

**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)  
**Parivesh Bhawan, East Arjun Nagar,**  
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**Utilization of Spent Ion Exchange Resin**

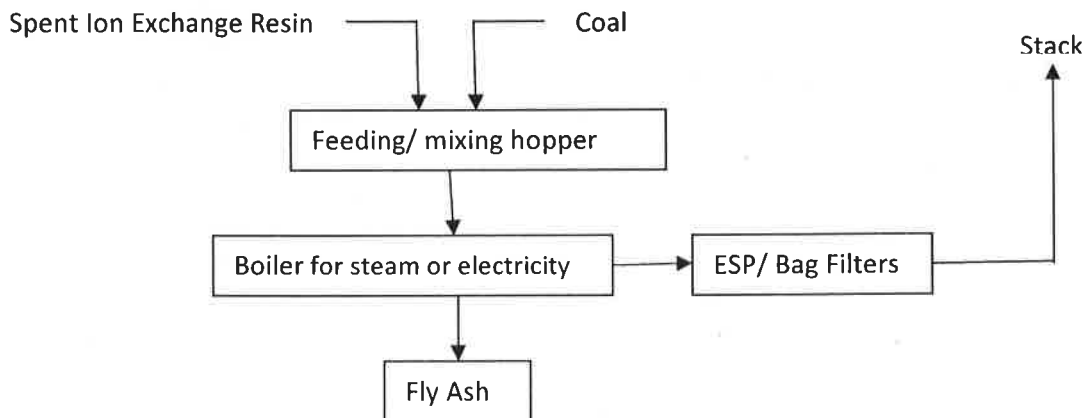
| Type of HW               | Source of generation        | Recovery/Product  |
|--------------------------|-----------------------------|---|
| Spent ion exchange resin | Demineralization (DM) plant | For energy recovery in Boiler for steam or power generation |

**26.1 Source of Waste**

The power plants de-mineralised water which is produced from Demineralization (DM) plant that involves treatment through ion exchange process where water is passed through resin beds. These anion and cations resins in course of time loose their ion exchange capacity and needs to be replaced. These discarded ion exchange resin known as “Spent ion exchange resin” is categorized as hazardous waste as per S.No 35.2 of schedule-I of HOWM Rules, 2016, that can be utilise as energy resource in stoker fired boiler .

**26.2 Proposed Process**

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



**26.3 Product Usage / Utilization**

The mixed Spent ion exchange resin with coal is used as a supplementary energy resource in boiler for steam and power generation.

**26.4 Standard Operating Procedure for utilization**

This SoP is applicable only for utilization of Spent ion exchange resin generated from Demineralization (DM) plant as a supplementary energy resource in boiler generating steam or electricity.

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- (1) The Spent ion exchange resin generated from its own Demineralization (DM) plant shall be collected and stored in drums kept under covered storage shed within premises, so as to eliminate rain water intrusion.
- (2) Utilisation of Spent ion exchange resin shall not exceed 1 % of the coal consumed in boiler.
- (3) Transfer of Spent ion exchange resin from the storage shed shall be carried out through mechanised conveyor system to the mixing chute/hopper unit where coal is uniformly mixed in the ratio of 1: 99 (Spent ion exchange resin : Coal).
- (4) Uniform mixing of coal and Spent ion exchange resin shall be achieved using appropriate mechanized mixing units
- (5) The uniformed mixed Spent ion exchange resin with coal shall be transferred to the boiler through conveyor system.
- (6) The boiler shall maintain the temperature not less than 850°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 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 operation.
- (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 Spent ion exchange resin.
- (11) The unit shall submit quarterly and annual information on Spent ion exchange resin generated, consumed, quantity utilised or resources conserved (specifying the details like type and quantity of resources conserved) to the concerned SPCB.
- (12) A log book with information on source, quantity, quality, date wise utilization of Spent ion exchange resin 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.

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- (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.

**26.5 Standards**

- (1) Source emission standards shall comply with following :
- (i) PM
  - (ii) SO<sub>2</sub>
  - (iii) NO<sub>x</sub>
  - (iv) CO : 100 mg/Nm<sup>3</sup>
- } As per the standards notified vide notification no. S.O. 3305 (E) dated 07/12/2015
- 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.

**26.6 Siting of Industry**

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

**26.7 Size of Plant & Efficiency of utilisation**

This SOP is applicable to all boiler generating steam /power irrespective of size of plant. The unit shall utilise spent ion exchange resin in the ratio of 1 : 99 alongwith coal (i.e. (Resin: Coal ratio)). Hence, requisite facilities of adequate size shall be installed accordingly.

**26.8 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.

**26.9 Checklist of Minimal Requisite Facilities:**

| S.No | Requisite Facilities  |
|------|---|
| 1.   | Covered Storage shed (s) for storage of Spent ion exchange resin in drums.      |
| 2.   | Mechanised systems for handling & transfer of Spent ion exchange resin and coal |
| 3    | Appropriate mechanised system for mixing of Spent ion exchange resin and coal.  |
| 4.   | Boiler for steam /power generation  |

|    |  |
|----|--|
| 5. | Electrostatic Precipitators/bag filters  |
| 6. | Stack of height as prescribed by SPCB with easy access to port hole, for conducting stack monitoring |
| 7. | Online analyzers for PM, SO <sub>2</sub> and NO <sub>x</sub> emission monitoring in stack.           |

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