ENVIRONMENT MANAGEMENT PLAN

1.0 SOIL/CLAY EXCAVATION FOR BRICK KILN:

1.1 INTRODUCTION:

Brick is the oldest manufactured building material, and much of its history is lost in antiquity. The oldest burnt or fired bricks have been found on the sites of the ancient cities of Babylonia, some of which are estimated to be about 6000 years old. The growth in India's economy and population coupled with urbanization has resulted in an increasing demand for residential, commercial industrial, and public building as well as other physical infrastructure .Building construction in India is estimated to growth at a rate of 6.6% per year between 2005-2030. Solid fired clay bricks are among the most widely used building material in the country.

India is the second largest producer of clay fired bricks in the world after China, accounting for more than 10 percent of global production. India is estimated to have more than 100,000 brick kilns, producing about 150-200 billion bricks annually, employing about 10 million workers and consuming about 25 million tons of coal annually. India's brick sector is characterized by traditional firing technologies; environmental pollution; reliance on manual labour and low mechanization rate; dominance of small-scale brick kilns with limited financial, technical and managerial capacity.

In brick-making terms, clay covers a range of naturally occurring raw materials which are used to make a product.

Clay

The key, in geological terms, is the mineral content of the raw material. This is common to all clay types. Clay minerals are a product of rock weathering. Mechanical and chemical weathering causes disintegration and decomposition of primary igneous rocks. The clay mineral is transported away by the action of water, wind, ice etc., and re-deposited elsewhere. In the process it picks up a number of impurities, Quartz, mica, Calcium Carbonate (lime), Iron Oxide etc. The subsequent deposit becomes a sedimentary rock. Due to variances in the age of the deposit, the conditions of its deposition and the impurities involved there will be variations between different clay types and even on occasions within the same deposit. These variations may affect the brick making process and the properties of the finished product. Pure clay mineral is formed from the erosion and weathering of primary igneous rocks.

In brick-making terms, clay covers a range of naturally occurring raw materials which are used to make a product. The clays vary considerably in physical properties, colour & hardness etc, and mineralogical content. They do, however, have certain properties in common. They have the ability to be crushed and mixed with water to form a plastic material which can be molded into various shapes. This can then be fired to a high temperature during which process it attains a hard, weather resistant characteristic.

1.2 Clay Winning

The choice of method of clay winning will depend on the depth, thickness, hardness and physical geology of the clay beds. The usual method for winning clay (extracting from the quarry) is once or twice a year, to stockpile large amounts. The advantages of bulk winning are that it can take place during good weather, a large reserve close to the factory means that breakdown of quarry plant is not critical to the production schedule. The layering of the stockpile from large reserves helps to eliminate localized variations in the clay strata. Particular attention must be given to environmental factors both during the clay winning and restoring the landscape after excavations are complete.

2.0 IMPACTS OF SOIL/CLAY EXCAVATION & MITIGATION

The severity of the impact of excavation activities on environment may be considered to be next only to that on agriculture. No doubt, minerals are indispensable for development and sustenance of the quality of life. At the same time, it is essential that the clay excavation activities need to be continuously monitored and kept under control for the overall management of the environment.

Most of the developmental activities generate environmental problems, but people do not give due regard and attention to those problems. The question to be addressed with regard to environmental issues of clay mining pertains to conservation of minerals on the one hand, and the environmental problems on the other. Depending on the location and the type of excavation, the magnitude and the importance of environmental impact would vary. The impacts can be broadly classified into four categories:

(1) Impact on Land;

(2) Impact on Water;

(3) Impact on air Environment;

(4) Impact on Noise Environment;

(5) Impact on Biological Environment; and

(6) Impact on socio-economic conditions of the people in the region.

The first five impacts are often categorized collectively as physical impacts. All these impacts need to be addressed properly to minimize the associated impacts.

Depending on the nature of activities and environmental screening, the impacts have been identified for their importance. Mitigating & monitoring requirement are focused in the Environmental Management plan for countering or minimizing the potential environmental impacts associated with clay mining. Impact on various environmental parameters and likely mitigation measures to be adopted are described below.

2.1 AIR ENVIRONMENT

2.1.1 Anticipated impacts

Although clay excavation does not cause any direct change in air environment, transportation and processing of raw clays into end products could cause atmospheric pollution. In clay/soil excavation operations, the source of air pollution may cause deterioration of air quality due to the fugitive dust emission during scooping, loading-unloading operations, grinding of soil and transportation. Loading and unloading of soil would be associated with the fugitive emission in the active area whereas fugitive emission during transportation would affect the areas/villages situated adjacent to road side. Another source of air pollution would be emission from the trucks/tractor/other vehicles to be used for transportation of soil/clay.

2.1.2 Mitigation Measures:

2.1.2.1 For Fugitive dust Emission:

- All trucks tractors will be covered by canvas sheet to prevent dust emission.
- Water will be sprayed after loading activity (if soil would be in dry condition)
- The dust suppression measures like water spraying will be done on the haul roads and working areas.
- Overloading of trucks and trolleys will be prevented.

2.1.2.2 For Vehicular Emission:

- Vehicular emission can pose serious health hazard. During the clay/soil mining extraction, tractor/truck would be used for transportation. Tractor/truck comprises of diesel engine produce particles are dangerously fine of PM10 & PM2.5. It is well known fact that combustion of diesel generates small particulate matter, nitrogen oxides and sulphur dioxide.
- Ultra low sulphur diesel would be used in vehicle. CPCB prescribed emission Standards for the vehicle would be followed.

2.2 WATER ENVIRONMENT

2.2.1 Anticipated impacts

Brick making required good amount of water. In most of the cases source of water is ground water. Hence withdrawal of ground water may results in lowering of ground water table below normal levels.

Further, clay mining causes changes in the quality of surface water sources of the area. The following are some of the changes which would be noticed in surface and groundwater sources.

As far as impact on surface water is concerned, during mining, transportation and processing, there are chances of contamination of surface water resources (pond, well etc) with dust or by other means. The laborers working in clay mining and those molding clay into bricks come from neighbouring States/districts and colonies in the surrounding areas with inadequate facilities for waste disposal. This, in due course, leads to disposal of various things into surface water bodies which in due course of time results into surface water contamination through misuse/mismanagement and decomposition of the trash.

Further, air pollutants would also be generated during firing and baking of clay articles, settling of the same on surface water bodies also contaminate the surface water source of the area.

2.2.2 Mitigation measures

- Rain Water Harvesting structure (pits and recharge pond) would be constructed in the Surrounding areas, from where ground water would be withdrawn.
- Laborers would not be allowed to through trashes in water bodies.
- Utmost care will be taken to minimize or control oil spills or leakage from vehicles used for soil transportation.
- The washing of tractor/trucks on the land will be avoided.
- Water Quality Monitoring for the, ground water shall be carried out seasonally to ensure that the water quality is not affected by the project activities.
- The contractor will adhere all guidelines and rules for proper and scientific method of mining during the period of extracting the soil. Thus, the project activities shall not have any adverse affect on the physical components of the environment and therefore may not have less effect on the recharge of ground waters or affect the water quality.

2.3 LAND ENVIRONMENT

Clay excavation is the process of scooping of soil that actively supports the agricultural activities of an area. The removal of naturally formed soil for clay articles is really a loss forever of this fertile natural medium. The entire process is a kind of man made erosion of materials otherwise segregated by the Mother Earth through its geologic processes. The top soil is usually fertile in nature. The surface (top) layer is several folds richer in N, P, K and other micro-nutrient elements than subsurface layers. But according to some farmers of the region, the top soils of certain areas of the agricultural land are unsuitable for agricultural activity. But the subsurface layers seem to be more fertile and good for cultivation. In such cases, removal of a layer or two from the surface would be a beneficial act.

2.3.1 Anticipated impacts

The major impacts of clay excavation on land are changes in landscape, land stability and soil loss. Due to continued and unscientific clay excavation, pits of different dimensions would be formed in the affected areas. Some of the pits may later be covered with water to form artificial ponds. The artificial ponds created in random locations due to indiscriminate clay excavation may lead to land stability problems in the adjoining areas. The problem of subsidence will be aggravated in areas where the subsurface geology is with sand and clay alternations. Land

failure incidences/sliding of the walls left behind after mining was completed into the neighboring lands are also recorded in some cases. Other impacts on land include:

- Disposal of packing material, carried by the workers. This packing material would include used sachet/gutka/pan masala pouches. Polythene bag used by the workers to bring their foods etc.

2.3.2 Mitigation measures

- Top soil (0-6 inches) will be scooped first and stored for further reclamation of mined area. No foreign material like polythene bag, jute bag and useless articles should be allowed to remain/spill on the land, or no pits/pockets will be allowed to be filled with such material.
- Excavation will not exceed beyond the agreed extraction depth.

2.4 NOISE ENVIRONMENT

2.4.1 Anticipated impacts

As far as noise pollution is concerned, clay mining does not contribute much to noise pollution, except the noise generated from the vehicles that transport raw clays scooped from lands and the products from the clay-based industrial units. Noise level in the working environment is compared with the standards prescribed by Central Pollution Control Board which has been adopted and enforced by the Govt. of India through The Noise Pollution (Regulation and Control) Rules, 2000.

2.4.2 Mitigation measures

- Well maintained vehicles will be used in order to reduce the noise during movement of vehicles.
- Regular and proper maintenance of transportation vehicles (trucks, tractor etc) will be ensured.
- There would be restriction on vehicular movement during night time.

2.4.3 BIOLOGICAL ENVIRONMENT:

The area where clay excavation is practiced is usually agricultural and waste lands which are generally devoid of any natural vegetation. The processes of excavation and reclamation in the fringe areas of the mines, in fact, foreclose the option of natural regeneration of land. As

regards agriculture any type of quarrying or reclamation would produce some impacts on the area. The magnitude of which is proportional to the area under quarrying or to the extent of area brought under reclamation. There will not be any impacts on the biological environment in the surrounding area.

2.4.4 Mine Closure Plan

Mine will be handed over to actual owner as per lease terms and conditions after proper mine closure. The top soil (upto 6 inches) would be stored before start of excavation; this soil will be used for reclaiming the land.

2.4.5 REHABILITATION

Rehabilitation is not applicable as the project involves soil excavation from the agricultural land, where no individual reside.

2.4.6 Plantation

Recommendations given by expert committee on plantation requirements would be fully implemented.

- The implementation for development of green belt will be of paramount importance as it will not only add up as an aesthetic feature, but also act as a pollution sink.
- The species to be grown in the area should be dust tolerant and fast growing species so that permanent plantation of plant should be done.
- Apart from the aesthetic plantation for elimination fugitive of emission and noise control, all other plantation efforts shall be decided and executed with the assistance and co-operation of the local community.

Trees proposed for plantation		**Middle Genetic Plains, North west alluvial sub zone**	
S.No.	**Scientific name**	**Common Name**	**Pollution control features**
1.	*Acacia nilotica*	Babul	Tolerant to SO_2
2.	*Azadirachita indica*	Neem	Tolerant to SO_2
3.	*Pithecolibium ducle*	Jungle Jalebi	Tolerant to SO_2 and Dust control
4.	*Mangifera indica*	Aam	Tolerant to Dust control

5.	*Ficus benghalensis*	Bargad	Tolerant to Dust control
6.	*Populus ciliate*	Popular	Fast growing, broad leaf
7.	*Ficus religiosa*	Peepal	Dust particles absorbance
8.	*Nerium indicum*	Kaner	Dust particles absorbance

Trees proposed for plantation.

3.0 ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION

Environmental Management Plan serves no purpose if it is not implemented with true spirit. Thus, an implementation and monitoring programme has to be prepared. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, soil mining management should be strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the soil/clay mining area relating to the following specific areas:

- Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure should be taken.
- Collection of soil samples at strategic locations once in a year and analysis thereof with regard to deleterious constituents, if any.
- Regular visual examination will be carried out to look for possibilities of erosion. Any abnormal condition, if observed should be taken care of.
- Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done.
- Plantation will be done as per program i.e. along the road sides and near civic amenities.

3.1 ENVIRONMENTAL OFFICER

Environmental professional/officer should be appointed to implement the environment management plan. The officer shall ensure the suitability, adequacy and effectiveness of the Environment Management Programme:-

- Environmental officer will be responsible for proper maintenance and operation of the programme and it will oversee the following aspects:

- Conduct environmental awareness program to the workers, supervisory staff and contract laborers during the mining and operation period.
- Regularly monitor the environmental parameters and prepare reports as required by the UPPCB.
- Recommend necessary measures to improve Environmental conditions.
- Conduct safety programmes to create safety awareness among workers/staff.
- Train the staff and other workers on safety measures and conduct safety drills to educate them.

Environmental officer will be in regular touch with State Pollution Control Board and state mining department and send them annual progress report. Any new regulations considered by State/Central Pollution Control Board for the soil/clay mining would be taken care of.

3.2 PROPOSED SET UP

The Environmental professional/officer will be responsible for:

- Liaison with environment monitoring laboratory for collecting and analyzing water and air samples from surrounding area and work zone monitoring for pollutants.
- Implementing the control and protective measures.
- Co-coordinating the environment related activities within the project as well as with outside agencies.
- Collecting statistics of health of workers and population of surrounding villages.
- Monitoring the progress of implementation of environmental management program.
- Greenbelt development along the access road at soil excavation site.

3.3 SAFETY MEASURES DURING EXCAVATION

- Safety programmes would be conducted to create safety awareness among workers/staff.
- First-aid facilities, drinking water facility and mobile toilet facilities would be provided to the labourer at the project site.
- Measures would be taken to check breeding of vectors in the water bodies created due to excavation of earth.

3.4 Solid Waste Management

- Disposal of packing material, carried by the workers at the project site. This packing material would include used sachet/gutka/pan masala pouches. Polythene bag used by the workers to bring their foods etc. would be separately stored in bins and managed as per Solid Waste Management Rules 2008.

3.5 Information Record

- Daily data of soil excavation at the project site would be recorded in the register by the supervisory staff.
- Number of employed workers would be entered in the register by the supervisory staff daily.
- Number of vehicles used for the transportation of excavated soil should be mentioned in the record register.

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