Environment Management Plan
For
Tirtol Cluster Brick Earth Quarry
Over 3.85 Areas or 1.558 Ha.
M/s Rupa Brick Kiln over 1.29 acres or 0.522 Ha.
M/s Sarada K B Brick over 2.56 acres or 1.036 Ha.

In Village Tirtol
Tehasil: Tirtol ,
District: Jagatsinghpur, Odisha
B2 Category Project

Quarry Name	Village	Tehasil	District	Khata No.	Plot No.	Kissam	Area in Acres
Tirtol Earth Bricks Quarry (Rupa Brick Kiln)	Tirtol	Tirtol	Jagatsinmghpur	360	530	Biali Dophasali	0.81
				1189	531	Biali Do Phasali	0.48
Tirtol Earth Bricks Quarry (Sarada KB Brick)	Tirtol	Tirtol	Jagatsinghpur	580	471	Patita	0.39
					472	Patita	1.06
					476	Patita	0.60
					477	Patita	0.51
						Total	Ac.3.85 or 1.558 Ha.

On behalf of
Sri Anil Mohapatra
M/s Rupa Brick Kiln, At/PO: Tirtol, Tehsil: Tirtol, Jagatsinghpur
and
Sri Patitapabana Hota
M/s Sarada KB Bricks, At/PO: Tirtol, Tehsil: Tirtol , Jagatsinghpur

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1.0 INTRODUCTION

As per EIA Notification 2006 and subsequent amendment Environment clearance is mandatory for mining of minerals. As per MoEF circular 12.12.2018 the minor mineral project below 5 Ha has been considered as B2 category and will be appraised based on Form 1, Pre feasibility report, approved mining plan and Environment Management Plan. Further if any minor mineral source located with 500 meter cluster approach to be made. In view of this this plan is prepared in cluster approach.

Environment Management Plan consists of a set of impact mitigation, management, monitoring, waste minimization and institutional measures to be taken during implementation and operation of the project to eliminate the adverse environmental impacts or to reduce them to the acceptable level. The EMP is required to ensure sustainable development as it tries to ensure judicious utilization of non-renewable resources and keep the pollution level within permissible assimilative capacity of the area.

An Environmental Management Plan is a site specific plan developed to ensure that the project is implemented in an environmentally sustainable manner. An effective EMP ensures the application of best practices of environment management to a project.

The purpose of an EMP is to:

(i) Assists proponent in the preparation of an effective and user friendly activity chart for environment management.

(ii) The commitments made as part of the project's life are implemented throughout the project period.

(iii) Ensure that environment management details is captured and documented at all stages of a project.

The design of EMP for operational phase should aim to acheive the following objectives

(i) To ensure adoption of best affordable technological environmental control measures and implementing them satisfactorily.

(ii) Effectiveness of mitigating measures in mitigation of impacts.

(iii) Description of monitoring program of the surrounding environment.

(iv) Institutional arrangements to monitor effectively and take suitable corrective steps for implementation of proper EMP.

Sri Anil Mohapatra, the lessees of TTirtol Bricks Quarry is a Proprietorship (private individual) firm having its office at – Tirtol, PS - Tirtol, in the district of Jagatsinghpur, Odisha. The clay spreads over the total area of 0.522 ha at Khata No. 360 & 1189 and bearing plot No – 530, 531 at Village – Tirtol under Tahasil – Tirtol Dist- Jagatsinghpur, State- Odisha. The mining plan of the project has been approved by Dy. Director of Geology, Office of the Director of Geology, Bhubaneswar on dated 05.02.2021.

Sri Patitapabana Hota, the lessees of TTirtol Bricks Quarry is a Proprietorship (private individual) firm having its office at – Tirtol, PS - Tirtol, in the district of Jagatsinghpur, Odisha. The clay spreads over the total area of 1.036 ha at Khata No. 580 and bearing plot No – 471, 472, 476 & 477 at Village – Tirtol under Tahasil – Tirtol Dist- Jagatsinghpur, State- Odisha. The mining plan of the project has been approved by Dy. Director of Geology, Office of the Director of Geology, Bhubaneswar on dated 05.02.2021.

1.1 Brief Profile of The Project

Sl No.	Parameters	Description
1	Name of the Project	Tirtol Cluster Brick earth Quarry
2	Location of the Project	Village – Tirtol under Tahasil – Tirtol Dist- Jagatsinghpur, State- Odisha.
3	Nature of the Project	Brick earth Mining
4	Project Proponent	Sri Anil Mohapatra and Sri Patitapabana Hota
6	Total Area	1.558 ha
8	Lease Area Coordinates	Latitude: 20°18'26.43" to 20°18''35.05" N and longitudes from 86°21'06.60" to 86°21'13.59" E Topo – F45U7
9	Production Capacity of the Project	5456 cum/Annum (1162 cum and 4294 cum)
10	Category of the Project	"B2"
17	Water Requirement	5 KLD

18	Source of Water	Ground water for drinking purpose and for other purpose, water will be sourced as per availability.
25	Project Cost	20 lakhs

1.2 Location & Physiology

Geographically, the district is not a compact unit and consists of widely dissimilar tracts of expansive and fairly open, dotted with tree, clad isolated peaks, vast inaccessible forests, extensive river valleys and mountainous terrain. It has an undulating tableland of different elevations broken up by rugged hill ranges and cut up by torrential hill streams and the rivers Mahandi. The general slope of the District is from west to east. Because of this undulating, hilly and sloping nature of landscape, the area is subjected to rapid runoff. There- is neither perennial nor seasonal nala is flowing within the mining lease area. Surface water in the region is drained by dry nala. Mahandi Nadi is in north of quarry area at a distance of 0.8 Km.

1.3 Drainage

The required quantity of Brick Earth can be achieved from 2 meters depth only.

More over the mining activity is for temporary period only and no nala will be diverted.

1.4 Regional Geology

Mineral Reserve

Based on the surface exposures, the updated geological reserve as well as mineable reserve has been estimated in the entire lease area. The geological reserve of brick clay is 58,860 cu.m and mineable reserve is 40,920 cu.m.. During the plan period from 2020-21 to 2024-25, a total of 27,280 cu.m. brick clay will be excavated.

Method of Quarrying

The mining is confined to extraction of brick clay from the proposed as mentioned in the mining plan. The proposed burrowing/excavation area is less than 5 hectare and shall be restricted to a maximum depth of 2.0m below general ground level as well as 2m above the ground water table at the site. The operation will be Manual which the minor mineral will be collected in its existing from. Hoes/ pick axes, shovels and wheel barrows, sieve etc. will be used. Mining will be carried out only during the day time. The excavated soil shall be used for brick making by clay preparation, shaping or hand molding, sun drying and then put into coal fired kiln connected with fixed chimney for firing operation. The excavated brick clay will be loaded into tippers/trucks by loaders and dispatched to end users the final products will be sold in the local market. Extraction of brick clay is seasonal work in nature and project schedule shall only be December to April every year.

2.0 ANTICIPATED ENVIRONMENT IMPACTS AND ITS MITIGATIVE MEASURES

Environmental Management Plan (EMP) is prepared for impact mitigation, management, monitoring, waste minimization and institutional measures to be taken during implementation and operation of the project to eliminate the adverse environmental impacts or to reduce them to the acceptable level. The EMP is required to ensure sustainable development as it tries to ensure judicious utilization of non renewable resources and keep the pollution level within permissible assimilative capacity of the area. The assimilative capacity of the study area is the maximum amount of the pollution load that can be discharged in the environment without affecting the designated use and is governed by dilution, dispersion and removal due to natural physiochemical and biological process.

Mining of bricks earth has a direct impact on the land topography, ambient air quality, drainage and water, soil and land use pattern. The impact of mining on the surrounding environment include increase dust emission during excavation, sizing loading, unloading and transportation activity. The ground water regime and surface water quality may have some impact due to the mining process. To mitigate such adverse impacts, appropriate remedial measures have been proposed. An EMP is an implementation plan to mitigate and offset the adverse environmental impacts of the project and to protect and where possible, enhance the environment. EMP should be viewed as a legal commitment on the part of the proponent to minimize environmental impacts. So Environmental Management Plan (EMP), which will be an integral part of the project for minimizing the adverse impacts and to ensure the sustainable development of the area.

There are various sources of pollution during the mining and allied activities. These includes drilling, block cutting, sizing and dressing, dumping, loading and unloading, transportation etc which are having direct impact on the environment. The EMP proposed for the mines has been elaborated in chapter. .

2.1 Objectives

The EMP has been worked out with the following objectives:

- Reclamation of the mined out area where ever and whenever possible.
- Restoration of landscape consistent with the economy of mining operations, keeping in view the drainage pattern, geological stability, vegetation etc.
- Minimization, mitigation and where possible elimination of degradation in land, quality of air and water.
- Making least disturbance to the water regime and water quality.
- Least disruption to the existing basic ecological status in the mining area during mining.
- Improvement of the overall flora scenario of the area.

2.2 Planning To Maintain Better Environment In The Area

The following broad categories of environmental factors have been taken into consideration in order to prepare sustainable environmental management plan. These impacts include:

- - Degradation of land/soil
- - Disposal & management of Solid waste
- - Degradation of natural vegetation cover/forest
- - Water pollution
- - Air pollution
- - Noise pollution
- - Forest & Vegetation cover
- - Socio-economic measures
- -Occupational safety and health

2.3. Impact on Ambient Air Quality and Mitigation Measures

Mitigative measures suggested for air emission control will be based on the baseline ambient air quality situation. From the point of view of maintenance of an acceptable ambient air quality in the lease area, it is desirable that the air quality needs to be monitored

on a regular basis to check it vis-à-vis the NAAQS prescribed by MoEF&CC and in cases of non-compliance, appropriate mitigative measures will be adopted at the time of operation. In order to minimize impacts of mining on air and to maintain it within the prescribed limits of CPCB/ SPCB, an Environmental Management Plan (EMP) should be prepared. This will help in resolving all environmental and ecological issues likely to be caused due to mining in the area.

During the course of mining no toxic substances are released into the atmosphere posing potential threat to health of human beings. In the mining activities, the source of gaseous emissions is engines of vehicles, Operation of mining machinery/ loading operations, drilling and blasting. The reasons may be quality of fuel, improper operation of the engine, etc; proper maintenance of engines will improve combustion process and brings reduction in pollution.

2.4 Control of Gaseous Pollution

In mining activities, the main source of gaseous emissions is from blasting and the machineries and vehicles. Blasting of explosive results in increase of nitrogen oxides, which will be dispersed by the wind. Controlled blasting and optimization of use of explosive energy will help in reducing the above emissions. The emissions from the diesel engines of the machinery / vehicles can be controlled by proper maintenance and monitoring of machines.

2.5 Control of Dust Pollution

The main pollutant in air is PM10, which is generated due to various mining activities. However, to reduce the impact of dust pollution the following steps should be taken during various mining activities.

a) During Drilling Operations

(i) No drilling proposed.

b) During Loading Operation

(i) Water sprinkling will be done to reduce dust emission before &during loading operations.

(ii) Water will be sprinkled at quarry faces & along loading sites to reduce dust emission.

(iii) Skilled operators will be engaged to operate different equipments.

(iii) Avoid overloading of trucks and consequent spillage on the roads.

c) During Transport Operation

(i) All the haulage roads including the main ramp be kept wide, levelled, compacted and properly maintained and watered regularly during the shift operation to prevent generation of dust due to movement of dumpers, and other vehicles.

(ii) Mineral carrying trucks should be effectively covered by Tarpaulin to avoid escape of fines to atmosphere.

(iii) Regular Compaction and grading of haul roads to clear accumulation of loose material.

(iv) Air quality should be regularly monitored both in the core zone and the buffer zone.

d) Monitoring Of Air Pollution

Periodic air quality survey will be carried out to monitor the changes consequent upon mining activities as per the norms of State Pollution Control Board.

2.6 Impact On Noise Environment And Mitigation Measures

The ambient noise level monitoring carried out in and around the mine lease area /cluster to assess that ambient noise levels are well within the stipulated limits of MoEF & CC.

Noise pollution due to transportation will cause some problem to the inhabitants of this area if there is human settlement in close proximity to the link roads in lease area. Effective steps should be taken to keep the noise level well below the DGMS prescribed limit of 85 dBA.

Noise Abatement and Control

(i) All the machineries including transport vehicles will be properly maintained to minimize generation of noise.

(ii) Plantation in mining area will also reduce propagation of noise outside the core zone.

(iii) Periodical monitoring of noise will be done to adopt corrective actions wherever needed.

(iv) Plantation will be taken up along the approach roads. The plantation minimizes propagation of noise and also arrests dust.

(v) Noise level shall be maintained within prescribed limits in the working zone (for 8 hr. Exposure).

2.7 Impacts On Land Use And Mitigation Measures

Mining can lead to soil erosion/ cutting and thereby degradation of land, causing loss of properties and degradation of surrounding landscape. Thus, the environmental friendly mining the proper control/ abatement measures should be followed.

Mineral should be mined out in from the lease area and sufficient safety barrier should be taken during mining.

The mining activity involves in the excavation of mineral ore those results in the creation of depressions in the area. But the excavated pits created will be converted to water recharge pits during the conceptual period. Hence there would be temporary change in the topography and land use pattern which are reclaimed after mining.

2.8 Impact on Water Environment And Its Mitigation Measures

There will be no waste water generation from the mining operations during removal/ collection of mined material. Wash rooms will be made available near working blocks. Waste water generated will be sanitary wastewater, which will be treated in septic tank and soak pits for the disposal of domestic/ washrooms effluents followed by sub surface dispersion.

Surface Water Management

No surface water source exists in the lease area, so impact of mining on same will not be envisaged. Proper mitigative measures will be taken up to control the pollutants within prescribed standards and limiting the emissions to site only.

Garland drains will be provided to prevent the entry of rainwater into the mining pit.

The proposed dumps will be well protected by retaining walls, garland drains and settling tank to prevent wash offs of the dump.

The settling tank will be cleaned regularly to clear the deposited sediments.

Ground Water management

Mining operation and allied activities will not intersect the ground water table of the area and impact will be positive.

Natural pits will be used for rain water conservation and harvesting. Rain water harvesting practices shall be done which will lead to ground water recharge.

Water Conservation

The project do not consume any water process except for drinking, dust suppression and plantation. Plantation is proposed, which will increase the water holding capacity and help in recharging of ground water. Artificial rain water is proposed for the present project.

2.9 Impacts On Soil Environment And Mitigation Measures

There is no generation of top- soil in the lease area during the scheme period. So the management of top soil does not arise.

2.10. Green Belt Development

The green belt in the lease area will be developed taking into consideration the availability of area as the efficiency of green belt in pollution control mainly depends on tree species, its width, distance from pollution sources, side of the habitat from working place and tree height. The proposed green belt will be designed to control PM10, gaseous pollutants, noise, surface run off and soil erosion etc. While considering the above aspects, due care should be taken for selecting the suitable characteristic plant species such as fast growing, locally suitable plant species, resistant to specific pollutant and those which would maintain the ecological balance, soil and hydrological conditions. 7.5 meter width all along the lease boundaries will be utilized for plantation. This area is calculated to be 0.215 ha.. It is Proposed to be plant 350 saplings during the plan period. Local species like Mango, Neem, Mahaneem etc. is proposed to be planted at 5m spacing.

2.11Impacts On Socio-Economic Environment And Mitigation Measures

In general, socio- economic environment will have positive impact due to the mining project in the area.The deployed labourers will be from nearby villages only as these people are mainly dependent upon such mining activities. The proposed mining activity will generate direct employment and indirect employments for the people living in the surrounding area.

2.12 Impacts On Occupational Health And Safety

Occupational health and safety are important to the people and domestic animals concerned. Periodic assessment of it will be useful. The villages and their inhabitants & domestic animals will not be disturbed from their settlements due to the mining operations. There is no inhabitation within the lease area. Therefore neither villages nor any part of village or any hamlet will be disturbed during the plan period of the mines. As the mining operations will not disturb or relocate any village or settlement, no adverse impact is anticipated on any human settlement. The mining operation does not disturb/relocate any human population or domestic animals.

2.13 Effect on Flora & Fauna.

The direct impacts of the mining activity disturbances to land surfaces are usually significant, with the likelihood of destruction of biodiversity within natural ecosystems through removal of natural soils, plants and the floral dependent animals. No wildlife population is present in the study area except the common type of birds and domestic animals. As the mining is restricted to very small area there is no likelihood of any deforestation being caused. No significant long- term residual impacts on fauna due to mining activity of the proposed mine is expected.

2.14 Visual Impact

After reclamation aesthetic value will enhance.

2.15 Details of budgetary arrangement for environment management:

To evaluate the effectiveness of Environmental Management Programme, regular monitoring of the important environment protection activities will be taken up. A budget of Rs 1,

00,000/- for the each quarry shall be assigned for the purpose. The details breakup cost for implementing the environmental protection measures is given below;

Budgetary measures for EMP for Each Quarry

Sl. No.	Activity	Total Capital Cost in Rs.
1.	Environmental Monitoring & Pollution Control Measures	50,000
2.	Maintenance of Vehicles	10, 000
3.	Plantation & Maintenance	20, 000
4.	Water Sprinkling	10, 000
5.	Others	10, 000
Total		**Rs 1, 00,000**

2.16 Summary

As per above discussion there is no major impact on the environment due to mining except fugitive emission in the form of dust generated during handling and loading of mineral. The adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Plantation development will be carried out in the mine premises, along the approach roads, around Govt. buildings, school. It will prove an effective pollution mitigate technique and help avoid soil erosion during monsoon season. Employment opportunities will be provided to the locals as extraction of minerals from the mine site is an important prevailing occupation for them for their livelihood. A budget of Rs.1.0 lakhs for EMP is proposed for the lease area.

3.0 ENVIRONMENTAL MONITORING PLAN

3.1 Introduction

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. The knowledge of baseline conditions comes through monitoring of environmental parameters; the monitoring program will serve as an indicator for environmental conditions due to operation of the project. Monitoring is an important tool for the management, environmentalist and policy maker to make changes in pollution control equipment, environmental policy to save environment. It is decision making tool for the state of environment carried out through periodic monitoring. Further, impact assessment study is carried over short period of time and the data cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring program of the environmental parameters is essential to take into account the changes in the environmental quality over the period of time to comply environmental conditions necessary to save environment.

3.2 Monitoring Objective

Monitoring will conform to commitments and compliances. This may take the form of direct measurement and recording of quantitative information, such as amount and concentrations of discharges. The objectives of the monitoring are:-

- Very effectiveness of planning decisions;
- Measure effectiveness of operational procedures;
- Conform statutory and corporate compliance; and identify unexpected changes.

3.3. Monitoring of Environmental Parameters

Monitoring of environmental parameters will be done through outsourcing basis.Monitoring of important environmental parameters which are of immense importance to assess the status of environment during mine operation and mitigation steps will be taken to safeguard the environment. The routine monitoring program will be implemented as per CPCB & MoEF & CC guidelines.

3.4 Environmental Management

In order to maintain the environmental quality within the stipulated standard ,regular monitoring of various environmental parameters will be necessary. Environmental Management under Senior Officer (not below the rank of General Manager/Supervisor) will be constituted for regular observation, monitoring and compliances of environmental parameters.

3.5 Environmental Monitoring Programme

Environmental monitoring schedules will be prepared covering various phases ofproject advancement, such as Mining and regular operational phase. Environmental Monitoring Program will be conducted on outsource basis once in season except monsoon. The Environmental Monitoring of environmental parameters at site and data thus generated will be regularly furnished to the State regulatory agencies/ State Pollution Control Board at the frequency of six month.

3.6 Environmental Parameters

Environmental monitoring schedules will be prepared covering various phases of project advancement, such as Mining and regular operational phase. Environmental Monitoring Program will be conducted once in season except monsoon.

Environmental Parameter and Frequency

S No	Potential Impact	Parameters for Monitoring	Frequency of Monitoring	Location
1	**Air Emission**	**PM10, PM2.5, So2, NOx, CO**	As per CPCB / MoEF & CC requirement i.e. 24 hourly monitoring for one month in each season except monsoon season.	Two locations in the core mining area and four in buffer area.
2	**Noise**	Spot Noise level recording	Periodic / As per CPCB norms i.e. Once in season	Two locations in the core mining area and four in

		Leq (day), Leq (night), Leq (dn)	(1-hourly)	buffer area.
3	**Water Quality**	As per drinking water standards	Once in a season except monsoon.	Two locations in the core mining area and four in buffer area.
4	**Soil Quality**	Analyzed as CPCB method	Once in a season except monsoon.	Two locations in core and two in the buffer area.
5	**Health**	Total health parameters	Initial Medical Examination (IME) and Periodic Medical Examination – Once in a five year as per Mines Rules, 1955.	All employees

Ambient air quality monitoring (Workspace Monitoring)

The concentration of air born pollutants in the workspace / work zone environment will be monitored periodically. If concentrations higher than threshold limit values will be observed, the source of fugitive emissions will be identified and necessary measures will be taken as detailed in EMP.

The ground level concentrations of PM10, PM 2.5, SO2, NOx and CO in the ambient air will be monitored at regular intervals except monsoon. Monitoring locations will be decided on the meteorology of the area, topography potential of receptors in the core and buffer area locations. Any abnormal rise will be investigated to identify the causes. Greenbelt will be developed for minimizing dust propagation.

Monitoring of water quality

Monitoring of Ground Water: The monitoring of groundwater is the most important tool to find out the depletion in level of water table. Water table will be monitored at regular interval to check the behavior pattern of the water table. It is suggested to collect water samples and analyze. Records of analysis will be maintained.

Monitoring of Surface Water:

Samples will be collected from well-mixed section of the river (main stream) and will be analyzed. There are two locations to collect the samples from the surface water. The objective is to collect the water samples in up-stream and down-stream of the river and analyzed for physical, chemical and biological parameters to study the seasonal variation of water quality except monsoon.

Monitoring noise levels

Potential receptors of Noise levels in the core and buffer areas are identified based on the present noise levels and proposed increment. Noise levels in the work zone environment shall be monitored. The frequency will be once in three months (one season) in the work zone. Noise monitoring will be conducted in three seasons except monsoon with monitoring frequency once in a season carried on hourly basis for 24-h representing site, human settlements, close to high ways, commercial and residential areas and for the industrial area (if any). Similarly, ambient noise levels near habitations will also be monitored once in three months. Audiometric tests will be conducted periodically for the employees working close to the high noise sources.

Reporting schedules of the reporting data

It is proposed that voluntary reporting of environmental performance with reference to the EMP will be undertaken.

The Environmental Monitoring Cell will co-ordinate all monitoring programs at site and data thus generated will be regularly furnished to the State regulatory agencies/ State Pollution Control Board at the frequency of six month. The Environmental audit reports will be prepared for the entire year of operations and will be regularly submitted to regulatory authorities.

Post – Environmental Clearance Monitoring

The project proponent will submit half yearly compliance report in respect of stipulated prior Environmental Clearance terms and conditions of each calendar year. The latest compliance report will be displayed on the website of the concerned regulatory authority. Environment statement will be prepared based on one year data comprises of six monthly reports. Further environmental conditions will be complied and reports will be submitted at the State Pollution Control Board and Regional Office of MoEF&CC.

Conclusion

Post Project Environmental monitoring is an essential tool in Environmental Management Program to check Environmental Quality status through monitoring of Environmental parameters as per frequency and method recommended by CPCB. It helps environmental planners, policy makers, managements, scientists and technologists to make amendment at

the appropriate placers for clean technology and green environment. Mitigation measures are applied at the various stages; fuel, technology and house-keeping and waste management. Mitigation may be in form of technology up-gradation, design modification or modification in environmental policy. Environment works on cause -and -effect relationship. Clean technology will provide green environment. Clean mining activity will be required for sustainable growth. The Environmental Monitoring Cell will co-ordinate all monitoring program, environmental awareness program, training and its importance in proposed project at site. Data generated will be furnished as per statutory requirements in CTE/CTO and the environmental conditions. The frequency of monitoring will be one month in each season except monsoon. Half yearly report will be submitted on June and January of each year to the Regional Office of MoEF & CC,Bhubaneswar. The Environmental audit reports will be prepared for the entire year of operations and will be regularly submitted to regulatory authorities. Objective of entire process will be to improve environment and reduce the impact of project / project activities on environment.

(Patitapabana Hota)