells in different mines peripheral villages. ❖ Nine dustbins were constructed in different locations of Dhuturapas & Peringini villages to facilitate cleanliness of the village. ❖ Construction of Masonary drains in Chandragiri & Paikakupakhal villages. ❖ Extending financial assistance to poor and needy people for medical treatment. ❖ Organizing Multispecialty Health Camp at Cluster level on quarterly basis. ❖ Creating health awareness through rallies, awareness camps competitions, sanitation drives, and street plays etc. ❖ Disinfection of drains, tube well platforms and water logging areas to guard against the spread of disease. ❖ Conducted eye cataract surgery by 49 people from different villages & 106 No. of persons were provided with spectacles. ❖ Facilitated construction of 93 toilets in five villages in collaboration with Swachha Bharat Mission ❖ Established "Nirogshala" – Static Health Centers at Paikakupakhal & Andirakanch Villages to extend health treatment services to the villagers at their doorsteps. ❖ Organized blood donation camp at Nuapada club house where 80 donors were donated their blood. ❖ Installation of 24 New tube wells,11 solar based drinking water projects & 1 Swajaldhara in peripheral villages to ensure safe drinking water for the villagers. ❖ Ten TB patients of Kashipur block are being supported with Nutrition food baskets to help them for ensuring good health and fast recovery. ❖ 434 no's of drinking water sources of 41 villages in Kashipur block were

		chlorinated ❖ Created awareness on tuberculosis in 25 mines periphery villages through street plays. ❖ Developed wall paintings on Diarrhoea & ODF in seven mines periphery villages. ❖ Adopted Lundrukana village as Open Defecation Free (ODF) Village. **Sustainable Livelihoods:** ❖ Supply of improved varieties of vegetable seeds, pesticides, micronutrients, and other inputs like sprayer machines to the farmers of sixteen peripheral villages during kharif and rabi season every year in order to increase their income through commercial vegetable cultivation. ❖ 213 farm families of six different villages have been supported for orchard development and 12 land less families for Goat Rearing under Project WADI in collaboration with NABARD. ❖ 436 farmers of ten different villages were supported for orchard development with saplings, fertilizers, pesticides, fencing, Agri implements and irrigation facilities. ❖ Women Self Help Group of Hatikhaman Village is supported for Pisciculture as an Income Generation Activity. ❖ Imparted tailoring and applique training to 181 girls/women of mines peripheral villages. ❖ Provided Irrigation facilities by construction of check dams, irrigation channels & Water Storage Tanks. Farmers Committees were provided with Diesel Pump Sets, HDPE Pipes with Sprinklers and installation of river lift irrigation, micro lift irrigation, solar based irrigations and deep borewells in our peripheral villages. ❖ Capacity Building of farmers through different trainings, exposure visits and extending hand holding supports to the members of different farmers clubs, pani panchayats, udyan vikash samitis, producers' groups etc. Promoted in our periphery. ❖ Livestock vaccination cum health camps have been organized in different

		mines peripheral villages at a regular interval of time. ❖ Production of applique materials at Nuagaon. Formation of a Producer group by taking 30 women Producers. Explored Market linkages with Pipili & Utkalika, BBSR. Total products worth Rs. 52000/- has been sold during the FY. ❖ Tailoring training center of Paikakupakhal developed as a small garment manufacturing Unit under Project Sakasham -II. Orders received from different vendors of Rayagada to earn their livelihood. ❖ Initiated Agro Forestry project and Suryadaya project to engage women members of Paikakupakhal. Apart from this, Organizing different awareness program as well as capacity building training for the members of both the project. ❖ Villagers of Andirakanch & Paikakupakhal were supplied with 2575 mango & 1115 Cashew saplings for promotion of fruit orchards in their respective villages. ❖ 4000 Mango Sapling and 3200 cashew grafting were supplied to 259 farmers of 4 villages under Project Plantation ❖ 137 farmers of eight different villages were supported for lemon grass cultivation in 203.88 acres of land. Installation of two lemon grass Oil extraction units at Jogiparitunda & Nuagaon villages. ❖ Avenue Plantation has been undertaken in 5 kms from Jogiparitunda chowk to Lundrukana chowk(3350 nos. of plants) **Village Infrastructure development:** ❖ In order to enhance the quality of life of villagers, we have undertaken village infrastructure development jobs like Construction of Cement Concrete Roads, Causeways, Steps to river, Rest house, Boundary Walls, Culverts, Bridges, Community Centers, Street lighting, drains, bus stops and Protection Walls etc. in different peripheral villages. **Social Interventions:**

		❖ Organizing Block level rural volleyball tournament by taking youths of sixteen different villages. ❖ Extending financial support to organize Panchayat, Block as well as District level tournaments. ❖ Supply of sports materials to the youths of peripheral villages ❖ Extending financial support for observing different puja and festivals in the villages ❖ Organizing Various social functions such as Raja Utshab, Diwali etc. in villages ❖ Promoting local folk dance Dhimsa by enabling the village youths to take part in different competitions. ❖ Observation of Independence Day at Suryodaya project cite by taking both the project members (Agroforestry & Suryodaya) ❖ Organized one volleyball tournament & one Cricket tournament at Paikakupakhal village. ❖ Observed International women's day at Andirakanch where 1500 women from 14 different villages were presented during the program. ❖ Created Awareness on Girl Child Marriage through street plays in fifteen different villages.
8	The project proponent should provide garland drains around the mining pit to prevent entry of rainy water. Adequate check dams shall be provided to prevent the wash out of soils etc. from mines and solid waste dumping sites to surrounding fields.	Necessary care has been taken during monsoon to divert /channelize run off water to the excavated pits, so that it does not carry any sediment to obstruct / affect the water bodies at the foot hill. To check flow of any silt and sediments, numbers of check dams/siltation ponds have been constructed and ensured by regular cleaning and maintenance. There are also pumps installed in siltation pond to pump out the collected water to the open and non-working pit area for ground water recharge. The same is being also continued concurrently with the running of the mines.
9	After the mining operation is over the project proponent should reclaim the mined out area with overburden, top soil followed by plantation.	From 4th year onwards i.e., since 1.04.2016 backfilling has been started by utilizing entire quantity of overburden in the voids of the mined-out area as per the proposal given in the Scheme of Mining. The topsoil scrapped during on-going mining is being utilized during concurrent backfilling & plantation activities. Till March 2024, 141.204 Ha area has been backfilled & 88.75 Ha has been afforested in this

		backfilled area. Both the activities are under progress & shall meet by 100% as per the proposal within scheme period. After the mining operation is over the whole area will be reclaimed as per the conceptual plan of mining scheme.
10	The mine shall obtain necessary clearances such as Forest clearance, wild life clearance, clearance from water resources department, etc. from the appropriate authorities	Necessary clearances such as Forest clearance, wildlife clearance, clearance from water resources department, etc. has been obtained from the appropriate authorities. Details of the letter no and date of approval is enlisted below. Forest Stage 2 Clearance: 8-18/2016-FC/02.02.2018 Wildlife clearance: 5608/IWL-SSP-80/2016/27.06.2017 Water Resource Department: Agreement with Harabhangi Irrigation Division, Adava, Gajapati on 21.12.2021 valid up to 17.01.2025 Environment Clearance: J-11015/650/2007-IA-II(M)/19.02.2009 Consent to Establish: 14388/Ind-II-NOC-4432/16.08.2007. Consent to operate: 4157/IND-I-CON - 5450 dated 20.03.2023 with consent order No. 2765 which is valid up to 31.03.2027
11	The project proponent shall provide alternate gazing field for the cattle in consultation with the District Administration	However, plantation of fodder species in 3 Ha land has been taken into consideration at the extreme south of mining lease area. The said area has been demarcated and spreading of grass seeds is being carried out. Gradually the fodder plot to be developed on the backfilled area at suitable locations.

Status of the issues raised in Public Hearing of the Environmental Assessment for M/s. Utkal Alumina International Ltd., for Baphlimali Bauxite Mines for expansion of production up to 8.5 MTPA ot Bauxite over an area of 492.82 Ha at Baphlimali in the district of Kalahandi.

Sl.No.	Issues raised in Public Hearing	Compliance Status
1	Allocation of funds for peripheral development	We are allocating funds every year for the peripheral development of the area. This allocated amount is spent in the sectors like Education, Health Care, Sustainable Livelihoods, Village Infrastructure development and Social Interventions as per the Govt. Guidelines.
2	Electricity	Roadside electrification is being done in different villages at the mine proximity with consultation with government dept..
3	Water Supply	Thirteen tube wells and five solar based drinking water supply system have been installed in peripheral villages like Kendumundi, Kanarpas, Suryagarh & Durmusi of Th.Rampur block of Kalahandi district. Apart from this, defunct tube wells have also been repaired from time to time with the support of Self-Employed Mechanic of RWSS dept. Chlorination of different tube wells through the support of our MHU team has been carried out every year for ensuring availability of safe drinking

		water.
4	Health	During COVID-19 Pandemic Situation, Public announcement has been carried out along with leaflet distribution and fixation of banners in 30 villages of three GPs in order to create awareness on COVID. Besides, 15000 face masks & 3500 soaps have been supplied to the villagers including Govt. officials, fumigation carried out in four villages. Extended financial support to Th.Rampur block for production and distribution of 60000 masks through Women Self Help Groups of this area. Diarrhea Control activities such as cleaning of village surroundings, disinfection of water logging areas, chlorination of water sources, providing water cans, installation of new tube wells, distribution of halogen tablets, extending treatment services to the diarrhea affected persons through organizing health camps etc. have been carried out in Diarrhea affected villages. First-Aid Center established at Mines top is extending treatment services to the villagers of mines adjacent villages. One MHU Vehicle is engaged by our company to extend treatment services to 34 remote villages of Th. Rampur block. Apart from treatment services, this MHU is also conducting health awareness camps, home visits and chlorination of water sources as well as disinfection of water logging areas. Facilitated construction of 40 individual toilets in Durmusi with the support of RWSS dept. Facilitated immunization programme in 26 villages in convergence with health deptt. Under Indradhanush programme. In order to ensure smooth drainage of rainwater masonry drains have been constructed in the villages. Financial assistance has been given to the poor and needy persons for medical treatment. 50 TB patients at Kalahandi district are being supporting as Ni-Kshay Mitra under project 'TB Mukt Bharat Abhiyaan' of Govt. of India. UAIL will continue supporting this additional nutrition supplement to these persons till next one year

		and help them for ensuring good health and fast recovery. Six New Tube well installed in rural remote areas to ensure safe drinking water for villagers. Organized multi-specialty health camp based on the disease pattern or symptom identified by the Mobile Health Unit. Almost 656 patients attended this camp. One Nirogshala, (Static Health Center) was launched at Gopinathpur of Th.Rampur block, Kalahandi district to provide healthcare services at the doorsteps. Launching of one Ambulance service at Gopinathpur village. Seven Cataract Patients were operated at Junagarh and twenty-five eye patients were supplied with spectacles to address their low vision. 301 nos of drinking water sources of 34 villages in Th. Rampur block were chlorinated. Organized two multi-specialty health camps at Brahmanichanchara and Maligaon. Almost 1200 patients attended during camp. Created awareness on Tuberculosis & Diarrhoea in Mines peripheral villages through street plays. Developed wall paintings on Diarrhoea & ODF in mines periphery villages
5	Employment	Total engagement/employment 341 out of which 18 from buffer zone.
6	Protection of religious places	Protection of Janadurga temple has been taken care of. No mining has been carried out in the vicinity till now and will not be done in future. Notice has also been displayed on the site.
7	Improvement of Roads	Construction of Cement Concrete Roads, Causeways, Culvert, Earthen Bridges etc have been carried out in the villages like Kendumundi, Kanarpas, Chirika, Durmusi and Adri (Gunjamali pada as well as harijan pada) as per the request of the villagers.

8	Education	In order to increase school enrolment, we are organizing an awareness rally and prabesh utshabs in our peripheral schools every year and supplying school bags, study materials etc. during this occasion. Similarly, to reduce school dropouts' parents counseling meets were organized every year. Efforts have been given for strengthening school management committees. Schools were supplied with sports materials for attracting the students towards schools. School furniture has been supplied to one of the private high schools of Karlapat GP. Awareness on Education has been created among the villagers through street plays and wall writings. Established one Mini Science Center and one Library at Govt. High School, Adri. Organized Essay & drawing competition on Swachhata among the students of Adri UGHS. Organized sports competition among the school students at Adri high school Supplied 80 sets of desks and benches to Adri, Kendumundi, Suryagarh and Durmusi schools. Four remedial coaching centers has been launched at Kendumundi, Suryagarh, Kanarpas and Durmusi villages. Study Materials were supplied to the students at Adri school.
9	Alternate Grazing Field	However, plantation of fodder species in 3 Ha land has been taken into consideration at the extreme south of mining lease area. The said area has been demarcated and spreading of grass seeds is being carried out. Gradually the fodder plot to be developed on the backfilled area at suitable locations.

10	Plantation	This year (2023-24) till the end of FY'24, we have planted around 134188 Nos. saplings which includes safety zone around the mining lease, backfilled area, 15 Mtrs peripheral barrier of plateau boundary, mining lease slope area, around void, roads, avenue plantation etc. The remaining area will be covered progressively in phase wise manner as per the Scheme of Mining. Villagers of Chirika, Durmusi and Kanarpas were supplied with 2185 mango saplings for promotion of fruit orchards in their respective villages. Villagers of Suryagarh & Adri were supplied with 2470 mango & 1040 Cashew saplings for promotion of fruit orchards in their respective villages.
11	Compensation for the displaced	There is no displacement due to the project.
12	Local Office and Grievance Cell	A Grievance cell has been formed by the company by taking representative from Plant & Mines CSR & Admin, dept. They are mostly handling all the issues relating to employment and peripheral development.
13	Protection of environment	Suitable environment plan has been formulated and continuously upgraded to mitigate the impact of different components of the Environment such as air, water, soil. Conditions in different authorizations obtained from statutory authorities have been complied to restoration and betterment of environment.
14	Other Peripheral Development	Under Farm based livelihood activities,160 HHs were supported for improved paddy cultivation, 30 HHs for improved pulses cultivation ,57 HHs for Promotion of Nutrition Gardens ,25 HHs for Integrated vegetable cultivation, 20 HHs for orchard development, 20 HHs for Goat rearing, and 50 HHs for Poultry rearing in the villages of Kendumundi, Kanarpas, Chirika, Durmusi & Suryagarh .

		Nine Ponds were de-silted in the villages like Gopinathpur, Phatkimahul, Chingdiphas, Musajhal, Adri, Kendumundi and Rajamunda of Th.Rampur block. Provided skill development training on Light Motor Vehicle Driving to 60 unemployed youths of 10 different peripheral villages. Promoted lemongrass cultivation in 142 acres of land with 74 farmers of nine villages. Also Organizing Exposure visit & Capacity building training for the farmers. One lemon grass oil extraction plant was established at Gunjamalipada of Adri to provide extraction facility at the doorsteps. Distributed weeders, HDPE Pipes, and Irrigation Pump sets to the lemon grass farmers of different villages. Installed Solar based Irrigation System at Tentulipada for irrigating the lemon grass field. Promoted Fruit Orchards in 42 acres of land with 70 farmers of 4 different villages under project Sambhab.

ANNEXURE-II

DETAILS OF GARLAND DRAIN, RETAINING WALL, SETTLING POND AND CHECK DAM

Sl. No	Type of works	Particulars		
		Length	Width (avg)	Height (avg)
01	Wall around back side of OB dump	1300 mts	0.8 mtrs	1 mtr
02	Drain work at the back side of OB dump	1922 mtrs	2.8 mtrs	1 mtr
03	Drain work at ore stack yard	353 mtrs	2.7 mtrs	1 mtr
04	Drain work at haul road towards OB dump	1000 mtrs	2 mtrs	0.6 mtr
05	Wall beside the cave	385 mtrs	0.8 mtr	1 mtr
06	Three settling pond on back side of OB dump	40 mtrs	8 mtrs	2.2 mtrs
07	Parapet wall between service center facility to mine entrance	1501 mtrs	0.8 mtr	1 mtr
08	Check dam between crusher, ramp and haul road	76 mtrs	0.8 mtrs	1 mtr
09	Check dam across the slope from previous topsoil area towards mining pit (2 nos)	47 mtrs	0.8 mtr	1 mtr
10	Check dam across the slope near mine entrance	35 mtrs	0.8 mtr	1 mtr
11	Drain work around the crusher	426 mtr	2 mtr	1 mtr
12	Hume pipe culvert in the natural stream flowing nearby Kalahandi Pit	5 mtrs	15 mtrs	
13	Concrete drain near fixed crusher	50 mtrs	1.5 mtrs	1 mtr
14	Earthen drain near fixed crusher	520 mtrs	1.5 mtrs	1 mtr
15	Settling pond connected to concrete drain near fixed crusher	44 mtrs	20 mtrs	4 mtrs
16	Parapet wall around the safety zone area of Kalahandi Pit	600 mtrs	1.5 mtrs	2 mtrs
17	Three nos. concreted weir across the natural seasonal nallah	135 mtrs	1.2 mtrs	2.5 mtrs
19	Implementation of gabion along OB dump	60 mtrs	1 mtr	1 mtr
20	Settling pond near mine entrance	40 mtrs	21 mtrs	4 mtrs
21	Settling pond near MRSS building	38 mtrs	20 mtrs	4 mtrs
22	Two Concrete drain near MRSS	290 mtrs	1.5 mtrs	1.5 mtrs
23	Settling pond near Rayagada OB dump	46 mtrs	28 mtrs	4 mtrs
24	Check Dam over slope area North East Side (48 Nos.)	30 mtrs	2 mtrs	2 mtrs

ANNEXURE-III

Verification report on implementation of recommendations suggested in scientific study of surface & ground water management at Baphlimali Bauxite Mine, studied by NIT, Rourkela

ADITYA BIRLA

UTKAL ALUMINA

Ref: UAIL-Mines/BBM/28/2020

14th January 2020

To

The Member secretary
State Pollution Control Board, Odisha
Parivesh Bhawan, A/118
Nilakanthanagar, unit- VIII
Bhubaneswar- 751012

Sub: submission of verification report of NIT, Rourkela pertaining to the special condition no. 13 of CTO

Ref: (i) Consent Letter No. 2608/IND-I-CON/5450 Dt.14.03.2019, Consent Order No. 2765

(ii) Our CTO renewal online Application No. 2354845 Dt.19.12.2018

Dear Sir,

With reference to the special condition no. 13 of CTO and clarification raised against our CTO for renewal, we are submitting herewith the verification report of NIT, Rourkela, regarding implementation status of recommendation suggested in the technical study of surface and ground water management of our mines by NIT, Rourkela.

This is for your information and kind perusal.

Yours faithfully,

For Utkal Alumina International Limited

(Dr Rama Chandra Rout)
Asst. Vice President- Corporate Affairs, Bhubaneswar

Copy to: Regional Office, OSPCB, Rayagada.

Encl: As Above

राष्ट्रीय प्रौद्योगिकी संस्थान
NATIONAL INSTITUTE OF TECHNOLOGY
राउरकेला ROURKELA - 769008, ओडिशा ODISHA

RIGHT TO INFORMATION

NITR/MN/HBS/2020/L/0023 Date: January 13, 2020

Dr. H. B. Sahu
Associate Professor
Department of Mining Engineering
NIT, Rourkela – 769 008
& Principal Investigator

Subject: Verification of Implementation of the recommendation of the Scientific study of Surface and Ground Water Management at Baphlimali Bauxite Mine of M/s Utkal Alumina International Limited

Dear Sir,

Attached please find the report of the verification of *implementation of the recommendations of the Scientific study of Surface and Ground Water Management at Baphlimali Bauxite Mine* which was submitted in December 2016.

Thanking you and with regards.

Yours Sincerely.

13.01.2020

Dr. H. B. Sahu

To,
Mr. Mukesh Kumar Jha
General Manager (Mines)
Baphlimali Bauxite Mines, UAIL
At: Doraguda
Post : Kucheipadar- 765 015
Dist.: Rayagada

फोन Phone : (0661) 2476773, फैक्स Fax : (0661) 2462022, वेबसाइट Website : www.nitrkl.ac.in
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An institute of national importance under ministry of HRD, Govt. of India

Verification Report on the Implementation of the Scientific Study of Surface and Ground Water Management at Baphlimali Bauxite Mine, UAIL

DEPARTMENT OF MINING ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY
ROURKELA – 769 008

January 2020

Verification Report on the Implementation of the Scientific Study of Surface and Ground Water Management at Baphlimali Bauxite Mine, UAIL

1. Background

The technical study of surface and ground water management at Baphlimali bauxite mine, UAIL; was carried out during 2015-16.As per the requirement of Consent to Operate, stipulated by State Pollution Control Board, Bhubaneswar; the verification of the implementation of the recommendation of the scientific study is required to be carried out. In light of the above, a team comprising of Prof. H. B. Sahu, Department of Mining Engineering; and Prof. Sk Md Equeenuddin, Associate Professor, Department of Earth and Atmospheric Sciences; carried out the physical verification taking into account the plans and sections, site visit and discussion with the mine officials.

2. OBJECTIVES OF THE PROJECT

Verification of status of implementation of the Scientific study on Surface and Ground Water Management at Baphlimali Bauxite Mine, UAIL with reference

3. RECOMMENDATIONS

Observation 1:

It is seen that the active mining area occupies a very small space at the moment. The runoff generated from the active mining area (6.21 Lakh m^3) is very insignificant compared to that of total leasehold area during the monsoon, which is 90.07 lakh m^3.

Observation 2:

The maximum runoff likely to be generated in a single month in the monsoon is likely to be 25.51 Lakh m^3 considering the rainfall intensity to be 349mm, which is the maximum average rainfall in this area over 12 year period.

Recommendation 1:

The maximum runoff likely to be generated in R1 region per hour during the monsoon is 3403m^3 considering a maximum rainfall of 40mm per hour. The existing settling pit near the crusherof 12 m x 8m size with a depth of 4m is inadequate to handle the runoff likely to be generated. Its size is required to be enhanced to (42m x 20m x 4m) to accommodate the expected runoff. A garland drain of 277m x 1m x 1m is to be provided in the eastern boundary to channelize the runoff to the sump. The water from the sump is to be pumped to quarry 1 after settling.

Current Status: Implemented.

The dimensions of the existing settling pit has been enhanced to 44mx20mx4m (Fig.1) to accommodate the expected runoff during monsoon. One 50hp pump have been installed to pump out the water to quarry 1 after settling. A garland drain of 520m length has been constructed along the eastern boundary to channelize the runoff to the sump.

Figure 1: View of settling pit and pumps near the crusher

Recommendation 2:

The maximum runoff likely to be generated in R2 region during monsoon is 6680 m^3/hr. This runoff is likely to be contaminated by loading and ancillary activities. It is proposed to have two settling ponds near the mine entrance of 1800m^3 capacity each (30m x 15m x 4m) to handle the runoff.Garland drains of 545m x 1m x 1m is required to be constructed to channelize the runoff to the settling ponds. The water after settling may be allowed to flow outside since it has been found that there is no significant contamination of the water bodies downstream.

Current Status: Implemented

The existing settling pit near the mine entrance has been enhanced to 40m x 21m x 4m to accommodate 3360 m^3 of runoff (Fig.2). A new settling pit of 38m x 20m x 4m depth has been constructed to accommodate 3040 m^3 of runoff (Fig.3). Two 75hp pumps have been installed in the 2nd settling pit to pump the runoff to Quarry 1.Two concrete garland drains of an aggregate length of 290m and earthen garland drains of 600m have been constructed in this region to channelize the runoff to these settling pits (Fig.4).

Figure 2: View of the reconstructed settling pit near the mine entrance

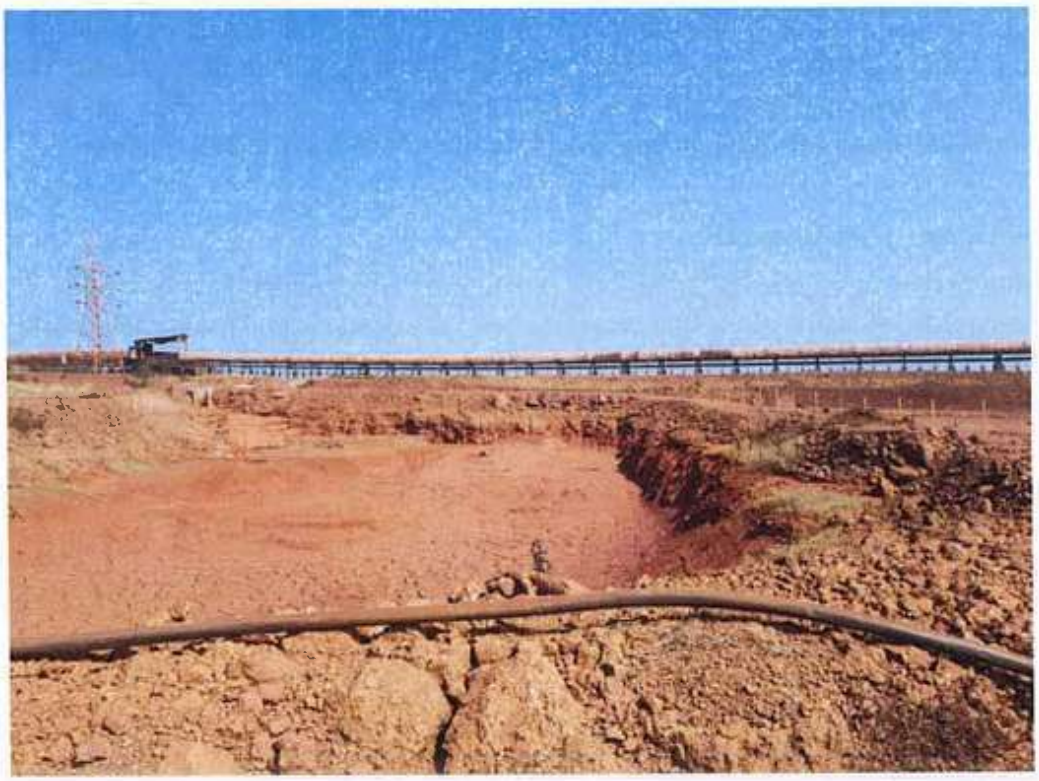

Figure 3: View of the newly constructed 2nd settling pit near the mine entrance

Figure 4: View of garland drains constructed in the R2 region

Recommendation 3:

The expected runoff in R3 region is 8444 m^3 per hour. A drain of 1170m having width and depth of of 4m and 2m respectively is proposed to be constructed in R3 region on the western side parallel to the existing of conveyor belt to arrest the surface runoff generated within this region and channelize it to quarry 1. As the flow of runoff is towards the bauxite storage, crusher and conveyor belt, therefore there is maximum possibility of intermixing of surface runoff with that of bauxite ore. The bauxite storage site, and crusher plant and ancillary facilities are covering very small portions of the total area of R3 region. Culverts/hume pipes are required to be provided where the drain crosses the road.

Current Status: Implemented

Garland drains of adequate dimensions have been constructed in this region (Fig.5). Earthern retaining wall and garland drain has been provided around the bauxite storage area to prevent the intermixing of the runoff. Hume pipe has been provided at the locations where the drains cross the road.

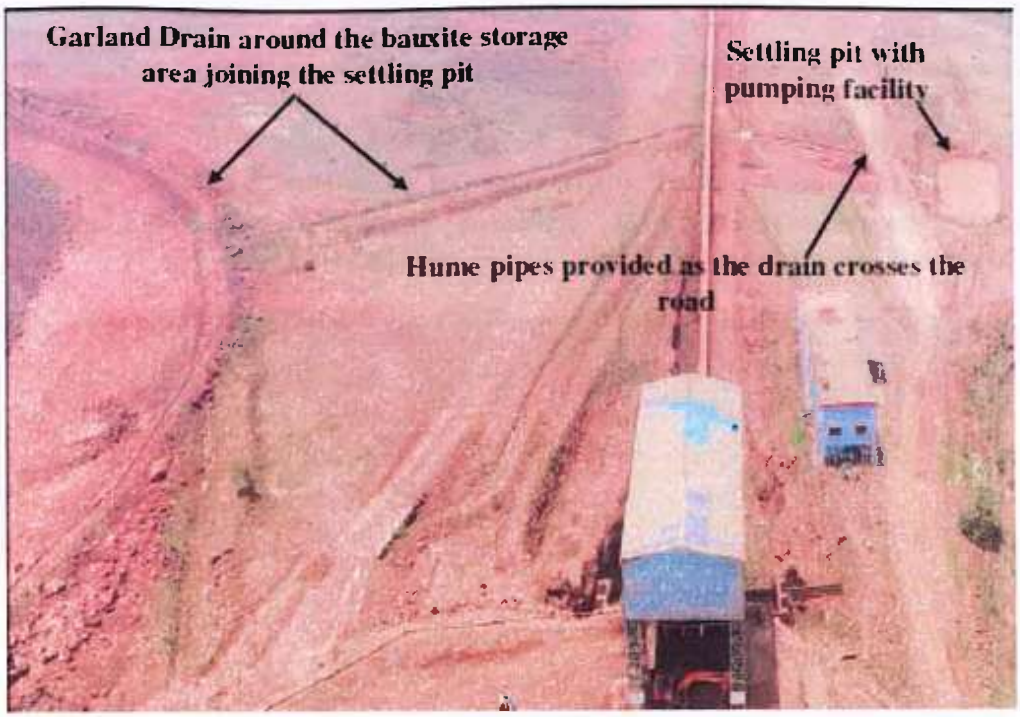

Figure 5: View of earthen retaining wall and garland drains near the bauxite storage area and crusher

Recommendation 4:

The regions R4, R5 and R6 regions are in virgin state. The runoff from these regions may be allowed to follow the natural topography. There are some small seasonal nallahs that are created during the monsoon, which carries the surface runoff to the nearby valleys.

Current Status: There is no change in this region.

Recommendation 5:

Most part of R8 is in a virgin state. The runoff from this region is channelized to the valley after the settlement of suspended solids in small settling pits constructed near the boundary. A sewage treatment plant (STP) of 75KLD capacity is under construction to handle the waste water from the domestic and office areas which is adequate.

Current Status: The runoff from this region is settled in the settling pits. The construction of STP near the administrative building has been completed. Meanwhile, more plantations have been carried out in this region along with the establishment of a nursery. The area is now greener than before.

Recommendations 6:

A retaining wall has been provided below the Rayagada dump (Dump I). However, it is damaged in different locations, allowing the mixing of runoff from the virgin areas of R8 before flowing to the valley. Since the quality of runoff from virgin areas is relatively uncontaminated, it should be allowed to flow without mixing with the runoff from the dump. It

is suggested that the retaining wall around the periphery of the dump should be properly maintained to avoid the direct mixing of the runoff with that of the virgin areas.

Current Status: Implemented.

The retaining walls have been properly maintaining with reconstruction of the damaged portions (Fig. 6). The natural runoff from the virgin areas do not mix with the runoff from the dump and flows to the valley after being settled in the renovated settling pits (Fig.7).

Figure 6: Photographic view of reconstriction of the retaining wall

Figure 7: Renovated settling pits

Recommendation 7:

A part of the runoff from this dump is flowing to the quarry. However, nearly 4500 m^3 of runoff per hour is expected to flow outside during peak monsoon period. Therefore, a sedimentation pond of 45m x 25m x 4m is proposed to be constructed below the dump. Zigzag flow pattern may be followed in the garland drains below the dumps to arrest the suspended solids before it reaches the settling pond, which will enhance the capacity of the settling pit.

Current Status: Implemented.

An additional settling pit of 46m x 28m x 4m has been constructed as per the recommendation (Fig. 8). The runoff from the dump is being channelized to the settling pit.

Figure 8: Settling pond near Rayagada dump.

Recommendation 8:

The runoff from Kalahandi Dump (Dump II) is being channelized to Kalahandi Quarry (Quarry II). The total runoff from the quarry and the dump in monsoon is likely to be 1.34 Lakh m^3. The quarry sump has the capacity to accommodate 1.54 Lakh m^3 of runoff during the monsoon (120m x 80 m x 16m). It was noticed that most of the water in the mine sump percolates downward, and there is very small amount of water present in the mine even during the monsoon.

Current Status:

The Kalahandi quarry sump has adequate capacity to store the runoff generated during the monsoon.

Recommendation 9:

There is a seasonal nallah in R7 region. It was noted that the nallah is seasonal one and exists only during the monsoon. Three check dams have been constructed on this nallh. The dimension of the check dams varies between 50 to 60 m in length, 2m width and 1 to 1.5m in

height (Fig. 3). However, during mine visits, it was noticed that there are cracks in the bottom parts of the dams which is allowing seepage of the water to the downstream. These may be properly constructed so that they will work as permanent storage reservoirs. These have the capability to store 75,000 m^3 to 1,35,000 m^3 of runoff. To meet part of the mine water demand the height of the check dams may be enhanced to 4m so that it can store upto 3,60,000 m^3 of runoff during monsoon.

Current Status: Implemented

The existing check dams in this region have been reconstructed with repairing of the cracks that were existing the bottom part of these dams. The heights of these dams have been enhanced to 4m to accommodate the runoff likely to be generated during the monsoon. A view of the check dams before and after reconstruction has been presented in Figure 9a and 9b respectively.

Figure 9a: Photographic view of damged check dam during 2016

Figure 9b: Photographic view of the reconstructed check dam

Recommendation 10:

Retaining walls are required to be provided in the top soils storage and crushed bauxite storage sites, so that the natural runoff coming from the topmost part of the mine does not mix with it.

Current status: Implemented. Top soil dump has already been re-handled and utilized for the plantation purpose.

Recommendation 11:

All the existing mine sumps, garland drains, sedimentation ponds created on thesurface should be de-silted before monsoon and a record of the same should bemaintained in the respective mine office. Wherever possible, the sumps may bedeepened to accommodate more surface runoff quantity.

Status: Implemented

All the existing mine sumps, garland drains, sedimentation ponds created on the surfaceis being de-silted before monsoon and a record of the same being maintained.

Recommendation 12:

In order to avoid accidental entry of any person or cattle into the sedimentationponds, roper fencing should be carried out. Warning signs should also bedisplayed near the water bodies along with their depth.

Status: Implemented

The sedimentation ponds have been properly fenced to prevent accidental entry of anyperson or cattle with a depth measurement scale in the middle of the pond (Fig. 10).

Figure 10: Fencing around the settling pit

Recommendation 13:

Plantation, grassing and soil water conservation measures like contour trenches(2ft wide x 2ft depth x continuous or staggered 2ft wide x 2ft depth x 2m length at 6m slope interval) and bund (2 ft high), agave plantation, silt arrestors, check dametc should be carried out in all the external o/b dumps slopes to minimize siltationduring monsoon, otherwise the capacity of garland drain to carry the surfacerunoff will decrease and will lead to flooding and discharged to nearby areasinstead of being channelled to the sump. Proper retaining wall or gabion wall orcatch drain (1.5m x 1.5m cross section) should be provided at the toe of the OBdumps to arrest the siltation during heavy rains and these catch drains should be cleaned before onset of monsoon each year.

Status: Implemented

Garland drains, settling tanks and check dams of appropriate size, gradient and lengthhas been constructed both around the mine pit and the over burden dump to preventun off of water and flow of sediments directly into the natural nallah and other water bodies. The garland drains are being desilted regularly before onset of monsoon.

Additional Observations:

During site visit the following additional observations were made:

Concrete drains of 160m length, 1.5m width and 1m depth has been provided on the side of approach road to the mine entrance.

A network of pumps and pipelines has been provided to channelize the runoff from the settling pits to the Quarries.

Vast amount of plantation has been carried out on the backfilled areas of the mine (Fig. 11).

Figure 11: Photographic view of the plantation in the backfilled areas of the mine

12.07.2020

Dr. H. B. Sahu
Associate Professor and Head
Department of Mining Engineering
Principal Investigator

13-01-2020

Dr. Sk. Md. Equeenuddin
Associate Professor
Dept of Earth and Atmospheric Sciences
Co-Principal Investigator

Ref: Envlab/24-25/TR-02435 **Date:17.05.2024**

ANNEXURE-IV

Ambient Air Quality (AAQ) Monitoring Results

Period: October'23 - March'24 (Monthly Average Values)

(Core Zone)

AAQ-S1: Mining Pit (N19°20.773′ E82°58.332′)	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	O3 µg/m³
Oct-23	39.7	25.3	21.4	29.1	0.50	5.34
Nov-23	44.2	24.2	24.3	32.5	0.58	6.40
Dec-23	44.4	21.7	23.4	30.3	0.54	5.28
Jan-24	45.8	22.5	23.9	31.4	0.55	5.21
Feb-24	48.4	23.5	23.7	29.7	0.57	5.76
Mar-24	52.6	24.6	24.4	29.5	0.56	5.44
Six Monthly Average	**45.8**	**23.6**	**23.5**	**30.4**	**0.55**	**5.57**
AAQ-S2: Near Crusher (N19°20.915′ E82°58.543′)	**PM_{10} µg/m³**	**$PM_{2.5}$ µg/m³**	**SO_2 µg/m³**	**NO_2 µg/m³**	**CO mg/m³**	**O3 µg/m³**
Oct-23	40.9	19.8	13.6	21.0	0.51	5.42
Nov-23	51.6	25.4	20.6	30.4	0.55	4.70
Dec-23	50.8	24.9	21.6	29.6	0.53	4.49
Jan-24	53.4	25.7	22.7	30.6	0.50	4.06
Feb-24	55.9	26.7	21.9	31.7	0.54	3.93
Mar-24	53.4	25.3	22.2	31.3	0.55	4.48
Six Monthly Average	**51.0**	**24.6**	**20.4**	**29.1**	**0.53**	**4.51**
AAQ-S3: Near Weigh Bridge (N19°21.079' E82°58.775')	**PM_{10} µg/m³**	**$PM_{2.5}$ µg/m³**	**SO_2 µg/m³**	**NO_2 µg/m³**	**CO mg/m³**	**O3 µg/m³**
Oct-23	52.7	25.2	22.0	29.6	0.48	5.18
Nov-23	58.4	29.4	26.6	36.2	0.76	6.14
Dec-23	54.2	25.4	25.1	34.3	0.54	5.90
Jan-24	53.3	25.8	24.8	34.8	0.53	5.84
Feb-24	54.9	26.4	25.0	34.6	0.60	5.93
Mar-24	52.1	24.7	23.2	33.1	0.54	5.19
Six Monthly Average	**54.3**	**26.1**	**24.5**	**33.8**	**0.57**	**5.69**

Note: No deviation from the NAAQS is observed and all the values are within the standard prescribed under National Ambient Air Quality Standards (NAAQS)

VISIONTEK CONSULTANCY SERVICES PVT. LTD. *Reviewed by*

VISIONTEK CONSULTANCY SERVICES PVT. LTD. *Approved by*

Ref: Envlab/24-25/TR-02436 **Date:17.05.2024**

ANNEXURE-IV

Ambient Air Quality (AAQ) Monitoring Results

Period: October'23 - March'24 (Monthly Average Values)

(Core Zone)

AAQ-S4: Near Admin Office (N19°20.366´ E82°58.874´)	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³	O3 µg/m³
Oct-23	31.4	18.6	10.2	19.0	0.52	5.86
Nov-23	45.9	23.1	21.4	32.5	0.57	4.97
Dec-23	44.4	21.8	20.8	31.2	0.53	4.73
Jan-24	45.4	22.3	21.9	32.1	0.53	5.04
Feb-24	46.3	22.0	22.8	32.7	0.58	5.24
Mar-24	49.0	22.8	22.9	31.7	0.55	5.04
Six Monthly Average	**43.7**	**21.7**	**20.0**	**29.8**	**0.55**	**5.14**
NAAQ Standard	**100**	**60**	**80**	**80**	**4**	**100**
Testing method	**Gravimetric** ISO 5182 (Part-23) RA2019	**Gravimetric** ISO 5182 (Part-24) RA2019	**Improved West and Geake method** ISO 5182 (Part-2) RA 2017	**Modified Jacob & Hochheiser (Na-Arsenite)** ISO 5182 (Part-6) RA 2012	**NDIR Spectroscopy** ISO 5182(Part 10) RA2009	**Chemical Method**

Note: No deviation from the NAAQS is observed and all the values are within the standard prescribed under National Ambient Air Quality Standards (NAAQS)

VISIONTEK CONSULTANCY SERVICES PVT. LTD. *Reviewed by*

VISIONTEK CONSULTANCY SERVICES PVT. LTD. *Approved by*

Ref: Envlab/24-25/TR-02437 **Date:17.05.2024**

ANNEXURE-V

Ambient Air Quality (AAQ) Monitoring Results

Period: October'23 - March'24 (Monthly Average Values)

(Buffer Zone)

AAQ-BZ-S5: Adri Village (N 19°21.928' E 82°56.705')	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³
Oct-23	30.4	13.4	6.7	13.7	0.45
Nov-23	38.4	19.5	13.6	24.2	0.51
Dec-23	35.3	17.3	12.9	21.7	0.45
Jan-24	33.8	17.0	13.2	21.1	0.46
Feb-24	33.7	17.2	13.0	21.8	0.4
Mar-24	33.3	16.2	14.2	22.6	0.5
Six Monthly Average	**34.2**	**16.7**	**12.3**	**20.9**	**0.46**
AAQ-BZ-S6: Chandragiri (N 19°23.107' E 82°59.221')	**PM_{10} µg/m³**	**$PM_{2.5}$ µg/m³**	**SO_2 µg/m³**	**NO_2 µg/m³**	**CO mg/m³**
Oct-23	30.5	14.1	5.0	12.5	0.43
Nov-23	36.7	18.5	12.6	20.3	0.55
Dec-23	33.4	16.0	11.9	20.7	0.48
Jan-24	34.3	16.6	12.2	22.3	0.52
Feb-24	32.8	15.7	12.8	22.3	0.53
Mar-24	33.4	15.7	12.9	22.0	0.51
Six Monthly Average	**33.5**	**16.1**	**11.2**	**20.0**	**0.51**
AAQ-BZ-S7: Paikupakhal (N 19°20.197' E 82°59.589')	**PM_{10} µg/m³**	**$PM_{2.5}$ µg/m³**	**SO_2 µg/m³**	**NO_2 µg/m³**	**CO mg/m³**
Oct-23	31.0	14.9	5.2	12.0	0.36
Nov-23	40.4	20.3	10.8	20.5	0.59
Dec-23	42.1	19.9	11.1	20.9	0.53
Jan-24	43.7	21.5	12.1	21.5	0.51
Feb-24	44.8	21.8	12.6	23.1	0.52
Mar-24	45.4	21.6	14.1	24.9	0.54
Six Monthly Average	**41.2**	**20.0**	**11.0**	**20.5**	**0.51**

Note: No deviation from the NAAQS is observed and all the values are within the standard prescribed under National Ambient Air Quality Standards (NAAQS)

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ANNEXURE-V

Ambient Air Quality (AAQ) Monitoring Results

Period: October'23 - March'24 (Monthly Average Values)

(Buffer Zone)

AAQ-BZ-S8: Andirakanch (N 19°19.079' E 83°0.738')	PM_{10} µg/m^3	$PM_{2.5}$ µg/m^3	SO_2 µg/m^3	NO_2 µg/m^3	CO mg/m^3
Oct-23	28.3	14.2	5.8	11.8	0.33
Nov-23	30.7	15.6	13.0	23.1	0.52
Dec-23	32.2	15.6	12.3	21.2	0.50
Jan-24	31.3	15.2	13.2	23.1	0.55
Feb-24	32.0	15.4	13.2	23.1	0.55
Mar-24	33.35	15.775	14.175	23.55	0.53
Six Monthly Average	**31.3**	**15.3**	**11.9**	**21.0**	**0.50**
NAAQ Standard	**100**	**60**	**80**	**80**	**4**
Testing method	**Gravimetric** ISO 5182 (Part-23) RA2019	**Gravimetric** ISO 5182 (Part-24) RA2019	**Improved West and Geake method** ISO 5182 (Part-2) RA 2017	**Modified Jacob & Hochheiser (Na-Arsenite)** ISO 5182 (Part-6) RA 2012	**NDIR Spectroscopy** ISO 5182(Part 10) RA2009

Note: No deviation from the NAAQS is observed and all the values are within the standard prescribed under National Ambient Air Quality Standards (NAAQS)

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ANNEXURE-VI

Stream Flow Monitoring Results

Period: October'23 - March'24 (Monthly Average Values)

Sl. No	Stream Location	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Monthly Average	
		Stream Flow (m^3/hr.)	Stream Flow (m^3/hr.)	Stream Flow (m^3/hr.)	Stream Flow (m^3/hr.)	Stream Flow (m^3/hr.)	Stream Flow (m^3/hr.)	Stream Flow (m^3/hr.)	Stream flow (Cusec)
1	SW1: Paikupakhal Nala (N19°20.056' E82°59.776')	34.0	100.5	69.2	77.76	46.1	57.5	**64.2**	**0.63**
2	SW2: Near Dandabada Nala (N19°22.940' E82°57.515')	191.5	471.6	404.4	539.4	1098.0	307.3	**502.0**	**4.93**
3	SW3: Chandragiri Nala (N19°23.078' E83°0.248')	1165.3	2857.7	2576.6	2644.8	5673.0	1103.1	**2670.1**	**26.19**
4	SW4: Mishripada Nala (N19°22.829' E82°59.268')	217.9	547.0	435.5	275.4	576.5	122.6	**362.5**	**3.56**

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Ref: Envlab/24-25/TR-02440 **Date:17.05.2024**

ANNEXURE-VII

Surface Water Quality
Period: October'23 - March'24 (Monthly Average Values)

SW1: Sana River (Up Stream) (N 19°17.015' E 83°0.879'')

Sl. No.	Parameter	Unit	Standards as per IS-2296:1992 Class – 'C'	Analysis Results SW1						
				Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Months Average
1	Colour	Hazen, max	300	10	5	10	10	5	5	7.5
2	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH value	--	6.5-8.5	7.52	7.44	7.33	7.33	7.45	7.55	7.44
4	Suspended Solids	mg/l, max	--	56	45	48	48	56	55	51.33
5	Total dissolved solids	mg/l, max	1500	411	386.1	382.8	386.1	174.9	190.08	321.83
6	Temperature	0c	--	26.2	25.2	22.8	23.6	25.5	25.4	24.78
7	Conductivity	µs/cm	--	672	585	580	585	265	288	495.83
8	Ammoniacal Nitrogen (as NH4-N)	mg/l, max	--	4.2	4.5	3.5	3.2	3.3	3.6	3.72
9	Total Kjeldahl Nitrogen (as N)	mg/l, max	--	5.8	6.4	5.2	5.5	5.6	5.8	5.72
10	Oil & Grease	mg/l, max	0.1	ND	ND	ND	ND	ND	ND	ND
11	Dissolved Oxygen (as DO)	mg/l, min	4	6.5	6.4	5.5	5	5.5	5.6	5.75
12	Biochemical Oxygen Demand (as BOD at 270C For 3 days)	mg/l, max	3.0	2.1	1.6	1.4	1.8	1.8	1.6	1.52
13	Chemical Oxygen Demand (as COD)	mg/l, max	--	16	11.6	10.5	11.4	12.3	13.6	12.57
14	Free Ammonia (as NH3)	mg/l, max	--	ND	ND	ND	ND	ND	ND	ND
15	Total Residual Chlorine (as RFC)	mg/l, min	--	0.05	0.04	0.03	0.02	0.02	0.02	ND
16	Iron (as Fe)	mg/l, max	50	1.85	1.66	1.45	1.42	1.24	1.24	1.48
17	Fluoride (as F)	mg/l, max	1.5	0.55	0.44	0.41	0.48	0.4	0.35	0.44
18	Hexavalent Chromium (as Cr+6)	mg/l, max	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
19	Cyanide (as CN)	mg/l, max	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
20	Sulphate (as S)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Nitrate (as NO3)	mg/l, max	50	8.56	10.5	11.3	14.5	12.6	11.6	11.51
22	Dissolved Phosphate (as PO4)	mg/l, max	--	0.44	0.55	0.58	0.65	0.62	0.61	0.58
23	Phenolic Compound (as C6H5OH)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Bio-assay Test	mg/l, max	90% survival of fish after 96 hrs. in 100% effluent	87%	99%	98%	97%	98%	98%	96%
25	Selenium (as S)	mg/l, max	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
26	Manganese (as Mn)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	Copper (as Cu)	mg/l, max	1.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
28	Zinc (as Zn)	mg/l, max	15	0.14	0.17	0.15	0.25	0.21	0.18	0.18
29	Cadmium	mg/l, max	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lead (as Pb)	mg/l, max	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
31	Mercury (as Hg)	mg/l, max	--	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
32	Nickel (as Ni)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
33	Arsenic (as As)	mg/l, max	0.2	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
34	Total Chromium (as TCr)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Ref: Envlab/24-25/TR-02441 **Date:17.05.2024**

ANNEXURE-VII

Surface Water Quality
Period: October'23 - March'24 (Monthly Average Values)

SW2: Sana River (Down Stream) (N 19°16.602' E 82°59.812')

Sl. No.	Parameter	Unit	Standards as per IS-2296:1992 Class – 'C'	Analysis Results SW2						
				Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Months Average
1	Color	Hazen, max	300	10	10	5	5	10	10	8.33
2	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH value	--	6.5-8.5	7.45	7.63	7.45	7.45	7.36	7.45	7.47
4	Suspended Solids	mg/l, max	--	59	39	41	41	52	62	49.00
5	Total dissolved solids	mg/l, max	1500	421	399.3	405.9	403.26	399.3	405.9	405.78
6	Temperature	0c	--	26.1	25.8	23.4	24.5	25.6	25.6	25.17
7	Conductivity	µs/cm	--	638	605	615	611	605	615	614.83
8	Ammoniacal Nitrogen (as NH4-N)	mg/l, max	--	3.9	5.2	4.6	4.2	4.1	4.5	4.42
9	Total Kjeldahl Nitrogen (as N)	mg/l, max	--	5.2	7.8	5.8	5.3	5.8	5.4	5.88
10	Oil & Grease	mg/l, max	0.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11	Dissolved Oxygen (as DO)	mg/l, min	4	6.2	6.2	4.6	4.3	4.8	5.2	5.22
12	Biochemical Oxygen Demand (as BOD at 270C For 3 days)	mg/l, max	3.0	1.2	1.8	1.2	1.2	1.6	1.4	1.57
13	Chemical Oxygen Demand (as COD)	mg/l, max	--	15.5	10.4	11.6	12.6	14.2	15.4	13.28
14	Free Ammonia (as NH3)	mg/l, max	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
15	Total Residual Chlorine (as RFC)	mg/l, min	--	0.02	0.03	0.02	0.02	0.02	0.02	0.02
16	Iron (as Fe)	mg/l, max	50	1.85	1.66	1.45	1.42	1.24	1.24	1.48
17	Fluoride (as F)	mg/l, max	1.5	0.63	0.52	0.43	0.44	0.42	0.44	0.48
18	Hexavalent Chromium (as Cr+6)	mg/l, max	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
19	Cyanide (as CN)	mg/l, max	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
20	Sulphate (as S)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Nitrate (as NO3)	mg/l, max	50	7.69	9.98	10.6	11.8	12.8	12.8	10.95
22	Dissolved Phosphate (as PO4)	mg/l, max	--	0.65	0.75	0.64	0.55	0.58	0.66	0.64
23	Phenolic Compound (as C6H5OH)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Bio-assay Test	mg/l, max	90% survival of fish after 96 hrs. in 100% effluent	90%	98%	99%	98%	99%	97%	96.8%
25	Selenium (as S)	mg/l, max	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
26	Manganese (as Mn)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	Copper (as Cu)	mg/l, max	1.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
28	Zinc (as Zn)	mg/l, max	15	0.12	0.18	0.14	0.18	0.2	0.16	0.16
29	Cadmium	mg/l, max	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lead (as Pb)	mg/l, max	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
31	Mercury (as Hg)	mg/l, max	--	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
32	Nickel (as Ni)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
33	Arsenic (as As)	mg/l, max	0.2	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
34	Total Chromium (as TCr)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Ref: Envlab/24-25/TR-02442 **Date:17.05.2024**

ANNEXURE-VII

Surface Water Quality

Period: October'23 - March'24 (Monthly Average Values)

SW3: Kandabindha (Up Stream) (N 19°22.014' E 83°0.248')

Sl. No.	Parameter	Unit	Standards as per IS-2296:1992 Class – 'C'	Analysis Results SW3						
				Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Months Average
1	Color	Hazen, max	300	15	10	5	5	10	10	9.17
2	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH value	--	6.5-8.5	7.63	7.66	7.42	7.42	7.44	7.36	7.49
4	Suspended Solids	mg/l, max	--	55	51	39	39	55	58	49.50
5	Total dissolved solids	mg/l, max	1500	390	367.62	370.92	373.56	386.1	382.8	378.50
6	Temperature	0c	--	26.8	25.7	24.3	25.3	25.4	25.1	25.43
7	Conductivity	µs/cm	--	605	557	562	566	585	580	575.83
8	Ammoniacal Nitrogen (as NH4-N)	mg/l, max	--	2.8	3.7	3.8	3.5	3.6	3.9	3.55
9	Total Kjeldahl Nitrogen (as N)	mg/l, max	--	3.5	5.8	4.6	5.6	5.9	4.6	5.00
10	Oil & Grease	mg/l, max	0.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11	Dissolved Oxygen (as DO)	mg/l, min	4	6.2	6.5	5.2	5.1	5.2	5.4	5.60
12	Biochemical Oxygen Demand (as BOD at 270C For 3 days)	mg/l, max	3.0	2.8	1.2	1.6	1.5	1.5	1.3	1.65
13	Chemical Oxygen Demand (as COD)	mg/l, max	--	10.5	12.4	12.9	10.8	11.6	12.8	11.83
14	Free Ammonia (as NH3)	mg/l, max	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
15	Total Residual Chlorine (as RFC)	mg/l, min	--	0.03	0.02	0.02	0.03	0.03	0.03	ND
16	Iron (as Fe)	mg/l, max	50	0.96	1.11	1.21	0.32	0.36	0.36	0.72
17	Fluoride (as F)	mg/l, max	1.5	0.48	0.57	0.52	0.48	0.41	0.43	0.48
18	Hexavalent Chromium (as Cr+6)	mg/l, max	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
19	Cyanide (as CN)	mg/l, max	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
20	Sulphate (as S)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Nitrate (as NO3)	mg/l, max	50	6.66	12.5	11.6	14.3	11.6	11.4	11.34
22	Dissolved Phosphate (as PO4)	mg/l, max	--	0.87	0.65	0.68	0.62	0.59	0.53	0.66
23	Phenolic Compound (as C6H5OH)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Bio-assay Test	mg/l, max	90% survival of fish after 96 hrs. in 100% effluent	89%	98%	99%	99%	98%	98%	96.8%
25	Selenium (as S)	mg/l, max	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
26	Manganese (as Mn)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	Copper (as Cu)	mg/l, max	1.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
28	Zinc (as Zn)	mg/l, max	15	0.15	0.14	0.13	0.16	0.21	0.2	0.17
29	Cadmium	mg/l, max	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lead (as Pb)	mg/l, max	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
31	Mercury (as Hg)	mg/l, max	--	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
32	Nickel (as Ni)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
33	Arsenic (as As)	mg/l, max	0.2	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
34	Total Chromium (as TCr)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Ref: Envlab/24-25/TR-02443 **Date:17.05.2024**

ANNEXURE-VII

Surface Water Quality

Period: October'23 - March'24 (Monthly Average Values)

SW4: Kandabindha (Down Stream) (N 19°23.078' E 83°0.248')

Sl. No.	Parameter	Unit	Standards as per IS-2296:1992 Class – 'C'	Analysis Results SW4						
				Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Months Average
1	Color	Hazen, max	300	10	5	5	5	5	5	5.83
2	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH value	--	6.5-8.5	7.58	7.59	7.39	7.39	7.25	7.48	7.45
4	Suspended Solids	mg/l, max	--	53.6	54	42	42	52	57	50.10
5	Total dissolved solids	mg/l, max	1500	435	405.9	410.52	415.14	399.96	403.92	411.74
6	Temperature	0c	--	26.7	25.4	24.5	24.8	25.2	25.4	25.33
7	Conductivity	µs/cm	--	667	615	622	629	606	612	625.17
8	Ammoniacal Nitrogen (as NH4-N)	mg/l, max	--	3.2	4.4	4.2	4.4	4.2	4.8	4.20
9	Total Kjeldahl Nitrogen (as N)	mg/l, max	--	4.8	6.1	5.5	5.2	5.1	5.3	5.33
10	Oil & Grease	mg/l, max	0.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11	Dissolved Oxygen (as DO)	mg/l, min	4	6.5	6.2	5.8	5.2	5.5	5.6	5.80
12	Biochemical Oxygen Demand (as BOD at 270C For 3 days)	mg/l, max	3.0	2.1	1.6	1.5	1.4	1.3	1.2	1.52
13	Chemical Oxygen Demand (as COD)	mg/l, max	--	12.4	10.6	11.4	12.5	11.8	13.5	12.03
14	Free Ammonia (as NH3)	mg/l, max	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
15	Total Residual Chlorine (as RFC)	mg/l, min	--	0.04	0.03	0.03	0.02	0.02	0.02	0.03
16	Iron (as Fe)	mg/l, max	50	1.65	1.45	1.24	1.44	1.44	1.44	1.44
17	Fluoride (as F)	mg/l, max	1.5	0.5	0.47	0.39	0.44	0.42	0.39	0.44
18	Hexavalent Chromium (as Cr+6)	mg/l, max	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
19	Cyanide (as CN)	mg/l, max	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
20	Sulphate (as S)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Nitrate (as NO3)	mg/l, max	50	8.69	7.45	9.85	12.6	10.8	11.8	10.20
22	Dissolved Phosphate (as PO4)	mg/l, max	--	0.65	0.77	0.72	0.67	0.62	0.64	0.68
23	Phenolic Compound (as C6H5OH)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
24	Bio-assay Test	mg/l, max	90% survival of fish after 96 hrs. in 100% effluent	88%	99%	97%	96%	99%	99%	96.3%
25	Selenium (as S)	mg/l, max	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
26	Manganese (as Mn)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
27	Copper (as Cu)	mg/l, max	1.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
28	Zinc (as Zn)	mg/l, max	15	0.18	0.17	0.16	0.14	0.22	0.17	0.17
29	Cadmium	mg/l, max	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
30	Lead (as Pb)	mg/l, max	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
31	Mercury (as Hg)	mg/l, max	--	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
32	Nickel (as Ni)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
33	Arsenic (as As)	mg/l, max	0.2	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
34	Total Chromium (as Cr+3)	mg/l, max	--	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Reviewed by

Approved by

Ref: Envlab/24-25/TR-02444 **Date:17.05.2024**

ANNEXURE-VIII

Ground Water Quality
Period: October'23 - March'24 (Monthly Average Values)

GW1: Paikupakhal (N19°20.197′ E82°59.589')

Sl. No.	Parameter	Unit	Standard as per IS 10500:2012, Amend. 2015 & 2018	Analysis Results GW1						
				Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Months Average
Organoleptic & Physical Parameters										
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH value	--	6.5-8.5	7.35	7.45	7.36	7.63	7.25	7.36	7.4
4	Turbidity	NTU, max	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5	Total Dissolved Solids	mg/l	500	366.96	359.7	364.32	353.1	366.96	368.94	363.33
6	Temperature	0C	-	25.3	25.3	24.3	24.6	25.3	25.4	25.03
7	Conductivity	µS/cm	-	556	545	552	535	556	559	550.50
General Parameters Concerning Substances Undesirable in Excessive Amounts										
8	Calcium (as Ca)	mg/l, max	75	30.4	24	31.2	28.8	25.6	30.4	28.40
9	Chloride (as Cl)	mg/l, max	250	51.6	48.8	52.8	56.9	55.6	56.6	53.72
10	Copper (as Cu)	mg/l, max	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11	Fluoride (as F)	mg/l, max	1.0	0.36	0.45	0.44	0.46	0.42	0.36	0.42
12	Free residual Chlorine	mg/l, min	0.2	0.23	0.31	0.36	0.26	0.26	0.20	0.27
13	Iron (as Fe)	mg/l, max	1.0	0.31	0.36	0.25	0.28	0.26	0.35	0.30
14	Magnesium (as Mg)	mg/l, max	30	16.8	18.0	16.1	19.9	17.3	15.8	17.32
15	Manganese (as Mn)	mg/l, max	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Mineral oil	mg/l, max	0.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
17	Acidity	mg/l, max	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
18	Phenolic Compounds	mg/l, max	0.001	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
19	Selenium (as Se)	mg/l, max	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01
20	Sulphate (as SO4)	mg/l, max	200	25.4	25.4	21.4	22.5	22.5	18.6	22.63
21	Total Alkalinity	mg/l, max	200	108	105	112	124	109	112	111.67
22	Total Hardness	mg/l, max	200	146	135	145	155	136	142	143.17
23	Zinc (as Zn)	mg/l, max	5.0	0.21	0.22	0.24	0.26	0.21	0.21	0.23
Parameters Concerning Toxic Substances										
24	Cadmium (as Cd)	mg/l, max	0.003	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Cyanide (as CN)	mg/l, max	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead (as Pb)	mg/l, max	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Mercury (as Hg)	mg/l, max	0.001	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
28	Total arsenic	mg/l, max	0.01	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
29	Pesticide	mg/l, max	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
BACTERIOLOGICAL QUALITY										
30	Total Coli forms	MPN/100 ml	Shall not be detected in any 100 ml sample	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Reviewed by*

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Approved by*

Ref: Envlab/24-25/TR-02445 **Date:17.05.2024**

ANNEXURE-VIII

Ground Water Quality
Period: October'23 - March'24 (Monthly Average Values)

GW2: Andirakanch (N19°19.079′ E83°00.738′)

Sl. No.	Parameter	Unit	Standard as per IS 10500:2012, Amend. 2015 & 2018	Analysis Results GW2						
				Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Months Average
Organoleptic & Physical Parameters										
1	Color	Hazen	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH value	--	6.5-8.5	7.55	7.77	7.62	7.65	7.36	7.45	7.57
4	Turbidity	NTU, max	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5	Total Dissolved Solids	mg/l	500	363.66	357.72	353.76	357.72	359.7	357.72	358.38
6	Temperature	0C	-	25.4	25.4	24.3	24.8	25.1	25.4	25.07
7	Conductivity	µS/cm	-	551	542	536	542	545	542	543.00
General Parameters Concerning Substances Undesirable in Excessive Amounts										
8	Calcium (as Ca)	mg/l, max	75	24.8	26.8	22.4	26.4	25.2	24	24.93
9	Chloride (as Cl)	mg/l, max	250	43.6	45.7	48.8	52.4	2.8	43.9	39.53
10	Copper (as Cu)	mg/l, max	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11	Fluoride (as F)	mg/l, max	1.0	0.42	0.44	0.38	0.32	0.36	0.42	0.39
12	Free residual Chlorine	mg/l, min	0.2	0.26	0.28	0.22	0.28	0.24	0.21	0.25
13	Iron (as Fe)	mg/l, max	1.0	0.39	0.33	0.36	0.31	0.25	0.33	0.33
14	Magnesium (as Mg)	mg/l, max	30	17.00	14.90	13.40	14.40	14.9	18	15.43
15	Manganese (as Mn)	mg/l, max	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Mineral oil	mg/l, max	0.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
17	Acidity	mg/l, max	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
18	Phenolic Compounds	mg/l, max	0.001	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
19	Selenium (as Se)	mg/l, max	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
20	Sulphate (as SO4)	mg/l, max	200	27.8	27.8	31.6	30.6	31.6	24.7	29.02
21	Total Alkalinity	mg/l, max	200	103	109	98	105	105	108	104.67
22	Total Hardness	mg/l, max	200	133	129	112	126	125	135	126.67
23	Zinc (as Zn)	mg/l, max	5.0	0.22	0.28	0.23	0.25	0.22	0.22	0.24
Parameters Concerning Toxic Substances										
24	Cadmium (as Cd)	mg/l, max	0.003	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Cyanide (as CN)	mg/l, max	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead (as Pb)	mg/l, max	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Mercury (as Hg)	mg/l, max	0.001	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
28	Total arsenic	mg/l, max	0.01	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
29	Pesticide	mg/l, max	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
BACTERIOLOGICAL QUALITY										
30	Total Coli forms	MPN/100 ml	Shall not be detected in any 100 ml sample	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1

Reviewed by

Approved by

Ref: Envlab/24-25/TR-02446 **Date:17.05.2024**

ANNEXURE-VIII

Ground Water Quality
Period: October'23 - March'24 (Monthly Average Values)

GW3: Malligaon (N19°21.359′ E82°59.889′)

Sl. No.	Parameter	Unit	Standard as per IS 10500:2012, Amend. 2015 & 2018	Analysis Results GW3						
				Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Months Average
Organoleptic & Physical Parameters										
1	Color	Hazen	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH value	--	6.5-8.5	7.25	7.05	7.12	7.22	7.25	7.33	7.20
4	Turbidity	NTU, max	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5	Total Dissolved Solids	mg/l	500	337.92	335.94	337.92	349.14	346.5	353.1	343.42
6	Temperature	0C	-	25.1	25.1	24.1	25.1	25.3	25.1	24.97
7	Conductivity	µS/cm	-	512	509	512	529	525	535	520.33
General Parameters Concerning Substances Undesirable in Excessive Amounts										
8	Calcium (as Ca)	mg/l, max	75	26.8	27.6	28.4	30	26.4	25.2	27.40
9	Chloride (as Cl)	mg/l, max	250	42.8	44.9	42.9	40.8	43.6	46.2	43.53
10	Copper (as Cu)	mg/l, max	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11	Fluoride (as F)	mg/l, max	1.0	0.44	0.38	0.46	0.41	0.44	0.41	0.42
12	Free residual Chlorine	mg/l, min	0.2	0.21	0.25	0.28	0.22	0.25	0.22	0.24
13	Iron (as Fe)	mg/l, max	1.0	0.34	0.39	0.45	0.33	0.22	0.34	0.35
14	Magnesium (as Mg)	mg/l, max	30	16.60	15.40	15.60	17.50	14.40	13.90	15.57
15	Manganese (as Mn)	mg/l, max	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Mineral oil	mg/l, max	0.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
17	Acidity	mg/l, max	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
18	Phenolic Compounds	mg/l, max	0.001	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
19	Selenium (as Se)	mg/l, max	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
20	Sulphate (as SO4)	mg/l, max	200	25.4	25.4	28.5	24.6	26.5	23.6	25.67
21	Total Alkalinity	mg/l, max	200	99.6	96.7	105	112	112	106	105.22
22	Total Hardness	mg/l, max	200	136	133	136	148	126	121	133.33
23	Zinc (as Zn)	mg/l, max	5.0	0.23	0.22	0.26	0.22	0.24	0.24	0.24
Parameters Concerning Toxic Substances										
24	Cadmium (as Cd)	mg/l, max	0.003	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Cyanide (as CN)	mg/l, max	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead (as Ph)	mg/l, max	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Mercury (as Hg)	mg/l, max	0.001	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
28	Total arsenic	mg/l, max	0.01	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
29	Pesticide	mg/l, max	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
BACTERIOLOGICAL QUALITY										
30	Total Coli forms	MPN/100 ml	Shall not be detected in any 100 ml sample	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Reviewed by*

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Approved by*

Ref: Envlab/24-25/TR-02447 **Date:17.05.2024**

ANNEXURE-VIII

Ground Water Quality
Period: October'23 - March'24 (Monthly Average Values)

GW4: Kendumundi (N19°21.359′ E82°59.889′)

Sl. No.	Parameter	Unit	Standard as per IS 10500:2012, Amend. 2015 & 2018	Analysis Results GW4						
				Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Months Average
Organoleptic & Physical Parameters										
1	Color	Hazen	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2	Odour	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	pH value	--	6.5-8.5	7.29	7.18	7.24	7.36	7.35	7.29	7.29
4	Turbidity	NTU, max	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5	Total Dissolved Solids	mg/l	500	359.04	354.42	349.8	161.7	353.76	350.46	321.53
6	Temperature	0C	-	25.3	25.3	24.2	25.6	25.4	25.2	25.17
7	Conductivity	µS/cm	-	544	537	530	245	536	531	487.17
General Parameters Concerning Substances Undesirable in Excessive Amounts										
8	Calcium (as Ca)	mg/l, max	75	25.6	24	22	22.6	21.6	23.6	23.23
9	Chloride (as Cl)	mg/l, max	250	25.4	51.7	55.8	53.6	52.7	54.7	48.98
10	Copper (as Cu)	mg/l, max	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11	Fluoride (as F)	mg/l, max	1.0	0.41	0.36	0.42	0.44	0.38	0.39	0.40
12	Free residual Chlorine	mg/l, min	0.2	0.22	0.19	0.28	0.26	0.22	0.21	0.23
13	Iron (as Fe)	mg/l, max	1.0	0.33	0.45	0.42	0.38	0.23	0.36	0.36
14	Magnesium (as Mg)	mg/l, max	30	13.70	15.40	12.00	15.00	13.90	14.40	14.07
15	Manganese (as Mn)	mg/l, max	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
16	Mineral oil	mg/l, max	0.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
17	Acidity	mg/l, max	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
18	Phenolic Compounds	mg/l, max	0.001	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
19	Selenium (as Se)	mg/l, max	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
20	Sulphate (as SO4)	mg/l, max	200	21.8	21.8	22.6	21.4	24.8	21.6	22.33
21	Total Alkalinity	mg/l, max	200	95.4	99.8	102	106	106	109	103.03
22	Total Hardness	mg/l, max	200	121	124	105	119	112	119	116.67
23	Zinc (as Zn)	mg/l, max	5.0	0.22	0.23	0.24	0.29	0.21	0.21	0.23
Parameters Concerning Toxic Substances										
24	Cadmium (as Cd)	mg/l, max	0.003	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25	Cyanide (as CN)	mg/l, max	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
26	Lead (as Pb)	mg/l, max	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
27	Mercury (as Hg)	mg/l, max	0.001	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
28	Total arsenic	mg/l, max	0.01	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
29	Pesticide	mg/l, max	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
BACTERIOLOGICAL QUALITY										
30	Total Coli forms	MPN/100 ml	Shall not be detected in any 100 ml sample	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Reviewed by*

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Approved by*

Ref: Envlab/24-25/TR-02448 **Date:17.05.2024**

ANNEXURE-IX

Ground Water Level Monitoring Results

Period: October'23 - March'24 (Monthly Average Values)

Sl. No.	Monitoring Location	GPS Coordinate	Result (Meter)						
			Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Months Average
			Water Level (Meter)	Water Level (Meter)	Water Level (Meter)	Water Level (Meter)	Water Level (Meter)	Water Level (Meter)	Water Level (Meter)
1	Paikupakhal (Buffer Zone)	Latitude: N19°20.197´ Longitude: E82°59.589´ Altitude: 874.17 m.	3.0	3.4	3.2	2.9	2.7	2.4	**2.93**
2	Andirakanch (Buffer Zone)	Latitude: N19°19.079´ Longitude: E83°00.738´ Altitude: 739.45 m.	4.6	4.3	4.2	3.9	4.1	4.0	**4.18**
3	Malligaon (Buffer Zone)	Latitude: N19°21.359´ Longitude: E82°59.889´ Altitude: 699.82 m.	11.6	12.1	10.9	15.2	15.9	15.8	**13.58**
4	Kendumundi (Buffer Zone)	Latitude: N19°20.862´ Longitude: E82°55.272´ Altitude: 663.96 m.	5.2	4.9	5.1	4.6	4.5	4.6	**4.82**

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Reviewed by*

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Approved by*

ANNEXURE-X

Surface Water Withdrawal Agreement

Email Id:-eeharabhangi@gamil.com

Office of the Superintending Engineer
Harabhangi Irrigation Division,
Adava,Gajapati.

Letter No_____/ Date._____/

To,

The Chief Engineer, Water Service,
O/o the Engineer-in-Chief, Water Resources,
Odisha, Bhubaneswar.

Sub:- Submission of renewal of Agreement as per Clause 18 of the Agreement of M/s Utakal Alumina International Ltd, Doraguda , Rayagada.

Sir,

In inviting a kind reference to the letter on the above cited subject, I am to submit herewith the Xerox copy of renewal of the agreement as per clause 18 of the Agreement drown with M/s Utakal Alumina International Ltd, Doraguda, Rayagada on dated 21.12.2021 for drawl of 9.00 cusecs of Surface Water frum San River upstream of Indravati River along with Xerox copy of Bank Guarantee and F.D.R. for favour of kind information and necessary action.

Encl:- 1. Xerox copy of Agreement:- 11 pages.
2. Xerox copy of B.G. bearing No. 0665721BG0000131 dated.18.11.2021:-1No.
3. Xerox copy of FDR bearing Account No.40586201112 dated. 18.11.2021:-1No.

Superintending Engineer
Harabhangi Irrigation Division, Adava
Gajapati

Memo No. Date .
Copy Submitted to the Engineer-In-Chief-cum-Spl. Secretary to government, Department of Water Resources, Odisha, Rajiv Bhawan, Bhubaneswar for favour of kind information and necessary action.
Encl :-As above.

Superintending Engineer
Harabhangi Irrigation Division, Adava
Gajapati

Memo No. Date .
Copy Submitted to the Engineer-In-Chief, Water Resources, Odisha, BBSR for favour of kind information and necessary action.
Encl :-As above.

Superintending Engineer
Harabhangi Irrigation Division, Adava
Gajapati

Memo No. Date .
Copy Submitted to the Chief Engineer and Basin Manager, R.B.V.N. Basin, Berhampur/ Additional Chief Engineer Vansadhara, Nagavali Basin, Paralakhemundi for favour of kind information and necessary action.
Encl :-As above.

Superintending Engineer
Harabhangi Irrigation Division, Adava
Gajapati

Memo No. 4243 Date . 22/12/21
Copy Forwarded to M/s Utakal Alumina International Ltd, Doraguda, Rayagada for information.

Encl :-As above.

Superintending Engineer
Harabhangi Irrigation Division, Adava
Gajapati

ଓଡ଼ିଶା ओडिशा ODISHA

11AA 304983

FORM 'K'
(See Rule 23-A (2) (e) & rule 26)

AGREEMENT FOR SUPPLY OF WATER FOR THE PURPOSE OF INDUSTRIAL COMMERCIAL USE.

INDUSTRIAL/COMMERCIAL USE

THIS AGREEMENT is made on the 31st day of December Two Thousand Twenty-One (2021) BETWEEN **Shri. Mazharullah Beig** S/o Late Mohammed Masihullah Beig by profession Chief Executive Officer (CEO), permanent resident of 570, Ambamata OTC Scheme, Opp: Central Academy Sr. School, Udaipur, Rajasthan, PIN- 31300, presently residing at "A" type building, Oshapada Residential Campus, M/s. Utkal Alumina International Ltd, Ps. Doraguda, Dist- Rayagada, Pin-765015, the authorized representative of **M/s Utkal Alumina International Limited**, having its plant at Doraguda (Hereinafter called the **'Applicant'**) of the First part.

AND

Sri S.K.Gupta, Son of Late Chandravanu Gupta, resident of village Polosara, P.S. Polosara, Dist. Ganjam, Odisha by profession **Superintending Engineer, Harabhangi Irrigation Division, Adava, Dist:-Gajapati,** Odisha (hereinafter referred to as the **'Sureties')** of the second part: **AND** the Governor of Odisha which expression unless repugnant to the context, shall include his successors and assigns (hereinafter called 'the Government') of the third part:

UTKAL ALUMINA INTERNATIONAL LTD. DORAGUDA

31/12/21
Superintending Engineer
Harabhangi Irrigation Division
Adava, Gajapati

WHEREAS the applicant has made an application for supply of water from Government water source/from San River upstream of Indravati River for the period as mentioned in the schedule here to annexed:

AND WHEREAS, the sureties have agreed to stand surety for payment of rates charged for such supply in the manner hereinafter appearing and the Government has agreed to supply water for the purpose specified in the schedule annexed hereto:

SCHEDULE

Purpose for which water will be supplied	Volume of water, if any	Period of supply	The place at which it will be supplied
(1)	(2)	(3)	(4)
Industrial purpose for Refinery & Mines of M/s Utkal Alumina International Ltd.	9.0 cusec or 777600 cft/day	Continuous as per availability from the source	To Plant site at Doraguda & Mines at Baphalimali

UTKAL ALUMINA INTERNATIONAL LTD. DORAGUDA

Superintending Engineer
Harabhangi Irrigation Division

ANNEXURE-XI

CONSENT TO OPERATE(CTO)

BY REGD. POST WITH AD

STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]
A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012
Phone-2561909, Fax: 2562822, 2560955 E-mail: paribesh1@ospcboard.org, Website: www.ospcboard.org

CONSENT ORDER

No. 4157 / IND-I-CON- 5450 Dt. 20.03.2023/

CONSENT ORDER NO. 2765

Sub: **Consent for discharge of sewage and trade effluent under section 25/26 of Water (PCP) Act, 1974 and for existing / new operation of the plant under section 21 of Air (PCP) Act, 1981.**

Ref: Your online application **No. 4445226 Dated 22.12.2022.**

Consent to operate is hereby granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and rules framed thereunder to

Name of the Industry: **BAPHLIMALI BAUXITE MINES OF M/S. UTKAL ALUMINA INTERNATIONAL LTD.**

Name of the Occupier & Designation: **SRI SURYAKANTA MISHRA, DIRECTOR**

Address: **VILL: PAIKKUPAKHAL, PO: MAIKANCH, DIST: RAYAGADA**

This consent order is valid for the period from **01.04.2023 to 31.03.2027.**

Details of Products Manufactured

Sl. No	Product	Quantity
01.	*Bauxite*	*7.63 MTPA*

This consent order is valid for the specified outlets, discharge quantity and quality, specified chimney/stack, emission quantity and quality of emissions as specified below. This consent is granted subject to the general and special conditions stipulated therein.

Ref: Envlab/24-25/TR-02449 **Date:17.05.2024**

ANNEXURE-XII

Treated Water (STP Outlet) Baphalimali Mines Period: October'23 - March'24 (Monthly Average Values)										
SL. No.	**Parameters**	**Units**	**Standards (Inland Surface Water) Part-A**	**Oct-23**	**Nov-23**	**Dec-23**	**Jan-24**	**Feb-24**	**Mar-24**	**Six Months Average**
1	pH value		5.5-9.0	7.25	7.45	7.12	7.45	7.25	6.85	**7.22**
2	Faecal Coliform	MPN/100ml	--	63	58	47	34	47	58	**51.17**
3	Oil & Grease	mg/I, Max	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**<5.0**
4	N-Total	mg/I, Max	--	5.8	4.6	3.5	3.9	4.1	4.3	**4.37**
5	COD	mg/I, Max	250	16	18	30.2	18.4	18.6	20.5	**20.28**
6	BOD, 3 Days at 27°C	mg/I, Max	30	5.33	7.5	6.2	5.4	5.3	6.6	**6.06**
7	Total Suspended Solid	mg/I, Max	100	45	45	40	36	42	40	**41.33**
8	Ammoniacal Nitrogen (as NH_3-N)	mg/I, Max	100	2.3	1.8	1.6	2.4	2.9	3.6	**2.43**

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Reviewed by*

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Approved by*

Ref: Envlab/24-25/TR-02450 **Date:17.05.2024**

ANNEXURE-XIII

Treated Water (ETP Outlet) Baphalimali Mines
Period: October'23 - March'24 (Monthly Average Values)

SL. No.	Parameters	Units	Standards (Inland Surface Water) Part-A	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Six Months Average
1	pH value		5.5-9.0	6.85	6.65	6.73	6.78	7.05	7.12	6.86
2	Faecal Coliform	MPN/100ml	--	32	17	15	14	15	14	17.83
3	Oil & Grease	mg/I, Max	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4	N-Total	mg/I, Max	--	2.9	2.2	2.8	2.9	3.1	3.4	2.88
5	COD	mg/I, Max	250	20.4	16.7	20.6	16.8	17.7	18.4	18.43
6	BOD, 3 Days at 27°C	mg/I, Max	30	5	4.8	6.5	7.6	5.8	6.2	5.98
7	Total Suspended Solid	mg/I, Max	100	25	21.2	20.6	19.6	18.4	19.4	20.70
8	Ammoniacal Nitrogen (as NH_3-N)	mg/I, Max	100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Reviewed by

Approved by

ANNEXURE-XIV

FINANCIAL FORECAST OF ACTIVITIES TO BE UNDERTAKEN AT THE PROJECT AREA

(To be implemented by the Project proponent)

Sl. No.	Item of work to be undertaken	Unit	Amount in Lacs	Remarks
1	**Soil & Moisture Conservation Measures**			
	a) Construction of loose boulder Check dam across the seasonal nala, drainage line and semi perennial nala occurring along the slopy area of the lease. 1 mtr span 60 nos @ Rs. 3600/- each = 2.16 lacs 2 mtr span 40 nos @ Rs. 7113/- each = 2.8452 lacs 3 mtr span 26 nos @ Rs.14 920/- each = 3.9 lacs	126 nos	8.9052	Annexure-B-IV, V & VI
	b) Contour Bonding		3.0000	
2	**Fire Protection Measures**			
	Provision for a fire watch tower on North-west side of the lease near the boundary on LS-		5.0000	
	Deployment of a fire fighting squad consisting of 5 members with provision of vehicle etc. as per approved cost norm of CWLW, Odisha for five fire months @ 3.50 lacs per annum. 3.50 lacs x 10 years =	1 squad	35.0000	Annexure-A-V
3	**Prevention of fall & entry to mining pits by wild animals.**			
	Construction of balance RR Stone masonary $\frac{1mtr+0.75mtr}{2}$ x 1mtr @ 4.00 lacs per km Where necessary along the boundary for 10km.	10km	40.0000	
4	**Development of Green Belt.**			
	Green Belt through ANR practices with Gap Plantation and through Block plantation (50+50) in safety zone of 7.5 mtr width over a length of 22km = 8.25ha. ANR Pratices with plantation @ 400 plants per ha. @ Rs. 38,806/- per ha =3,20,150/- 8.25ha Block Plantation on Bald hill cost norm with 1600 plants per ha inside the non-forest land @ 2,86,421/- = 23,62,973/-		26.8312	Annexure-A-I & II
5	Cost of one latest Model SUV (SCORPIO-S-10) vehicle to be handed over to the DFO, Rayagada	01 no	16.0000	
6	**Interventions for regulating impact of mining activities.**			
	Interventions for regulating light, water, air, noise pollution, dump stabilisation & waste management will be carried out at the project cost as per the approved environmental management plan.		Implement ation at the project cost according to the approved EMP.	
	Total		**134.7364**	

(Rupees one crore thirty four lakhs seventy three thousand six hundred forty) only

Approved

For Utkal Alumina International Ltd.

Authorised Signatory

Principal Chief Conservator of Forests
(Wildlife) & Chief Wildlife Warden
Odisha, Bhubaneswar

ANNEXURE-XV

OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS
(WILDLIFE) & CHIEF WILDLIFE WARDEN, ODISHA
BDA APARTMENT, 5TH FLOOR, PRAKRUTI BHAWAN, NILAKANTHA NAGAR, BBSR-12
Ph. No.0674-2564587, FAX No.0674-2565062
(Website:odishawildlife.org, E. mail: odishawildlife@gmail.com)

No. 5608 /1WL-SSP-80/2016
Dated, Bhubaneswar, the 27 Jun, 2017

To

The Asst. Vice President, Mines,
M/s Utkal Alumina International Ltd.,
J-6, Jayadev Vihar,
Bhubaneswar - 751013

Sub: ***Proposal for diversion of 233.343 ha. of DLC forest land including safety zone of 10.283 ha in village Paik-Kupakhal, Dhuturapas and Karanj-Kupakhal under Kasipur Tahsil of Rayagada District within total mining lease area of 1388.74 ha for bauxite mining in their Baphilimali Bauxite Mines in Kalahandi and Rayagada Districts of Odisha by M/s Utkal Alumina International Ltd. - Approval of Site Specific Wildlife Conservation Plan***

Sir,

It is to inform you that you have to implement a Site Specific Wildlife Conservation Plan for your Baphilimali Bauxite Mines in Kalahandi and Rayagada Districts to address the impact on wildlife within the surrounding area and the recommendation of State Govt. for implementation of such a plan while forwarding the above diversion proposal to Govt. of India, MoEF&CC vide their letter No.12569/F&E dt 11.07.2016.

2. The Site Specific Wildlife Conservation Plan in respect of the above project has been approved by the undersigned with financial forecast of **₹670.451 lakh** (Rupees six crore seventy lakh forty-five thousand one hundred) only for the following activities.

a.	For activities to be implemented by the user agency in project area	₹134.736 lakh
b.	For activities to be implemented by DFO, Rayagada Division in project impact area	₹226.622 lakh
c.	For activities to be implemented by DFO, Kalahandi South Division in project impact area	₹309.093 lakh
Grand Total:		**₹670.451 lakh**

ANNEXURE-XVI

Submission of Digital processing of Mine lease area Report

ADITYA BIRLA
UTKAL ALUMINA

Ref: UAIL-Mines/BBM/53/2023 **14th October 2023**

To

The Addl. Principal Chief Conservator of Forest
Ministry of Environment Forests and Climate Change
Govt. of India
Eastern Regional Office, A/3, Chandrasekharpur
Bhubaneswar- 751023

Subject: Digital processing of the entire lease area using remote sensing technique for monitoring land use pattern with respect to our Baphlimali Bauxite Mine of M/s Utkal Alumina International Limited, Rayagada, Odisha with production capacity of 8.5 MTPA.

Ref: Environment Clearance- No. J-11015/650/2007-IA. II(M) dated 19.02.2009

Dear Sir,

Please find enclosed herewith the Land use report & the land use map of lease area, as a part of the compliance to the Special Condition No. XXXII of EC granted with respect to Baphlimali Bauxite Mine of M/s Utkal Alumina International Ltd. for an annual production capacity of 8.5 MTPA.

This is for your kind information and perusal.

Thanking You
Yours faithfully,
For Utkal Alumina International Limited

MK Jha

Mukesh Kumar Jha

Head- Mines
Baphlimali Bauxite Mine

Encl: As Above
Copy to:

1. The Member secretary State Pollution Control Board, Odisha Parivesh Bhawan, A/118 Nilakanthanagar, unit- VIII Bhubaneswar- 751012
2. Regional Office, OSPCB, Rayagada.
3. Roez.bsr-mef@nic.in , parivesh1@ospcboard.org & rospcb.rayagada@ospcboard.org

Ref: Envlab/24-25/TR-02451 **Date:17.05.2024**

ANNEXURE-XVII

Noise Monitoring Results
Period: October'23 - March'24 (Monthly Average Values)
CORE ZONE NOISE

Sl. No	Noise Monitoring Locations	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		Six Months Average	
		Results in dB(A)Leq		Results in dB(A)Leq		Results in dB(A)Leq		Results in dB(A)Leq		Results in dB(A)Leq		Results in dB(A)Leq			
		Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day	Night
1	Drilling Operation	71.5	65.5	68.2	54.2	67.5	64.8	66.5	62.5	66.8	58.8	65.8	52.5	67.72	59.72
2	Loader Operation	73.5	67.9	71.5	52.1	72.3	66.6	68.2	63.7	71.4	58.7	71.8	56.4	71.45	60.9
3	Shovel Operation	69.3	62.1	69.8	50.8	68.8	65.1	65.5	62.7	67.9	64.3	68.8	60.4	68.35	60.9
4	Dumper Operation	69.6	64.8	65.7	53.4	72.5	68.8	63.4	60.5	72.4	64.9	71.4	63.5	69.17	62.65
5	Crusher Operation	72.2	66.3	66.8	55.7	71.9	67.6	65.4	60.8	71.8	65.7	72.3	66.4	70.07	63.75
6	Workshop Area	71.6	62.2	69.5	53.7	70.4	64.5	67.7	63.4	72.5	63.9	71.6	64.8	70.47	62.08
7	Middle of Quarry	70.3	62.1	70.2	54.7	68.8	62.3	68.4	64.2	69	64.7	70.5	63.3	69.53	61.88
Ambient Air Quality Standards in respect of Noise for Industrial Area														75	70

Note: No deviation from the AAQ standard in respect of Noise is observed and all the values are within the standard prescribed.

Reviewed by

Approved by

Ref: Envlab/24-25/TR-02452 **Date:17.05.2024**

ANNEXURE-XVII

Noise Monitoring Results
Period: October'23 - March'24 (Monthly Average Values)
BUFFER ZONE NOISE

Sl. No	Noise Monitoring Locations	Oct-23		Nov-23		Dec-23		Jan-24		Feb-24		Mar-24		Six Months Average	
		Results in dB(A)Leq		Results in dB(A)Leq		Results in dB(A)Leq		Results in dB(A)Leq		Results in dB(A)Leq		Results in dB(A)Leq			
		Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day	Night
1	Village Paikupakhal	53.1	43.5	51.2	39.1	50.3	40.1	51.8	41.6	51.6	41.6	52.6	45.6	51.77	41.92
2	Village Andirakanch	54.1	43.8	49.8	38.7	52.1	39.8	54.6	40.7	53.2	42.4	51.7	44.8	52.58	41.7
3	Village ADRI	52.2	43	48.7	36.8	48.8	36.6	55.4	39.8	51.4	39.6	52.9	42.6	51.57	39.73
4	Village Chandragiri	54.5	44.5	49.6	38.5	49.6	37.8	52.7	41.2	51.5	39.8	53.4	41.6	51.88	40.57
Ambient Air Quality Standards in respect of Noise for Residential Area														55	45

Note: No deviation from the AAQ standard in respect of Noise is observed and all the values are within the standard prescribed.

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Reviewed by*

VISIONTEK CONSULTANCY SERVICES PVT. LTD. — *Approved by*

ADITYA BIRLA

UTKAL ALUMINA

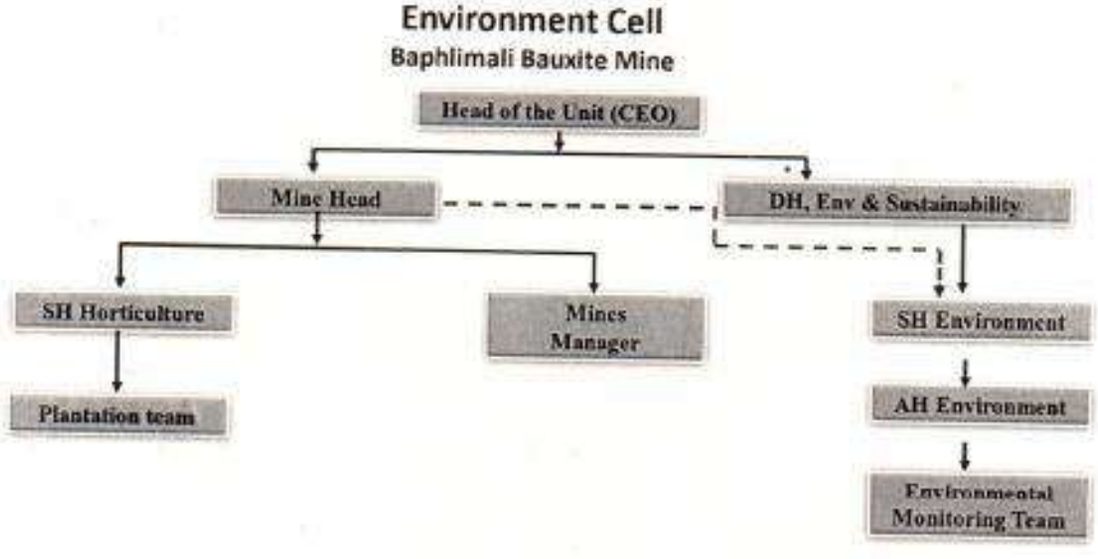
Annexure-XVIII

OFFICE ORDER

Date: 25th April 2024

According to the Environment clearance condition & to look after the compliances with respect to environment, an environmental cell at Baphlimali Bauxite Mine of M/s Utkal Alumina International Limited has been constituted.

The name & designations of the Environment Cell members with organization structure are enlisted below.



Thanking You
For Utkal Alumina International Limited

Vijay Chauhan
Head- Baphlimali Bauxite Mine

ANNEXURE-XIX

ENVIRONMENTAL EXPENDITURES

Recurring Annual Cost for Environmental Protection Measures for FY'2023-24		
Sl. No.	**Particulars of Environment Expenditure**	**Rs. In Lakhs**
1	Backfilling and Land Reclamation	360.69
2	Plantation & Horticulture	148.21
3	Air Pollution Control Measure	204.17
4	Water Pollution Control Measures	55.84
5	Waste Management	13.05
6	Environmental Monitoring	47.50
7	Environmental Awareness	9.13
8	Statutory Expenses	9.30
	Total	**847.89**

PHOTOS

PHOTO 1: Showing Check dam

PHOTO 2: Showing Retaining wall & garland Drain along the Dump Slope

PHOTO 3: Showing Settling Ponds

Settling Pond-1 Near Mines Entrance

Settling Pond-2 Near Mines Entrance

Settling Pit Near Crusher House

PHOTO 4: Showing Settling Pond Desilting

PHOTO 5: Showing Plantation in Backfilled Area

PHOTO 6: Showing Plantation in Mine Lease

PHOTO 7: Showing Nursery inside Mine Lease

PHOTO 8: Showing 28KL Mobile sprinkler

PHOTO 9: Showing Fixed Sprinklers

PHOTO 10: Showing Piezometers inside lease

PHOTO 11: Surface Rainwater Harvesting Structure.

PHOTO 12: Showing drilling machine with dust Extractor.

PHOTO 13: Showing Fixed sprinklers in stockpile area.

PHOTO 14: Showing Covered Long-Distance Conveyor (LDC)

PHOTO 15: Showing Dry fog system in Fixed Crushing plant.

PHOTO 16: Showing 75 KLD Sewage Treatment Plant (STP)

PHOTO 17: Showing 15 KLD Effluent Treatment Plant (ETP)