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 waste salts generated from CETPs/ETPs of Textile manufacturing/processing industries for recovery of salts for industrial use

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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, 1986 notified and OSHA standard respectively, however, SPCB/PCC may impose more stringent standards based on the location or process specific conditions.

68.0 Utilization of Mixed/Waste salts:

Type of HW	Source of generation	Recovery/Product
Mixed/Waste salts (Category 35.3 of Schedule I of HOWM Rules, 2016)	Reject Management System installed for treatment of concentrated saline liquor in CETPs/ETPs of Textile manufacturing/processing industries.	Recovery of salts for industrial use.

68.1 Source of Waste

The mixed/waste salts generated from Reject Management System installed for treatment of concentrated saline liquor in CETPs/ETPs of Textile manufacturing/processing industries is categorized as Hazardous waste at S. No. 35.3 of Schedule I of HOWM Rules, 2016, that can be utilise as resource in recovery of salts for industrial use.

Table 1: Characteristics of waste salt are given below:

Sl. No.	Characteristics	Mixed salt collected from CETPs	Mixed salt collected from ETPs	Blended salts of Both
1.	Bulk density gm/cc	1.34	1.34	1.34
2.	pH	9.78	9.78	9.78
3.	Reactive Cyanide (mg/kg)	<1	<1	<1
4.	Reactive Sulfide (mg/kg)	<1	<1	<1
5.	Total Phenols (mg/L)	<1	<1	<1
6.	Ammonia as N (mg/L)	24.70	24.70	24.70
7.	Cyanide (mg/L)	<0.2	<0.2	<0.2
8.	Fluoride as F (mg/L)	<1	<1	<1
9.	Nitrate Nitrogen as N (mg/L)`	22.50	22.50	22.50
10.	Arsenic (Total) mg/kg	<10	<10	<10
11.	Cadmium (Total) mg/kg	<5	<5	<5
12.	Total Chromium (Total) mg/kg	2.0	14.40	7.20
13.	Hexavalent Chromium (Total) mg/kg	<3	<5	<5
14.	Copper (Total) mg/kg	7.4	64.80	36.10
15.	Lead (Total) mg/kg	7.50	25.2	25.2
16.	Nickel (Total) mg/kg	6.50	18.0	10.10
17.	Zinc (Total) mg/kg	90.40	112.4	112.40
18.	Mercury (Total) mg/kg	Nil	Nil	Nil

68.2 Utilization Process

Waste Salts generated from various CETPs and ETPs are collected and mixed together and called mixed salts.

The mixed/waste salts is received in a collection cum equalization tank and mixed with sea water. The solution is to be prepared upto 1,00,0000 mg/litre TDS value. In this tank, coagulating chemicals such as lime, floc 1, floc 2 and poly electrolyte were dosed, after mixing it is allowed to settle. The supernatant from the collection tank is further treated through series of pleated cartridge filters followed by membrane filtration with specialised membrane (i.e. Nano filtration) to reject bi valent ions like calcium, magnesium and sulphate salts and increases the concentration of NaCl salt in the permeate. The reject from the membrane contains high concentration of sulphate, calcium and magnesium. The permeate from membrane being taken to salt pans and the rejects being taken to separate salt pans for natural evaporation and crystallization. After drying the salt is scooped out. The permeate forms the Sodium Chloride is to be called as Grade-I salt and rejects forms sodium sulphate salts with calcium and magnesium which is to be called as Grade-II salts.

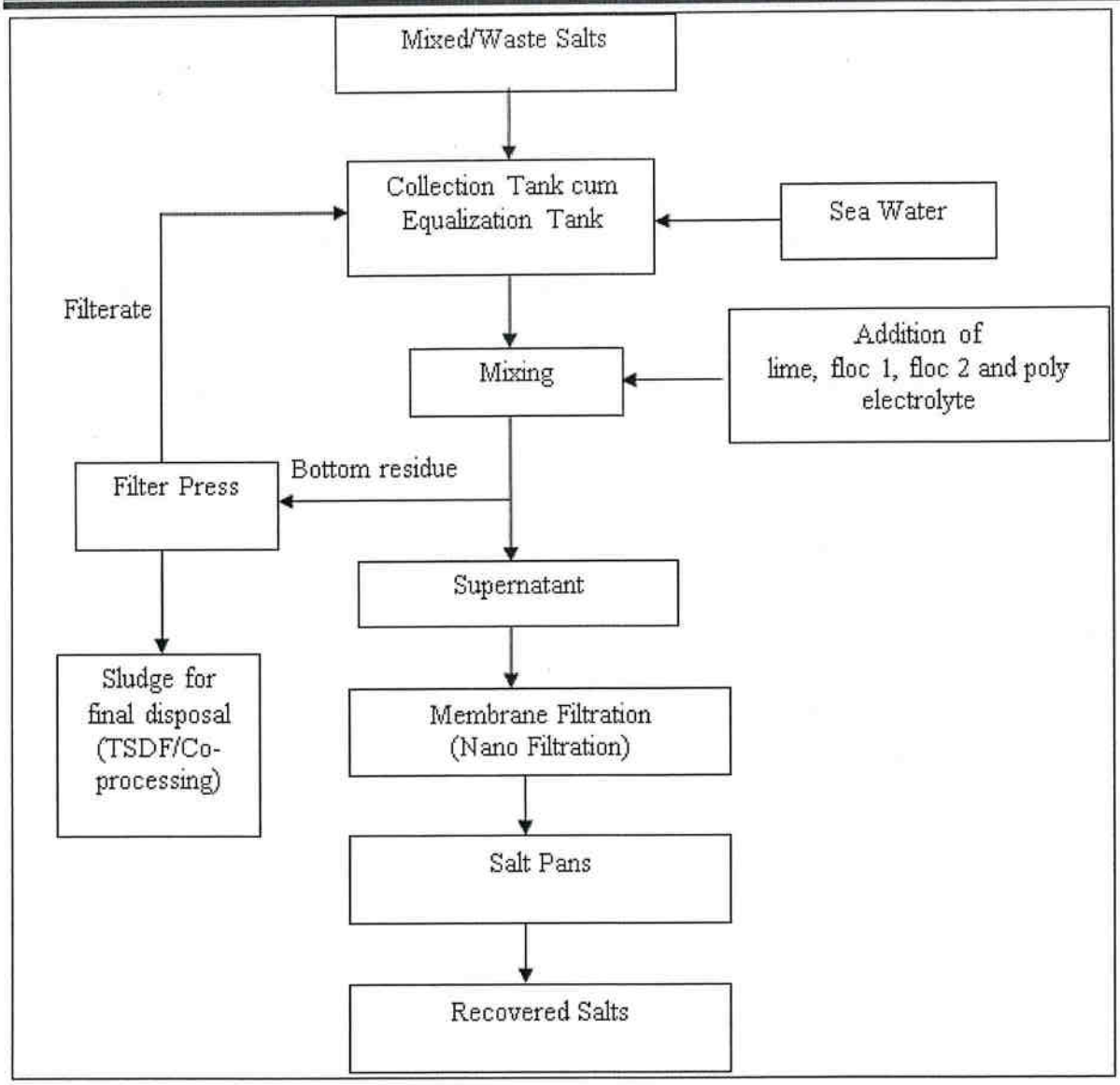

Figure: 1-*Process flow diagram for utilization of waste salts for recovery of salts for industrial use.*

68.3 Product Usage / Utilization

The recovered salts manufactured using mixed/waste salts generated from CETPs/ETPs of Textile manufacturing/processing industries shall be applicable for industrial use only.

The unit shall label its product (salts) manufactured by utilizing aforesaid hazardous waste as "These salts have been manufactured by utilizing mixed/waste salts generated from CETPs/ETPs of Textile manufacturing/processing industries"

68.4 Standard Operating Procedure for utilization

This SoP is applicable only for utilization of mixed/waste salts generated from Reject Management System installed for treatment of concentrated saline liquor in CETPs/ETPs of Textile manufacturing/processing industries.

1) Hazardous waste i.e. mixed/waste salts generated from CETPs/ ETPs of Textile manufacturing/processing industries shall be collected in drums or leak-proof bags and transported in SPCB/PCC authorized covered vehicles with requisite safeguards.

2) Mixed/waste salts shall be stored 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 collected in a pit and transferred to collection cum equalization tank or Evaporator/ETP, as applicable.

3) The handling of hazardous waste as well as chemicals (lime, floc, poly electrolyte, etc.) shall be carried out using mechanical means with minimal manual intervention.

4) There shall be a designated storage for chemicals to be used in utilization process.

5) Transfer of mixed/waste salts as well as other chemicals from their respective storage shed shall be transferred preferably through pump system, to eliminate the possibility of fugitive emission.

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

7) Uniform mixing of mixed/waste salts with sea water and other chemicals shall be achieved using mechanised mixing unit (such as paddle type mixer) in equalization tank.

8) The collection tank shall be constructed with hopper bottom so as to enable to collect the settle able sludge and to pump the same for further treatment. This chemical sludge collected at bottom of the tank shall be dewatered in the Filter Press. The filtrate to be recycled back in collection cum equalization tank. The sludge shall be sent in cement plant for co-processing or TSDF for final disposal and/or in accordance of authorization condition.

9) The unit shall provide adequate area of salt pans as per requirement of recovery of salts as given below in Section 68.8.

10) The unit shall ensure the quality of recovered salt of Grade-I and Grade-II for suitable industrial use and its suitability from recognised Institute/Organization. Quality report of salts shall be submitted alongwith quarterly analysis reports to concerned SPCB/PCC.

11) No Objection Certificate/statutory permissions (such as coastal regulatory zone approval & others) shall be obtained prior to the utilization of mixed/waste salts, as applicable.

12) 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.

13) 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.

14) Prior to utilization of mixed/waste salts, the unit shall obtain authorisation for collection, transportation, storage and utilization of hazardous wastes from the concerned State

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

15) 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.

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

17) 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.

68.5 Record/Returns Filing

1) A log book with information on source, quantity, date wise utilisation of mixed/waste salts generated from CETPs/ETPs of Textile manufacturing/processing industries 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.

68.6 Standards

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

PM_{10}	5 mg/m^3 TWA* (PEL)
Ammonia	35 mg/m^3

**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) 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.

68.7 Siting of Industry

Facilities for utilization of mixed/waste salts generated from generated from CETPs/ETPs of Textile manufacturing/processing industries shall be established in accordance with Consent to Establish issued by the concerned SPCB/PCC.

68.8 Size of Plant and Efficiency of Utilisation

1 MT of mixed/waste salts in 15,000 litres of sea water along with 60 -70 kg of chemicals shall produce 1450 Kg salts. Chemicals required for 1 MT of mixed/waste salts is lime (15-20 Kg), Ferrous sulphate (20-25 Kg), Floc 1 & 2 (15-20 Kg each) and Polyelectrolyte (0.25-0.50 Kg).

Therefore, requisite facilities of adequate size of storage shed and other plants and machineries as given in para 68.9 given below shall be installed accordingly

68.9 Checklist of Minimal Requisite Facilities

Sl. No	Particulars
1.	Covered storage shed of adequate capacity to store hazardous waste and chemicals.
2.	Cool, dry well-ventilated covered storage shed(s) for hazardous waste and chemicals storage, product storage and process activities with completely paved area within premises.
3.	Mechanized conveyer or pumping system for handling and transfer of mixed/waste salts and chemicals to collection cum equalization tank.
4.	Collection cum equalization tank of adequate capacity.
5.	Membrane filtration with specialised membrane (i.e. Nano filtration)
6.	Evaporator (Solar/Single or Multiple Effect) and/or Effluent treatment plant, as applicable, to treat wastewater/spillages.
7.	Collection pit for collection of spillages from the working, storage and unloading area.
8.	Imperviously lined Salt Pans of adequate capacity verified by SPCB/PCC.
9.	Pulse Jet Bag Filters (APCD) for fugitive emission, if required.
10.	No Objection Certificate/statutory permissions (such as coastal regulatory zone approval & others), as applicable.

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