Standard Operating Procedure and Checklist of Minimal Requisite Facilities for utilization of hazardous waste under Rule 9 of the Hazardous and Other Wastes (Management and Transboundary movement) Rules, 2016

Utilization of Sludge (generated from spent acid neutralization facility of CETP) for manufacturing of bricks

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Central Pollution Control Board

(Ministry of Environment, Forest & Climate Change, Government of India)

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Procedure for grant of authorization by SPCBs/PCCs for utilization of Hazardous waste

1) While granting authorisation for utilization of hazardous wastes, SPCBs/PCCs shall ensure that authorisation is given only to those wastes for which SoPs on utilisation have been circulated by CPCB ensuring the following:
   a. The waste (intended for utilization) belongs to similar source of generation as specified in SoP.
   b. The utilization shall be similar to as described in SoP.
   c. End-use/ product produced from the waste shall be same as specified in SoP.
   d. Authorisation shall be granted only after verification of details and minimum requisite facilities as given in SoP.
   e. Issuance of passbooks (similar to passbooks issued for recycling of used oil, waste oil, non-ferrous scraps, etc.) for maintaining records of receipt of hazardous waste for utilization.
2) After issuance of authorization, SPCB shall verify the compliance of checklist and SoP on quarterly basis for initial 2 years; followed by random checks in the subsequent period for atleast once a year.

   In-case of lack of requisite infrastructures with the SPCBs/PCCs, they may engage 3rd party institutions or laboratories having EPA, 1986/NABL/ISO17025 accreditation / recognition for monitoring and analysis of prescribed parameters in SoPs for verification purpose.
3) SPCBs shall provide half yearly updated list of units permitted under Rule 9 of Hazardous & Other Wastes (Management & Transboundary Movement) Rules, 2016 (HOWM Rules, 2016) to CPCB and also upload the same on SPCB website, periodically. Such updated list shall be sent to CPCB on a half yearly basis i.e., by July and January respectively.
4) Authorisation for utilisation shall not be given to the units located in the State/UT where there is no Common TSDF, unless the unit ensures authorised captive disposal of the hazardous waste (generated during utilisation) or its complete utilisation or arrangement of sharing with any other authorised disposal facility.
5) In case of the utilization proposal is not similar with respect to source of generation or utilization process or end-use as outlined in this SoP, the same may be referred to CPCB for clarification /conducting trial utilization studies and developing SoPs.
6) The source and work zone standards suggested in the SoP are based on the E(P)A notified and OSHA standard respectively, however, SPCB/PCC may impose more stringent standards based on the location or process specific conditions.

58.0 Utilization of CETP Sludge:

Type of HW	Source of generation	Recovery/Product
CETP sludge (Category 35.3 of Schedule I of HOWM Rules, 2016)	Spent acid neutralization facility of CETP	For manufacturing of bricks

58.1 Source of Waste

The sludge generated from spent acid neutralization facility of CETP is categorized as Hazardous waste at S. No. 35.3 of Schedule I of HOWM Rules, 2016, that can be utilise as resource in manufacturing of bricks.

Characteristics of sludge from spent acid neutralization facility of CETP are given below:

Parameters	Results	Unit	TCLP Study Unit (mg/l)
Moisture Content	38.7	% by mass	
Arsenic	0.93	mg/kg	ND
Mercury	ND	mg/kg	BDL
Manganese	10297	mg/kg	16.4
Copper	1563	mg/kg	5.9
Nickel	1173	mg/kg	3.9
Lead	BDL	mg/kg	0.01
Cadmium	BDL	mg/kg	BDL
Chromium	12477	mg/kg	5.6
Zinc	23	mg/kg	0.1
Iron	17.3	% by mass	4.2
Nitrate	2621	mg/kg	36
Fluoride	27	mg/kg	7

58.2 Utilization Process

Sludge generated from spent acid neutralization facility of CETP is added into pan mixer with lime, cement/gypsum and fly ash. The composition of CETP sludge, lime, cement/gypsum and fly ash will be 30 to 60%, upto 15%, 10 to 20% and upto 45% respectively in one brick. The materials, together in proposed composition will be added into Pan Mixer for about 5 minutes for making a homogenous mixture. The homogenous mixture is carried from pan mixer to brick making machine on a conveyor belt. Sludge bricks manufactured will be kept for 3 days under sun drying process and then 28 days for curing by sprinkling water on stacks of bricks.

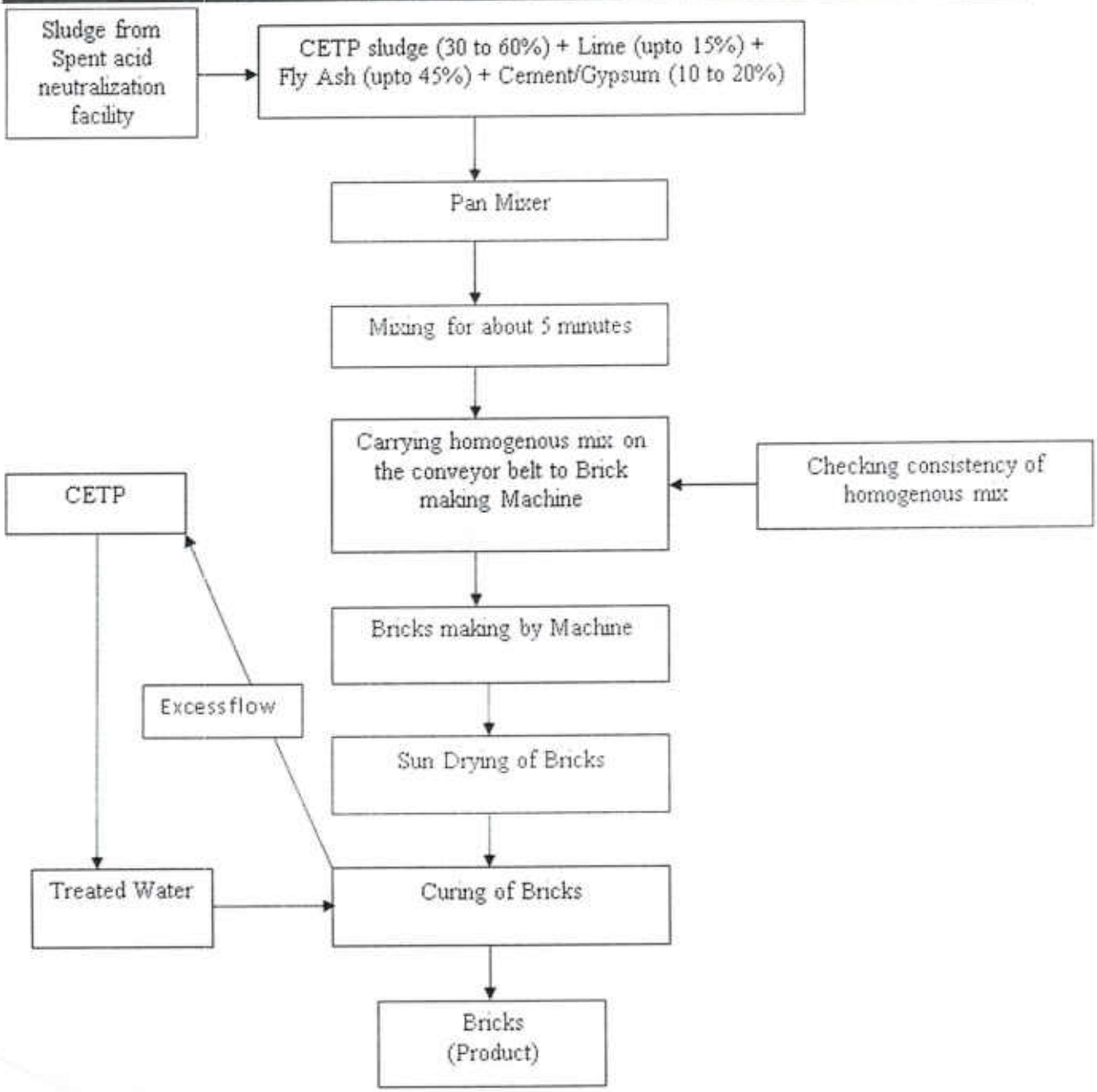

Figure: 1-*Process flow diagram for utilization of sludge generated from spent acid neutralization facility of CETP.*

58.3 Product Usage / Utilization

The bricks manufactured using sludge generated from spent acid neutralization facility of CETP shall meet IS 12894:2002 and these bricks shall be used in construction activity like boundary walls, load bearing walls, partition walls and foundation/footing work. Final product shall be TCLP/STLC tested for heavy metals before selling.

The unit shall label its product (bricks) manufactured by utilizing aforesaid hazardous waste as "These bricks has been manufactured by utilizing sludge generated from spent acid neutralization facility of CETP".

58.4 Standard Operating Procedure for utilization

This SoP is applicable only for utilization of Sludge generated from spent acid neutralization facility of CETP for manufacturing of bricks.

1) Sludge generated from spent acid neutralization facility of CETP shall be collected and stored in pits under covered storage shed(s) within premises, as authorized by the concerned SPCB/ PCC under Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016, so as to eliminate rain water intrusion.

   Further, the storage area shall have adequate slope to collect spillage, if any, and the spillage shall be transferred to ETP inlet.

2) The handling of hazardous waste as well as other raw materials shall be carried out using mechanical means with minimal manual intervention.

3) Transfer of sludge as well as other raw materials from their respective storage shed shall be transferred through mechanical conveyor system, to eliminate the possibility of fugitive emission.

4) The fugitive emission anywhere near the work zone shall be extracted through APCD i.e., Pulsejet Bag Filter and stack of adequate height.

5) Uniform mixing of sludge and raw materials shall be achieved using mechanised mixing unit (such as pan mixer) for keeping the consistency of mixture.

6) The hazardous waste i.e. CETP sludge and other raw materials shall be stored in separate pits or rooms covered with shed and properly paved floor with ventilation.

7) The storage area shall be of proper capacity, atleast 30 days storage capacity of per day requirement for each raw materials and hazardous waste.

8) Bricks manufactured by utilizing CETP sludge shall be stored for sun drying and curing on a leak proof floor. In case, effluent treated water is being use for curing then proper slope shall be provided with a drain to collect excess water and it should be sent back to CETP for treatment.

9) The unit shall be allowed to use CETP treated water for making quick lime slurry, curing of bricks, etc. in utilization process only if, the treated water meet permissible treated effluent quality standards issued by MoEF&CC vide notification dated 1st January, 2016.

10) The unit shall maintain proper ventilation in the work zone and process areas. All personnel involved in the plant operation shall wear proper personal protective equipment (PPE) specific to the process operations involved and type of chemicals handled as per Material Safety Data Sheet (MSDS). The safety precautions of the worker shall be in accordance with the Factory Act, 1948, as amended from time to time.

11) The treated effluent shall be discharged in accordance with the conditions stipulated in the Consent to Operate issued by respective SPCB/PCC under the Water (Prevention and Control of Pollution) Act, 1974.

12) Prior to utilization of CETP sludge, the unit shall obtain authorisation for generation, storage and utilization of CETP sludge from the concerned State Pollution Control Board

under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

13) In case of environmental damages arising due to improper handling of hazardous wastes including accidental spillage during generation, storage, processing, transportation and disposal, the occupier (sender or receiver, as the case may be) shall be liable to implement immediate response measures, environmental site assessment and remediation of contaminated soil/ groundwater/ sediment etc. as per the "*Guidelines on Implementing Liabilities for Environmental Damages due to Handling & Disposal of Hazardous Wastes and Penalty*" published by CPCB.

14) The unit shall provide suitable fire safety arrangements and flame proof electrical fittings.

15) During the process of utilization and handling of hazardous waste the unit shall comply with requirement in accordance with the Public Liability Insurance Act, 1991 as amended, wherever applicable.

58.5 Record/Returns Filing

1) A log book with information on source, quantity, date wise utilisation of sludge generated from spent acid neutralization facility of CETP and its generation and disposal, etc. shall be maintained including analysis report of fugitive emission monitoring & effluent discharged, as applicable.

2) The unit shall maintain record of hazardous waste utilised, hazardous waste generated and disposed as per Form 3 & shall file annual returns in Form 4 as per Rule 20 (1) and (2) of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, to concerned SPCB/PCC.

3) The unit shall submit quarterly and annual information on hazardous wastes consumed, its source, products generated or resources conserved (specifying the details like, type and quantity of resources conserved) to the concerned SPCB.

58.6 Standards

1) Fugitive emission in the storage area shall comply with the following standards:

PM_{10} ; 5 mg/m^3 TWA* (PEL)

**PEL: Permissible Exposure Limit*
**time-weighted average (TWA): measured over a period of 8 hours of operation of process.*

2) Fugitive emission for specified parameters shall be carried out quarterly. The monitoring shall be carried out by NABL or EPA approved laboratories and the results shall be submitted to the concerned SPCB/PCC on a quarterly basis.

3) CETP treated water (in case, used in utilization process) monitoring shall be carried out quarterly for parameters as mentioned in CETP outlet standard issued by MoEF&CC vide notification dated 1st January, 2016 and the results shall be submitted to the concerned SPCB/PCC.

4) Standard for wastewater discharge: Treated effluent shall be discharged in accordance with the conditions stipulated in Consent to Operate issued by respective SPCB/PCC under the Water (Prevention and Control of Pollution) Act, 1974.

58.7 Siting of Industry

Facilities for utilization of sludge generated from spent acid neutralization facility shall be located within CETP premises and/or in accordance with Consent to Establish issued by the concerned SPCB/PCC.

58.8 Size of Plant and Efficiency of Utilisation

30 tons of sludge with raw materials in the ratio CETP sludge, lime, cement/gypsum and fly ash will be 30 to 60%, upto 15%, 10 to 20% and upto 45% respectively shall produce 30,000 bricks per day.

Therefore, requisite facilities of adequate size of storage shed and other plants and machineries as given in para 58.9 given below shall be installed accordingly

58.9 Checklist of Minimal Requisite Facilities

Sl. No	Particulars
1	Covered storage shed of adequate capacity to store hazardous waste and raw materials of at least 30 days requirement.
2	Cool, dry well-ventilated covered storage shed(s) for hazardous waste and raw materials storage, product storage and process activities with completely paved area within premises.
3	Mechanized conveyer system for handling and transfer of Sludge (generated from spent acid neutralization facility of CETP).
4	Pan Mixer, Brick manufacturing machine.
6	Leak-proof flooring at drying and curing area with drain for excess water collection connected to CETP.
7	Pulse Jet Bag Filters (APCD) for fugitive emission (if required).

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