

**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 ETP Sludge generated from Pulp & Paper Industry**



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**Central Pollution Control Board**  
(Ministry of Environment, Forest & Climate Change, Government of India)  
**Parivesh Bhawan, East Arjun Nagar,**  
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**Utilization of ETP Sludge**

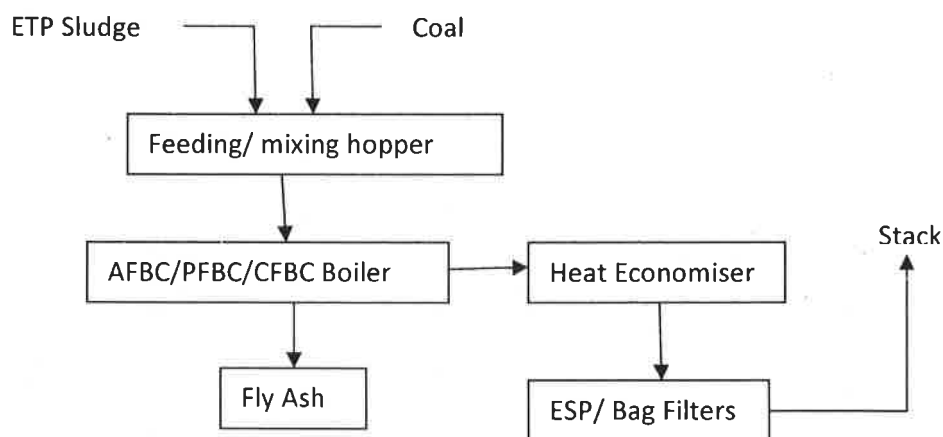
Type of HW	Source of generation	Recovery/Product
Chemical Sludge (Primary sludge) of ETP including sludge from secondary clarifier	Paper & Pulp Industry	For energy recovery in Atmospheric Fluidised Bed Combustion (AFBC) Boiler/ Pressurized Fluidized Bed Combustion (PFBC) Boiler/ Circulating Fluidized Bed Combustion (CFBC) Boiler for steam or electricity generation

**25.1 Source of Waste**

Sludge in pulp and paper industry during treatment of wastewater from the primary clarifier and secondary clarifier. The Chemical sludge of primary clarifier is categorized as hazardous waste as per S.No 35.3 of schedule-I of HOWM Rules, 2016, that can be utilise as energy resource in AFBC boiler.

**26.2 Proposed Process**

The utilisation process involves mixing of ETP sludge (we weight) with coal (in the ratio of 20: 80) and feeding this mixture in AFBC boiler as energy resource. The flue gases from the boiler after passing through heat economiser is cleaned in Electrostatic precipitator (ESP) or bag filters and dispersed into atmosphere through stack.



**25.3 Product Usage / Utilization**

The mixed ETP Sludge with coal is used as supplementary energy resource in AFBC/PFBC/CFBC boiler of power plant which will conserve the natural resource i.e. coal or other conventional fuels (permitted by concerned SPCB under Air Act, 1981).

*R. K. Singh*

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#### 25.4 Standard Operating Procedure for utilization

This SoP is applicable only for utilization of ETP Sludge generated from primary and secondary clarifier units of Effluent Treatment Plant as a supplementary energy resource in AFBC /PFBC/CFBC boiler.

- (1) The dewatered primary ETP Sludge & Secondary Sludge (with moisture not more than 40 %) generated from its own Effluent treatment Plant shall be collected and stored in pits under covered storage shed(s) within premises, so as to eliminate rain water intrusion. Further, the storage sheds shall have proper slope and seepage collection pit so as collect seepage/floor washings. The collected seepage/floor washings shall be channelized to Effluent Treatment Plant for further treatment.
- (2) Utilisation of primary ETP Sludge & Secondary Sludge shall not exceed 20 % of the coal consumed in AFBC boiler.
- (3) Transfer of ETP Sludge from the storage shed shall be carried out through mechanical conveyor system to storage hopper/mixing unit.
- (4) Uniform mixing of coal and ETP sludge in the ratio of 20: 80 (ETP Sludge: Coal) shall be achieved using appropriate mechanized mixing units
- (5) The uniformed mixture shall be transfer to the AFBC/PFBC/CFBC boiler through mechanised system.
- (6) The AFBC boiler shall maintain the temperature not less than 850°C.
- (7) Utilization of ETP Sludge shall not be carried out during un-stable/breakdown conditions in the boiler.
- (8) The hot flue gases shall be passed through heat economiser and treated in Electrostatic Precipitator (ESP) or bag dust collectors connected to stack of height as prescribed by SPCB.
- (9) The unit shall ensure that all personnel involved in the plant operation shall wear proper personal protective equipment such as masks, safety gloves, goggles, safety shoes etc. suitable for power plant operations.
- (10) The unit shall obtain authorization from the concerned State Pollution Control Board under the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016, for generation, storage and utilisation of ETP Sludge.
- (11) The unit shall submit quarterly and annual information on ETP Sludge generated, consumed, quantity utilised or resources conserved (specifying the details like type and quantity of resources conserved) to the concerned SPCB. Further, the unit shall also submit quarterly analysis report of fly ash generated during utilisation of ETP sludge for initial one year.
- (12) A log book with information on source, quantity, quality, date wise utilization of ETP Sludge shall be maintained including analysis report of emission monitoring & effluent discharged, as applicable.



- (13) The unit shall maintain record of hazardous waste utilised 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 SPCB.
- (14) In case of environmental damages arising due to improper handling of hazardous wastes including accidental spillage during generation, storage, processing, transportation and disposal, the unit 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.
- (15) During the process of utilization and handling of hazardous waste, the unit shall comply with the requirements in accordance with the Public Liability Insurance Act, 1991 as amended, wherever applicable.

**25.5 Standards**

- (1) Source emission standards shall comply with following :
    - (i) PM
    - (ii) SO<sub>2</sub>
    - (iii) NO<sub>x</sub> } As per the standards notified vide notification no. S.O. 3305 (E) dated 07/12/2015
  - (iv) CO : 100 mg/Nm<sup>3</sup>
  - (v) TOC : 20 mg/Nm<sup>3</sup>
  - (vi) HCl: 50 mg/Nm<sup>3</sup>
- } Or any stringent standards as prescribed by SPCB
- (2) Monitoring of the specified source emissions shall be carried out quarterly. The monitoring shall be carried out by NABL/EPA accredited laboratories and the results shall be submitted to the concerned SPCB quarterly.

**25.6 Siting of Industry**

This SOP is applicable only for utilization of ETP sludge in an ~~existing~~ power plant or captive boiler already in operation, hence siting is not applicable.

**25.7 Size of Plant & Efficiency of utilisation**

This SOP is applicable to all AFBC/PFBC/CFBC boiler irrespective of size of plant. The unit shall utilise ETP sludge in the ratio of 20 : 80 alongwith coal (i.e. (ETP Sludge: Coal)). Hence, requisite facilities of adequate size shall be installed accordingly.

**25.8 On-line detectors / Alarms / Analysers**

Online emission analysers for PM, SO<sub>2</sub> and NO<sub>x</sub> in the stack shall be installed and connect the online emission data to the concerned State Pollution Control Board and CPCB server.

**25.9 Checklist of Minimal Requisite Facilities:**

S.No	Requisite Facilities
1.	Covered Storage shed (s) for dewatered primary ETP Sludge & secondary sludge of adequate size to store 07 days of consumption
2.	Mechanised systems for handling & transfer of ETP Sludge and coal
3	Appropriate mechanised system for mixing of coal and ETP sludge.
4.	Boiler base on Atmospheric Fluidised Bed Combustion (AFBC) / Pressurized Fluidized Bed Combustion (PFBC)/ Circulating Fluidized Bed Combustion (CFBC)
5.	Flue gas heat economiser
6.	Electrostatic Precipitators or Bag filters
7.	Stack of height as prescribed by SPCB with easy access to port hole, for conducting stack monitoring
8.	Online analyzers for PM & CO emission monitoring in stack

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