

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 Spent ion exchange resin generated from
Demineralization (DM) plant**



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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 authorisation by SPCBs/PCCs for utilization of Hazardous Waste

- (i) While granting authorisation for utilization of hazardous wastes, SPCBs/PCCs shall ensure the following:
 - a. The waste (intended for utilization) belongs to similar source of generation as specified in SoPs.
 - b. The utilization process is similar to the process of utilization described in SoPs.
 - c. End-use / product produced from the waste shall be same as specified in SoPs.
 - d. Authorisation be granted only after verification of utilization process and minimum requisite facilities as given in SoPs.
 - e. Issuance of passbooks (similar to the passbooks issued for recycling of used oil, waste oil, non-ferrous scrap, etc.) for maintaining records of receipt of hazardous wastes for utilization.
- (ii) After issuance of authorization, SPCB shall verify the utilization process, checklist and SOPs 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 SPCB/PCC, they may engage 3rd party institutions or laboratories having EPA/NABL/ISO17025 accreditation/recognition for monitoring and analysis of prescribed parameters in SoPs for verification purpose.
- (iii) SPCBs shall provide half yearly updated list of units permitted under Rule 9 of HOWM Rule, 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.
- (iv) 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.
- (v) In case 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 thereof.
- (vi) The source and work zone standards suggested in the SoPs are based on the E(P)A notified and OSHA standards respectively, however, SPCB/PCC may impose more stringent standards based on the location or process specific conditions.

29.1 Utilization of Spent Ion Exchange Resin (Captive)

Type of HW	Source of generation	Recovery/Product
Spent ion exchange resin – listed at Sl. No. 35.2 of schedule-I of HOWM Rules, 2016	Demineralization (DM) plant	For energy recovery in captive Boiler

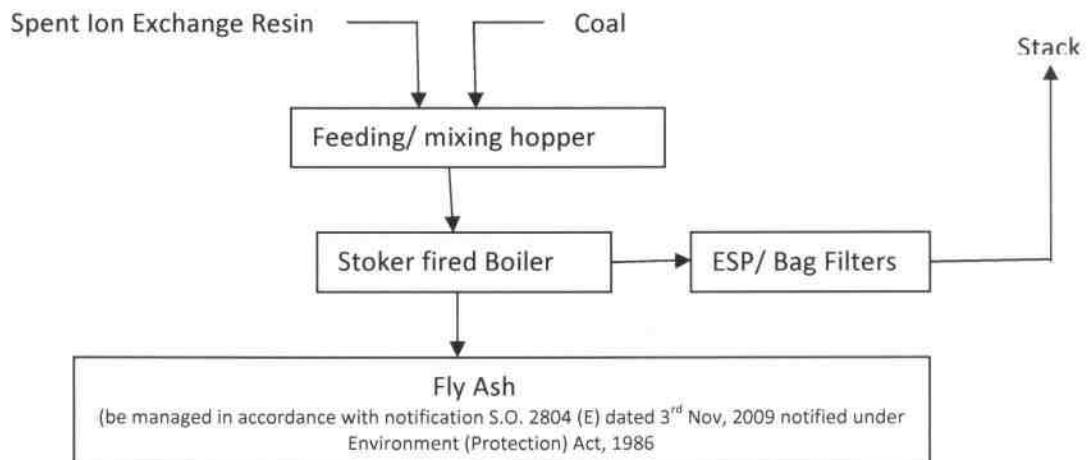
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29.1 Source of Waste

De-mineralised water is required in thermal power plant. The same is generated in Demineralization plant, where treatment of water is carried out through ion exchange process. In the ion exchange process, water is passed through resin beds. The anion and cation resins lose their ion exchange efficiency in resin beds in due course of time and need to be replaced. These discarded ion exchange resin is known as "Spent ion exchange resin", categorized as hazardous waste at S.No 35.2 of schedule-I of HOWM Rules, 2016 which are required to be disposed in authorized disposal facility in accordance with authorization condition, when not utilized as energy/resource recovery.

29.2 Proposed Process

The captive utilisation process involves mixing of Spent ion exchange resin with coal in a hopper and feeding the mixed material into stoker fired / fluidized bed boiler as supplementary energy resource. The flue gases from the boiler are treated in Electrostatic precipitator (ESP) and then dispersed into atmosphere through stack.



29.3 Product Usage / Utilization

The Spent ion exchange resin mixed with coal is used as a supplementary energy resource in captive stoker fired / fluidized bed boiler of power plant.

29.4 Standard Operating Procedure for utilization

This SoP is applicable only for captive utilization of Spent ion exchange resin generated from Demineralization (DM) plant, as a supplementary energy resource in captive stoker fired / fluidized bed boiler.

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Standard Operating Procedure and Checklist of Minimal Requisite Facilities for Utilization of Spent Ion Exchange Resin generated from Demineralization Plant

- (1) The Spent ion exchange resin generated from its own Demineralization (DM) plant shall be collected and stored in non-reactive containers/drums/bags in accordance with the provisions stipulated in Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- (2) There should be a designated space for storage of Spent ion exchange resin under cool, dry, well ventilated and covered storage shed, as authorized by the concerned SPCB/PCC under the HoWM Rules, 2016 so as to eliminate water intrusion. Such shed shall have impervious lined floor, adequate slope, seepage collection pit. The loading/unloading space for Spent Resin shall also be under the covered shed.
- (3) Spent ion exchange resin from the storage shed shall be transferred through mechanised conveyor system to the mixing chute/hopper unit, where coal is mixed in the ratio of 99.95:0.05 (Coal : Spent ion exchange resin).
- (4) The Spent ion exchange resin mixed with coal from chute shall be transferred to the boiler through mechanised conveyor system.
- (5) Utilisation of Spent ion exchange resin shall not exceed 0.05 % of the coal consumed in stoker fired boiler.
- (6) The stoker fired / fluidized bed boiler shall maintain a temperature not less than 1100 °C.
- (7) Utilization of Spent ion exchange resin shall not be carried out during unstable/breakdown conditions in the boiler.
- (8) The hot flue gases shall be treated in Electrostatic Precipitator (ESP) or Bag filter house followed by stack of height as prescribed by SPCB.
- (9) The unit shall ensure that, all personnel involved in handling of spent resin shall wear proper personal protective equipment such as masks, gloves, goggles, shoes etc. for safety.
- (10) Prior to utilization of spent ion exchange resin, the unit shall obtain authorization for generation, storage and utilisation of Spent ion exchange resin from the concerned State Pollution Control Board under the Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016.
- (11) In case of environmental damages arising due to improper handling of hazardous wastes (viz., accidental spillage during generation, storage, processing, transportation and disposal), the unit shall be liable to implement immediate corrective 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.
- (12) 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.

29.5 Record/Return Filing

- (1) The unit shall submit quarterly and annual information on Spent ion exchange resin generated, consumed, quantity utilised, resources conserved (specifying the details like type and quantity of resources conserved) to the concerned SPCB.
- (2) A log book shall be maintained with information on source, quantity, quality, date wise utilization of Spent ion exchange resin and record of analysis report of emission monitoring & effluent discharged, as applicable shall be maintained.
- (3) 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.

29.6 Standards

- (1) Source emission standards shall comply with following :
 - (i) PM : 100 mg/Nm³
 - (ii) SO₂ : 200 mg/Nm³
 - (iii) NO_x: 400 mg/Nm³
 - (iv) CO : 100 mg/Nm³

(as notified under the Environment (Protection) Act, 1986 vide Notification No. G.S.R. 481(E) dated 26/06/2008 for Common Hazardous Waste Incinerators) or stringent standards as prescribed by SPCB/PCC
- (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.

29.7 Siting of Industry

This SOPs is applicable only for captive utilization of spent ion exchange resin in an existing captive boiler and cited in accordance with Consent to Establish issued by the concerned SPCB/PCC.

29.8 Size of Plant & Efficiency of utilisation

Utilisation of Spent ion exchange resin shall not exceed 0.05 % of the coal consumed in stoker fired boiler. Hence, requisite facilities of adequate size shall be installed accordingly as mentioned under para 29.10 below

29.9 On-line detectors / Alarms / Analysers

Online emission analysers for PM and CO in the stack shall be installed and the online data be connected to the server of the concerned SPCB/PCC and CPCB.

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29.10 **Checklist of Minimal Requisite Facilities:**

S.No	Requisite Facilities
1.	Designated space for storage of Spent ion exchange resin under cool, dry, well ventilated and covered storage shed, so as to eliminate water intrusion.
2.	Storage shed with impervious lined floor, adequate slope, seepage collection pit
3.	The loading/unloading space for Spent ion exchange resin with covered shed.
4.	Mechanised systems for handling & transfer of Spent ion exchange resin and coal
5.	Mixing chute/ hopper unit for mixing coal and Spent ion exchange resin
6.	Stoker fired / fluidised bed Boilers
7.	Electrostatic Precipitators/bag filters house
8.	Stack of height as prescribed by SPCB/PCC with easy access to port hole, for conducting stack monitoring
9.	Online analyzers for PM & CO emission monitoring in stack and the online data be connected to the server of the concerned SPCB/PCC and CPCB.

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