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STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST & ENVIRONMENT, GOVERNMENT OF ODISHA]
Paribesh Bhawan, A/118, Nilakantha Nagar, Unit - VIII
Bhubaneswar - 751 012, INDIA

No. 11047 /

IND-IV-PCP-FARC-120

Date: 21.08.2017 /

RESOLUTION

Reclamation of low lying area and abandoned quarries with Ash generated from Thermal Power Plants is an acceptable method of utilization under Fly Ash notification of Ministry of Environment & Forests & CC, Govt. of India. The SPC Board, Odisha has been following the Manual on Technology and Methodology prepared by Centre for Fly Ash Research and Management (C-FARM) in association with State Pollution Control Board, Odisha since 27.09.10 for the purpose.

Over the period, utilization of Fly Ash in various sectors has gained momentum. Reclamation of low lying area and quarries is a major area of utilization. It is, therefore, felt imperative to put in place a set of new guidelines to ease the procedure, standardize and simplify processing of the applications as well as introducing a monitoring protocol for minimizing adverse impact on the environment.

After due deliberation, a revised Guideline for reclamation of low lying areas and abandoned quarries with ash, prepared by Fly Ash Resource Centre (FARC), SPC Board is brought out. Copy of the revised Guideline is enclosed for reference. Here after, the revised Guideline shall be followed by all concern.

This resolution supersedes the earlier resolution no. 15934 dated 27.09.10 and will come into force with immediate effect.

By order of the Chairman,

Encl: As above

Member Secretary

Contd..

Memo No. 11048 / Dt. 21.08.2017 /

Copy forwarded to the Additional Chief Secretary., Forest & Env. Deptt., Govt. of Odisha, Bhubaneswar for information and necessary action.

Encl: As above


Member Secretary

Memo No. 11049 / Dt. 21.08.2017 /

Copy forwarded to the Principal Secretary, Industries Department, Govt. of Odisha, Bhubaneswar for kind information.

Encl: As above


Member Secretary

Memo No. 11050 / Dt. 21.08.2017 /

Copy forwarded to the Director (Env.)-cum-Spl. Secretary to Govt., Forest and Env. Deptt., Govt. of Odisha, Bhubaneswar for favour of information.

Encl: As above


Member Secretary

Memo No. 11051 / Dt. 21.08.2017 /

Copy forwarded to All District Magistrates & Collectors for favour of information and necessary action.

Encl: As above


Member Secretary

Memo No. 11052 / Dt. 21.08.2017 /

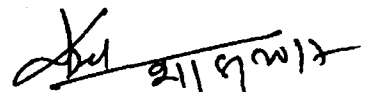
Copy forwarded to the Sr. Env. Engineer (N) / Sr. Env. Engineer (C) / Sr. Env. Scientist (I) / All Regional Officers / A.O. / All Env. Engineers / All Env. Scientists / Sr. Law Officer / All AEEs / All AESs, SPC Board, Bhubaneswar for information and necessary action.

Encl: As above


Member Secretary

Memo No. 11053 / Dt. 21.08.2017 /

Copy forwarded to the System Administrator, State Pollution Control Board, Odisha with a request to publish the Resolution Guidelines for Reclamation of low lying areas and Abandoned Quarries with Ash in the official website of the Board immediately.


SR. ENV. SCIENTIST, L-1 (PCP)

Guidelines for Reclamation of Low Lying Areas and Abandoned Quarries with Ash

August, 2017



FLY ASH RESOURCE CENTRE (FARC)

**STATE POLLUTION CONTROL BOARD, ODISHA
Paribesh Bhawan, A/118, Nilakantha Nagar, Unit - VIII
Bhubaneswar - 751 012**

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P R E F A C E

Huge quantity of ash is generated from the Boilers of Coal fired Thermal Power Plants. At present Odisha is generating about 32.5 Million Tons (MT) of Ash per annum. This is likely to increase further if the Thermal Power Plants in pipeline are established in the State. The management of ash is one of the largest environmental challenges for the State. Utilisation of the ash generated in various sectors such as construction material (bricks, blocks, tile, cement etc.), road construction, reclamation of low lying area and abandoned quarries, agriculture, mine void filling etc. has been encouraged to increase the percentage of use. In order to facilitate ash utilisation in the State, Fly Ash Resource Centre (FARC) has been set up in the State Pollution Control Board, Odisha. Reclamation of low lying area and abandoned quarries are potential area for bulk utilization of ash. Various studies have been undertaken by the Thermal Power Plants which reveal its safe to use in the activities as stated above. The present guidelines have been prepared to ease the procedure for reclamation of low lying area and abandoned quarries with ash. I place on record my appreciation for the effort made by Centre for Fly Ash Research & Management (C-FARM), New Delhi, in providing the technology and methodology for preparing the guidelines for reclamation of low lying area and abandoned quarries with ash. I also appreciate the efforts of the committee members headed by Dr. D. K. Behera, SES, in preparing the said guidelines. These guidelines will help all the stake holders i.e. Thermal Power Plants / individuals / different users in smooth supply and safe use of ash for reclamation of low lying areas and abandoned quarries.

Member Secretary

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Guidelines for Reclamation of Low Lying Areas and Abandoned Quarries with Ash Generated from Coal Fired Thermal Power Plants

1.0 Introduction:

Management of huge quantity of ash (fly ash, bottom ash and pond ash) generated from coal fired Thermal Power Plants (TPPs) is a serious environmental concern. Ash generation from coal or lignite based thermal power plants in our country, has increased from 40 Million tonne per year in 1993-94, to more than 200 Million tonne per year at present and is projected to increase to 275 Million Tons / year by end of this decade. In Odisha, around 32.50 Million tonne of ash was generated in the year 2016-17 from 40 thermal power plants of more than 10 MW capacity, out of which around 22 Million Tonne is being utilised in different sectors.

The ash generated in a thermal power plant has various forms such as dry ash, bottom ash, pond ash and mound ash that are required to be managed in such a manner that, it does not affect the environment. Gainful utilisation of ash is recognised as an attractive ash management option and therefore, MoEF&CC has also issued a notification to address this specific-subject.

SPCB's experience, in the past years, has shown that, a substantial fraction of ash utilisation has taken place for reclamation of low-lying area. Reclamation of low-lying area has many advantages such as, conservation of top soil, prevention of water logging besides utilisation of ash.

1.1 Need of the Guideline :

It has become necessary to protect the environment, conserve top soil, prevent dumping and regulate indiscriminate disposal of ash generated from coal-based thermal power plants. Ever since the Ministry of Environment Forest and Climate Change (MoEF&CC) emphasised on utilisation of ash, the SPC Board, Odisha realised the gravity of the issue and effective steps are being taken to ensure increase of Ash utilisation in

all possible sectors. Considering the huge quantity of ash generation in the State, continued efforts are being made for its gainful utilisation in accordance with the provisions of Fly ash Notification 1999, 2003, 2009 and 2016. One of the potential areas for gainful utilisation of ash has been recognised to be reclamation of low lying area. For reclaiming low lying area and abandoned quarries with ash, a guideline was formulated by Odisha State Pollution Control Board in July' 2010 in association with C-FARM, New Delhi. Over the years, several technical and administrative issues have been encountered while permitting reclamation of low lying areas with ash and very often those are observed as hindrance in the process. It was, therefore, felt necessary to review the Guideline and make it consistent.

A committee of Senior Technical Officers of the State Pollution Control Board, Odisha was constituted to review the existing guideline for necessary modification. The committee reviewed the contents relating to technical and environmental aspects and suggestions of the Committee have been incorporated in this guideline.

1.2 Objective of the Guideline :

This Guideline has been prepared with an objective to guide, facilitate and ensure filling and reclaiming the low lying area with ash in an environmentally sound manner. These guidelines have been prepared keeping in view the provisions of Fly Ash Notification and use of Ash as a substitute of soil for Geotechnical Applications.

1.3 Legal Provision :

The Ministry of Environment and Forests and Climate Change (MoEF&CC) in its Notification No. S.O. 763 (E) dated 14th September 1999, last amended on 25th January, 2016 mandates the following on reclamation ;

- i. No agency, person or organization shall within a radius of three hundred kilometres of a coal or lignite based thermal power plant undertake or approve or allow reclamation and compaction of low-lying areas with soil; only ash shall be used for compaction and reclamation.

- ii. Soil required for top or side covers of embankments of roads or flyovers shall be excavated from the embankment site and if it is not possible to do so, only the minimum quantity of soil required for the purpose shall be excavated from soil borrow area. In either case, the topsoil should be kept or stored separately. Voids created at soil borrow area shall be filled up with fly ash with proper compaction and covered with topsoil kept separately as above and this would be done as an integral part of embankment project.
- iii. No person or agency shall within fifty kilometers (by road) from coal or lignite based Thermal Power Plants, undertake or approve stowing of mine without using at least 25 % of fly ash on weight to weight basis, of the total stowing materials used and this shall be done under the guidance of the Director General of Mines Safety (DGMS).
- iv. No person or agency shall within fifty kilometers (by road) from coal or lignite based Thermal Power Plants, undertake or approve without using at least 25 % of ash on volume to volume basis of the total materials used for external dump of overburden and same percentage in upper benches of back filling of opencast mines and this shall be done under the guidance of the Director General of Mines Safety (DGMS);
- v. All agencies undertaking construction of roads of flyover bridges and reclamation and compaction of low lying areas, including Department of Road Transport and Highways (DORTH), National Highways Authority of India (NHAI), Central Public Works Department (CPWD), State Public Works Department and other State Government Agencies, shall within a period of four months from the publication of this Notification “ make provisions in their tender documents, schedules of approved materials and rates as well as technical documents for implementation of this Notification, including those relating to soil borrow area or pit “.

2.0 Properties of Fly Ash :

Dry Fly Ash (DFA), collected in air pollution control equipment and the Bottom Ash (BA) are fine particles with particle size ranging from few microns to about 150 micron. The percentage of +100 micron size

particles is generally around 5 and that of particles finer than 25 micron is around 15. Bottom Ash generally consists of particles of 200 to 2000 micron size. A small proportion of +2000 micron and some percentage of -200 micron size particles are also present. Bottom Ash (BA) is a granular material like coarse sand. Coarser material with good particle size distribution is generally the best material for geotechnical applications. However Dry Fly Ash is also a good material for this purpose as it gives very good compaction by virtue of excellent packaging due to good range of particle size distribution. The compaction is to be done maintaining optimum moisture content and procedure as detailed in this document. The comparative physical and Geotechnical properties of ash and soil are given in **Table 1** and Chemical properties are given in **Table 2**. Fly ash is easier to consolidate and settles much faster without any subsequent settlement. It is lighter in weight and thus can be conveniently used on weak soils. It has higher angle of internal friction and thus is more stable even with steeper slopes.

Table-1
Physical and Geotechnical Properties of Fly Ash and Soil

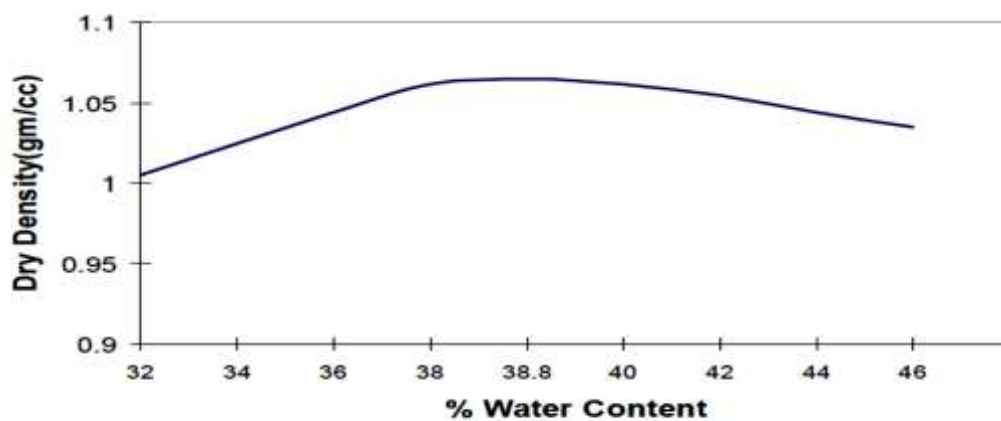
Properties	Fly Ash	Natural Soil
Bulk Density (gm/cc)	0.9 – 1.5	1.3 – 1.8
Specific Gravity	1.6 – 2.6	2.50 – 2.80
Maximum Dry Density (gm/cc)	0.9 – 1.6	1.6 – 2.0
Optimum Moisture Content (per cent)	18.0 – 40.0	12 – 22
Cohesion (kN/m ²)	Negligible	0 – 50
Angle of Internal Friction (degrees)	28 – 42	26 – 36
Coefficient of Consolidation C _v (cm ² /sec)	1.80 x 10 ⁻⁵ -2.00x10 ⁻³	10 ⁻⁵ – 10 ⁻³
Compression index C _c	0.05 – 0.40	0.05 – 1.0
Permeability (cm/sec)	8x10 ⁻⁶ – 7x10 ⁻⁴	1 – 10 ⁻⁷
Coefficient of Uniformity	3.1 – 10.7	1 – 20
Plasticity	Non – Plastic	Low to High
Shrinkage Limit	Very Low	Low to High
Grain size	Silty / Sandy	Varies according to type of soil
Clay content	Negligible	Depend on type of soil
Free Swell Index	Very Low	Variable
Classification	Sandy silt to silty sand	Variable

Table-2
Chemical Properties of Fly Ash and Soil

Constituents (in %)	Fly Ash	Natural Soil
SiO ₂	35 – 70	40 – 65
Al ₂ O ₃	10 – 35	10 – 30
TiO ₂	0.2 – 2.0	0.2 – 2.0
Fe ₂ O ₃	2.0 – 7.0	1 – 14
MnO	0.1 – 0.5	0 – 0.1
MgO	0.01 – 4.5	0.2 – 3.0
CaO	0.2 – 20	0 – 7.0
K ₂ O	0.05 – 0.9	0.2 – 0.4
Na ₂ O	0.05 – 2.0	0.2 – 2.5
LOI	0.1 – 8.0	5 - 15

2.1 Fly Ash a Substitute of Soil for Geotechnical Applications :

Fly Ash, by virtue of its physical and geotechnical properties, is a better or at least a competing material to soil for geotechnical applications. Proctor compaction test curve for ash is flatter than that for soil (**Figure 1 & 2**). Thus, desired compaction can be achieved on ash over a wide range of moisture. Further, fly ash being a free draining material, work can be restarted much faster than on soils in rainy season. In case, fly ash compaction is complete in the initial stages itself, subsequent settlement is practically nil.



Typical Proctor Test on Pond Ash

Figure-1

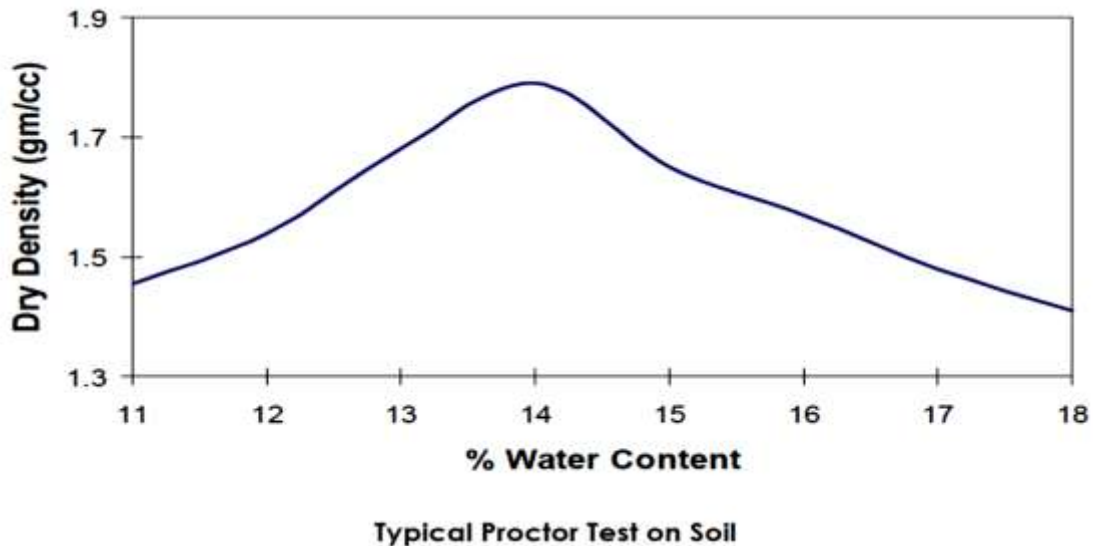


Figure-2

3.0 Transportation and Handling of Ash :

Transportation of ash to the site of low lying area or abandoned quarry for reclamation is to be done in an environmentally friendly manner without polluting the environment en-route. The trucks, trolleys and dumpers carrying the ash should be closed or be properly covered with tarpaulin which is tied properly and the carriers shall be filled with ash only to the extent that it does not spill over en-route. Alternatively, bulkers can be used for transportation of ash. The ash before transportation shall be adequately moistened with water, so that a minimum of 15% moisture is maintained on arrival at the destination. At the worksite, ash is to be managed in such a manner that it does not get airborne even in dry season and should not get carried away with runoff water during rain. It should be placed / stockpiled in well- drained area during rainy season and be kept wet or covered with tarpaulin or two inch layer of soil during summer season, as may be practicable.

The following precautionary measures be adhered to :

- (i) In case of any accidental spillage en-route in transporting ash, the agency shall ensure that the spilled ash is lifted immediately and transported to the disposal / usage site.

- (ii) All the carriers shall be fitted with speed governor so that in no case the speed exceeds 40 km/hr.
- (iii) Transportation of ash during day time in residential areas is to be minimised.

3.1 Excavation and Supply of Ash from Ash Pond:

Before supply, the existing vegetation in Ash pond / Mound shall be cleared. The pond ash shall be excavated in layers of maximum 4-5 meters and not by scrapping. The excavation of ash should be carried out in a safe manner so that the safety and stability of the ash pond is ensured. The area from which, ash is to be excavated, shall be properly conditioned by water sprinkling. The agency shall develop proper haulage road and provide adequate water sprinkling facility to avoid any fugitive dust emission during loading, unloading, transportation and excavation activities.

3.2 Management of Ash Pond Area/ Silo Area

The ash pond area from where the ash is excavated, shall be kept moist to avoid air pollution. The silo area, (if the ash is taken from silo) to be maintained in dust free condition with facilities of humidifiers and mechanised system for dispensing ash with minimum 15 percent moisture content. Mechanised road sweepers would be preferred to sweep the spilled ash from the silo area.

4.0 Execution of Reclamation work :

4.1 Pre Disposal :

(i) Stripping and grading:

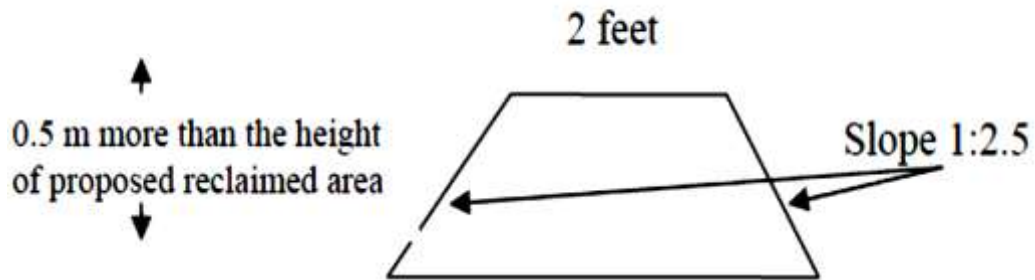
The site selected for reclamation of land shall be suitably stripped and the area should be properly levelled.

(ii) Water logged area:

If the entire area or a part of it, for reclamation is water logged or slushy, dewatering may be done first, followed by removal of slushy layer of soil and/ or filling and compacting the area with gravel and boulders.

(iii) Protection of pond or water body adjoining or within the working site:

If any pond or water body exists within or adjoining the low lying area / quarry then an earthen embankment of the cross-section as given in **Figure 3** be constructed around the pond or water body to protect it from spilling of ash or ingress of surface runoff into it.



Cross-section of water body protection embankment

Figure-3

The soil used for the embankment should neither be granular nor black cotton soil. It should be of good quality for geo-technical application. Soil should be compacted to 95% proctor by Vibratory Roller of 15 T minimum capacity, in the layers of 25-30 cm and the optimum moisture content determined before execution of work. After attaining the desired height, the disposal area should be thoroughly compacted, graded followed by soil cover at least 15 cm thickness for proper reclamation of the land by grass turfing or appropriate plantation.

4.2 Spreading and Compaction (Disposal of Ash)

Ash should be spread uniformly by means of earth moving equipment like dozers, tractors, spreader etc. having capacity commensurate to the size/ configuration of work site. Uniform spreading be done in layers of 250-300 mm thickness in the entire area or in strips of about 10-15 meters width whichever is less (**Figure 4**). The length of each strip may also be restricted up to maximum 150 meters. The compaction be done with vibratory rollers of at least 15 tonne capacity and to 95 % proctor.

Optimum moisture content may be maintained during compaction. The moisture content may vary in the Ash and especially during dry season. Addition of water with sprinklers may be required to adjust the moisture content to achieve best results.

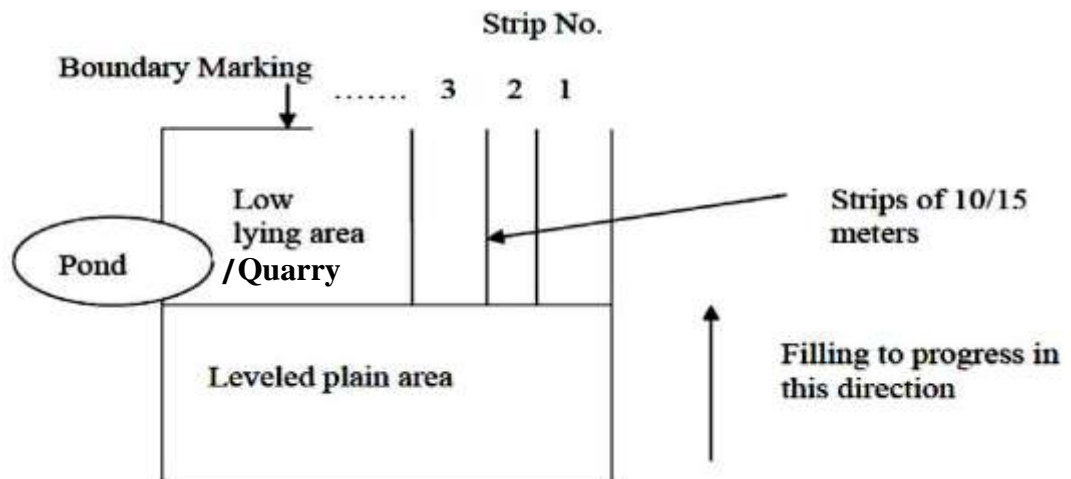


Figure-4
Spreading of Ash in Low Lying Area

Precaution :

The following precautionary measures are required for safe working during the reclamation activity :

- (i) Appropriate measures should be taken to prevent entry of cattle/livestock inside the disposal area during execution period.
- (ii) Care shall be taken to avoid any kind of nuisance / inconvenience to the public due to such dumping / filling activities.
- (iii) Water sprinkling for dust suppression during handling of Ash shall be ensured to prevent it from being air borne.
- (iv) After complete reclamation of the site, sign board shall be put up showing that the low lying land / abandoned quarry was reclaimed with ash. This will propagate the message of land reclamation by use of ash.

4.3 Schematic arrangement of reclamation of low lying area / abandoned quarries

For reclamation low lying area / abandoned quarries with ash, the following schematic arrangement is to be followed :

- i. Spreading and compaction to move from strip (1) to (2) to (3) and so on and from levelled land to the boundary marking as indicated by the arrow in **Figure-4**.
- ii. Two or three layers be laid on strip (1) and then one or two layers can be laid on strip no (2) and progressively subsequent strips can be taken up while raising the height of preceding strips. Overlap of 2m be maintained between two adjacent strips in different layers as shown in

Figure- 5

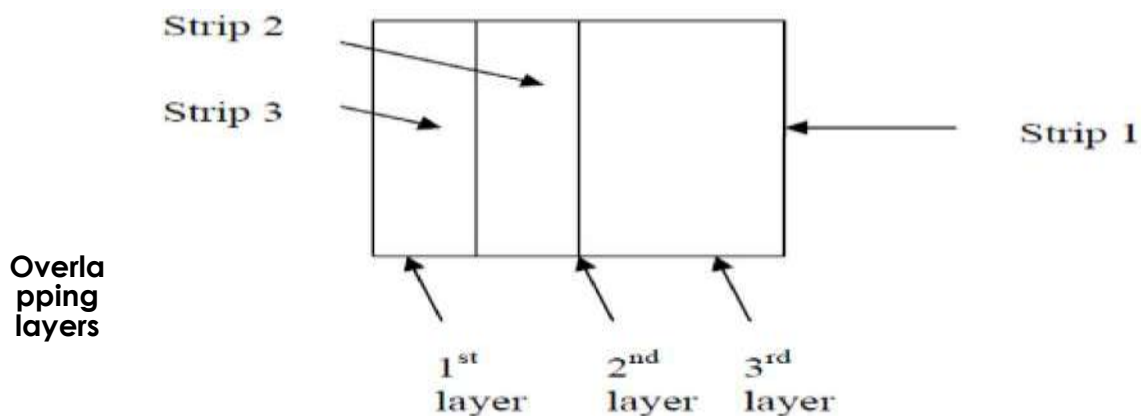
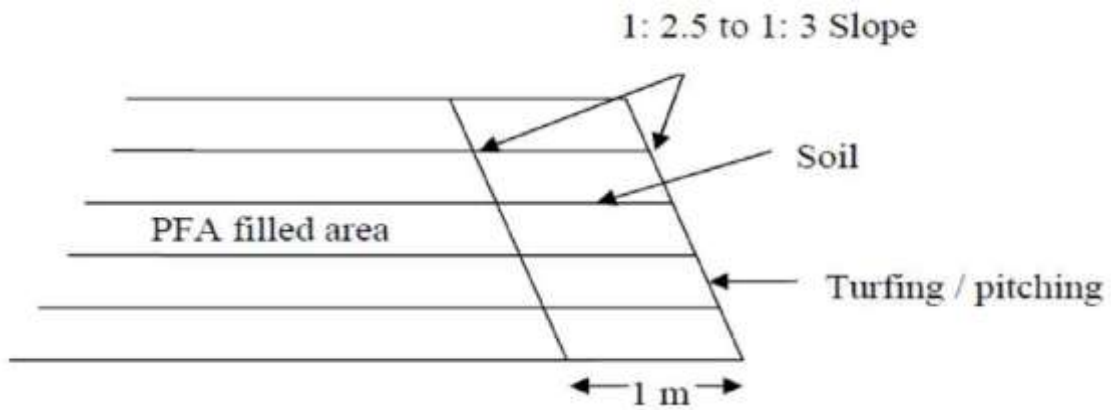


Figure-5

- iii. Similarly, 5 to 10 meter longitudinal overlap may also be maintained between two adjacent layers when the length of the area is more than 150 m.
- iv. At the boundary limits, where the fill material is likely to be exposed to air and water, it needs to be protected / confined with soil and pitching / turfing on the soil layer as for soil embankments. Soil cover of one meter thickness be provided and be compacted along with ash in each layer as shown in **Figure-6**



Exposed boundary configuration

Figure-6

- v. Vibratory rollers are generally not to be operated within 1 meter of concrete and masonry structure as well as at the edges. Compaction be done by hand held compactors or small rollers at locations near to concrete/ masonry structure. For exposed boundary conditions of filled material, spreading, rolling and compaction of soil layer be done for 1 meter extra length (total 2 meters) and the extra last 1 meter which is not properly compacted be removed by cutting and scrapping. Thereafter, the slope surface be compacted with hand compactor or other means.

4.4 Soil Cover:

The area reclaimed with ash along with its side slopes all around should be provided with soil cover of 200 mm, which shall either be excavated from the site itself before reclamation (if good earth is available there and be stored aside) or excavated from a borrow pit which has to be filled up/ reclaimed with ash as per the procedure laid in this document.

4.5 Restriction :

Reclamation of area by ash shall not be permitted in the following areas :

- i. Flood plain area.
- ii. Agriculture land / area.
- iii. Reclamation of Forest land / area is permissible only if clearance from MoEF&CC as per Forest Conservation Act, 1980 is available.
- iv. Gochar Kisam Land.

4.6 Environment Protection:

Adequate measures have to be taken for environment protection so that it may not result in adverse impact on human health and environment.

- i) Ambient Air Quality monitoring and water quality test shall be carried out both inside and outside the site before start of work to record the environmental quality of the site and the surrounding. Air quality monitoring is to be done till completion of the work.
- ii) Thereafter, the environmental quality monitoring (of air and surface water) shall be carried out once in a month at the boundary of disposal area and reported to the Board.
- iii) Surface water quality at up- stream&down- stream of site is to be carried out once in a month from start of work and six months beyond completion of work if natural water bodies exist in the vicinity.
- iv) Further, the side slopes of the completed site should be so maintained that there is no accumulation of water at garland drain, guard pond / connecting pit etc. at the site or at its immediate vicinity and ensure that there is no erosion or collapse of the slopes at least up to end of one monsoon after completion of work.
- v) Monitoring of ground water quality in a radius of 0.5 km shall be carried out prior to execution of work and at quarterly interval up to one year post closure of the site.
- vi) Water sprinkling shall be made during loading, unloading and spreading of Ash to minimise fugitive emission.

5.0 Quality Control:

The procedure prescribed in the foregoing paragraphs shall be adhered to while borrowing, transporting, spreading and compacting ash in the low lying area/ abandoned quarries/ laterite mine. The following aspects may specifically be monitored / controlled and recorded daily at the respective point of activity.

- i. Ash filling, spreading and compaction shall be done in layers of not more than 30 cm and compaction shall be done at optimum moisture content with vibratory roller of at least 15 tonne to 95% proctor.
- ii. Filling shall be done strip by strip and with recommended overlap side by side as well as length wise.
- iii. Two numbers of core should be cut of the compacted material, to check the quality of compaction and immediate corrective action should be taken, as may be required, in terms of maintaining optimum moisture content or number of passes of roller to get the required proctor compaction.
- iv. While the filling job is in progress, the ash surface at the reclaimed/ filled area should be kept moist to avoid ash getting airborne.
- v. Constant vigil shall be kept at the ash loading point. Ash carriers shall be covered to ensure that no dust nuisance due to spilling of ash takes place during its handling and transportation.
- vi. During summer months, extra measures for water sprinkling shall be provided to control fugitive dust.
- vii. The quarry pits are to be filled up by following the progressive land filling method from bottom to top with proper compaction and water sprinkling instead of haphazard dumping.
- viii. Filling of the low lying land (including borrow pits) without following the procedure stipulated in this guideline shall render the activity as noncompliant and liable for appropriate action under Consent Administration.

6.0 Regulatory Procedure for Processing the Application for consideration of grant of permission for Reclamation of Low Lying Areas / Abandoned Quarries :

The stipulations specified in this guideline is consistent with the provisions of Fly Ash Notification, 1999 and amended thereafter which is a special condition mentioned in Consent Order issued under the Water (PCP) Act,1974 and the Air (PCP) Act, 1981. Hence, the activity will be regulated

under the provisions of Water Act, 1974 and Air Act, 1981. Any violation to the guideline shall be treated as violation of Water (PCP) Act, 1974 and Air (PCP) Act, 1981 and action as deemed proper shall be taken under Consent Administration by the Board.

6.1 Procedure for Processing of Application for reclamation of low lying area / abandoned quarry of area less than equal to 10 acres:

The procedure for reclamation of low lying area / abandoned quarries with ash, within or outside the plant premises, for land measuring 10 Acres and below is further simplified. In such cases, the thermal power plants are required to obtain Consent to Establish (CTE) & Consent to Operate (CTO) from the concerned Regional Officer, State Pollution Control Board, Odisha.

- i. Application in the prescribed format in (**Annexure-I**) shall be submitted to concerned Regional Officer online by the applicant (Thermal Power Plant) intending to reclaim the area, accompanied with requisite documents as mentioned in the application form.
- ii. The proponent (TPP) shall pay the minimum fees under orange category as per the fee structure Notified by F&E Dept.. vide No. 13123&13127, Dt. 16.07.2012. The amount shall be paid online through Payment Gateway of the State Pollution Control Board, Odisha.
- iii. On receipt of complete application, concerned Regional Office shall conduct a site visit to examine the proposal by verifying the local environmental conditions within ½ km. radius including habitation, Water bodies, Schools, Hospitals, transportation route etc. to assess the possible impact.
- iv. Findings of the site visit shall be appropriately reflected in the inspection report in the format (**Annexure-II**). Based on the findings of the inspection report, the Regional Officer shall take necessary decision in the matter.
- v. The application shall be disposed by Regional Office within 30 days from the date of receipt of complete proposal. Permission if granted, shall be communicated to the Applicant in the prescribed format at **Annexure-III**

with copies to CTE Branch and Fly Ash Resource Centre (FARC) at Head Office. While according permission, suitable conditions shall be stipulated by Regional Office force. Such permission shall only be granted if the applicant (TPP / Industry) has a valid Consent to Operate (CTO).

- vi. In case Regional Office is of the opinion that the site is not suitable for undertaking such activity, the same shall be communicated to the applicant in writing assigning reasons of refusal with intimation to CTO branch and FARC at Head Office.
- vii. In case, the applicant (TPP) is not satisfied with the refusal made by Regional Office, they can appeal before the Member Secretary, SPC Board with proper justification for reconsideration on merit.

6.2 Procedure for Processing of Application for reclamation of low lying area / abandoned quarry of area more than 10 acres:

For reclamation of land / abandoned quarry in excess of 10 Acres, the application shall be processed under Consent Administration at Head Office. The procedure adopted to obtain Consent to Establish (CTE) and Consent to Operate (CTO) shall be followed.

- i. Application in the prescribed format in (**Annexure-I**) shall be submitted to concerned Regional Officer online by the applicant (Thermal Power Plant) intending to reclaim the area, accompanied with requisite documents as mentioned in the application form with a copy to CTE branch at head office.
- ii. The proponent (TPP) shall pay the fees under Orange category as per the fee structure Notified by F&E Dept. vide No. 13123 & 13127, Dt. 16.07.2012. The amount shall be paid online through Payment Gateway of the State Pollution Control Board, Odisha.
- iii. On receipt of application, concerned Regional Office shall conduct a site visit to examine the proposal by verifying the local environmental conditions within ½ km. radius including habitation, Water bodies, Schools, Hospitals, transportation route etc. to assess the possible impact.

- iv. Findings of the site visit shall be appropriately reflected in the inspection report in the format (**Annexure-II**) and the Regional Office shall submit the report along with online application of the proponent within 15 days to Head Office for consideration of the CTE.
- v. The CTE cell at Head Office shall scrutinise the application and if found complete, shall grant / refuse CTE on approval of the Member Secretary within next 15 days. Grant / refusal of CTE shall be placed in Consent Committee for ratification.

6.3 Inspection / Monitoring procedure.

- i. On receipt of the application and before granting permission, Regional Office shall conduct ambient air quality monitoring within the site and also habitation area (if existing within 500 meters) from the boundary of the land to be reclaimed with ash.
- ii. Regional Office shall collect water samples from ponds, bore wells, dug wells and from surface water bodies at upstream and downstream of the site, analyse it to maintain the background environmental status of the area and compare with the data furnished by the applicant. This data will be considered in evaluating the impact of reclamation activity in future.
- iii. Regional Office shall make routine inspection of the site during the period of execution of the work to verify adherence to the guidelines.
- iv. Regional Office shall verify the compliance status to the conditions stipulated in the permission letter and furnish the report to CTO Branch and FARC at Head Office confirming about the compliance. In case of any non-compliance, Regional Office shall issue necessary direction to the applicant (TPP) for immediate compliance in a time bound manner.
- v. Leachate test of ash to be used for reclamation of low lying area should be carried out by the TPP through NABL accredited laboratory and the report shall be submitted to the Board along with the application. The ash for which leaching test results are found to be in conformity to prevailing norms for discharge in to inland surface water, such ash can be permitted

for reclamation of low lying areas / abandoned quarries.

- vi. If the leachate test result of the ash is found to be in conformity and the underneath strata of the area for reclamation has permeability value less than 10^{-7} cm/sec, then the ash can be used for filling without requiring any protection measures against leaching.
- vii. In case the permeability is more than 10^{-7} cm/sec, appropriate lining like HDPE, Bentonite, clay or any other suitable liner shall be provided at the base layer of the low lying areas / quarries to prevent leaching and risk of ground water contamination. Permeability test should be carried out from NABL accredited laboratory only. The report shall be submitted to the Board as an enclosure while submitting the application.
- viii. After completion of the permitted reclamation, the applicant (TPP) shall submit a certificate to the Regional Office to the effect that all the conditions stipulated in the permission letter as well as guideline have been adhered to in the process of execution of reclamation works.
- ix. The applicant (TPP) shall be solely responsible for adverse environmental impact if any, observed or established to be a consequence of such reclamation activity and shall be duty bound to take appropriate remedial measures to minimise the adverse impact and also liable for appropriate action in case of persistent lapses.

7.0 Usage of Reclaimed Area:

The land reclaimed with ash in a manner as described in this document can be safely used for habitat construction, parking lots, play-grounds, recreation centre, agriculture, floriculture, horticulture, forestry etc. Wherever plantation is done, preferably local species be selected and 80 percent survival rate ensured. However, proper technical investigations and foundation design should be done before heavy construction/ usage. After complete reclamation of the site, signboard shall be put up showing that it was a low lying land reclaimed by filling with ash to popularize this practice.

Annexure-I

Application Form

(For Reclamation of Low Lying areas/ Abandoned Quarries with Ash)

To be submitted by Thermal Power Plants

1	Name and address of the Thermal Power Plant (Applicant)	:	
2	Name and address of the owner of land to be reclaimed.	:	
3	Land for reclamation with Ash	:	
	a) Ownership (substantiate with documents)	:	
	b) Area in Ac. (with supporting documents)	:	
	c) Mutual agreement for reclamation indicating end use. (If the land is not owned by the TPP)	:	
4	Site description :	:	
	a) Plot No and Kisam	:	
	b) Khata No.	:	
	c) Village / Mouza	:	
	d) Tahasil	:	
	e) District	:	
	f) Whether falls within eco-sensitive zone	:	
5	Results of test carried out (for all sites)	:	
	a) Leachability of Ash	:	
	b) Permeability of Site	:	
	c) Source of water for ash filling and dust suppression (Permission from local authority to be obtained if water to be drawn from public ponds / wells)	:	
	d) Transportation route from source to disposal site (Map showing the route)	:	

6	Vicinity Information (within ½ km from boundary of the plot)	:	
	a) Water body (Pond / Dam / Reservoir / lake / River etc.)	:	
	b) Distance from nearest Railway line / NH /SH / Major District Road (MDR)	:	
	c) Water in-take points / LI points (Public & Private)	:	
	d) Does the natural topography lead the run off from disposal site to get discharged at upstream of intake points	:	
	e) Distance from nearest river / embankment. (Whether natural topography permits surface runoff flow in to the river)	:	
	f) Distance from nearest Archaeological site if any.	:	
	g) Nearest habitation. (village / Basti with population and distance from boundary of site.)	:	
	h) Nearest Hospital / Education Institute / Place of worship	:	
7	Quantity of Ash estimated to be used (Supported with sectional contour map)	:	
9	Mode of Ash transportation	:	
10	Source of Soil (to be used as soil cover)	:	
11	Usage of Reclaimed area	:	

Signature of Authorised representative of TPP

List of document to be attached

1. Land documents in support at title / Ownership, Khata , Plot No., Mouza & Kism
2. Mouza Map (scale 32" : 1 mile) of the area
3. Analysis report on soil permeability and leachability test of ash
4. Village Map / SOI Map showing transportation route from source to destination
5. Sectoral contour map to justify estimated quantity of ash disposal
6. Copy of the Agreement with the land owner to take up the activity (if land is not owned by TPP)
7. Permission from revenue authority for reclamation of abandoned quarry / Govt. Land.

Annexure-II

Inspection Format

(For Reclamation of Low Lying area / Abandoned Quarries with Ash)

To be submitted by the Inspecting Officer of SPCB

1	Name and address of the Applicant	:	
2	Date of receipt of Application	:	
3	Date of Inspection	:	
4	Site details :	:	
	a) Plot No. &Kisam		
	b) Khata No.		
	c) Village / Mouza		
	d) Tahasil		
	e) District		
	f) Owner of site		
5	Source of Water for sprinkling arrangement :	:	
6	Available bore wells / ponds / nullah or other water bodies for monitoring:	:	
7	Back ground data to be generated by Regional Office :	:	
	a) On site AAQ	:	
	b) Water quality in surrounding area (Locations are to be defined and marked on mouza map)		
8	Source of supply of Fly Ash :	:	
	a) On road distance from TPP	:	
	b) Route Map of Transportation (Sketched on a Mouza Map or SOI Map in 1 : 25,000 scale)	:	
9	Vicinity Information :	:	
	Within ½ km from boundary of the plot both natural and manmade		

	a) Presence of any water body (Pond / Dam / Reservoir / lake etc.	:	
	b) Type of top soil at the site (Sand / Murram / Clay etc.)	:	
	c) Details of borrow pit (Location, distance & permissibility from owner)	:	
	d) Distance from nearest Railway line / NH / SH /MDR	:	
	e) Nearest Archaeological site if any along with its details	:	
	f) Habitation area within ½ km surrounding the boundary of the site : (Village / Basti with population and clear distance from site)	:	
	g) Nearest Hospital / Educational Institute / Place of Worship	:	
10	End Use of Reclaimed Land	:	
11	Date of submission of report	:	
12	Views of Inspecting Officer (Recommended / Not Recommended & Conditions suggested specific to the site)	:	
13	Decision of R.O. (Permitted / Rejected)	:	
13	If rejected, reasons thereof.	:	

Signature of Inspecting Officer

Signature of Regional Officer

List of documents attached

(In case the proposal is for more than 10 acres and referred to Head Office.)

Annexure-III

(Format for Grant of Permission)



STATE POLLUTION CONTROL BOARD, ODISHA

(Address – Regional Office)

No. _____/

Date _____/

OFFICE MEMORANDUM

In consideration of the application dt _____ of M/s (Name of TPP), the State Pollution Control Board is pleased to convey permission forreclamation (with Fly Ash) of the low lying area / abandoned quarries at Mouza _____ over an area of _____ Acres in Plot No _____), under Khata No _____, Kisam _____ as mentioned in the application, in the district of _____ with the following conditions :

This permission is an addendum to the consent order granted to the applicant under water (PCP) Act, 1974 & Air Act, 1981 and the conditions stipulated here-in are a part of conditions of the above said consent order for strict compliance.

General Conditions

1. This Permission is valid for _____ months from the date of issue and the quantity as mentioned in the application.
2. Reclamation of low lying area shall be carried out as per the guideline prepared by the State Pollution Control Board for the purpose. (copy enclosed)
3. The Thermal Power Plant shall dispose only ash for filling the low lying area. Under no circumstances, the industry shall dispose any other industrial solid waste in the low lying area other than ash without prior permission of the Board.
4. The Thermal Power Plants shall provide garland drain around the proposed site if fly ash is filled is above the contour of the surrounding land so that surface run off during rainy season shall not enter to the nearby human habitation and adjacent agricultural land.

5. The ash shall be dumped into low lying area / abandoned quarries and spread uniformly by engaging earth moving equipment. The spreading of ash shall be done in layers and compacted followed by concurrent top soil capping before rainy season, so that there shall not be any chance of mixing of the fly ash in nearby water body through rain water.
6. The Thermal Power Plants / Industry shall develop the approach road and shall provide adequate water spraying arrangement on the roads when ash is taken from the silo/plant to suppress any fugitive dust generated during working period.
7. Protective action to be ensured if the ash to be disposed at immediate vicinity of NH/SH.
8. The TPP / industry has to provide dust suppression like water sprinkling in and around the dump site. During summer extra care shall be taken to control fugitive dust.
9. For reclamation of land, irrespective of size located within administrative limit of any Municipality / Corporation or if the transportation route passes through its administrative limit, extra care to ensure non spillage of ash and non-congestion of traffic need to be exercised to prevent any pollution during transportation of fly ash.
10. **The following two condition are applicable if the permeability of the site is $> 10^{-7}$ cm/sec :**
11. If the permeability is more than 10^{-7} cm/sec, the TPP shall provide appropriate lining as mentioned in the guideline at the base layer at the low lying area in order to prevent leaching and risk of ground water contamination.
12. Commencement of fly ash filling shall be made after provision of the lining is verified by the Pollution Control Board's Official and on obtaining necessary permission in this regard.
13. The environmental quality monitoring of air, surface and ground water shall be carried out every month at the boundary of the disposal area for the following parameters and the monitoring report shall be submitted to the Board every quarter.
 - a. Ambient Air- PM_{10} , $PM_{2.5}$
 - b. Surface runoff - SS, F, Cd, As

14. Water quality monitoring shall be done from start of the work till six months beyond completion of work. Air monitoring shall be done till completion of the reclamation work.
15. The area shall be properly fenced to prevent any entry of cattle / Livestock inside the quarry area.
16. After complete reclaiming the site, signboard shall be put up showing that the land was reclaimed by filling low lying area.
17. Attempt shall be made to avoid any kind of public nuisance due to proposed activities.
18. On completion of the reclamation, the TPP shall submit a certificate to the effect that all the above stipulated conditions have been duly complied.
19. Board reserves the right to revoke this permission if conditions stipulated are not implemented to the satisfaction of the Board.

Regional Officer

To,
Address of TPP

Memo No. _____ / Dt. _____ /

Copy forwarded to :

1. The Member Secretary, SPC Board, Odisha
2. The District Magistrate and Collector, _____
3. FARC, SPC Board, Bhubaneswar
4. Copy to Guard file

Regional Officer