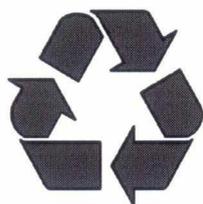


**Standard Operating Procedure and Checklist of Minimal
Requisite Facilities for utilization of hazardous waste
under Rule 9 of the Hazardous and Other Wastes
(Management and Transboundary Movement) Rules, 2016**

**Captive utilization of Spent ion exchange resin generated from
Demineralization (DM) plant in DRI Kiln of Sponge Iron**



March, 2017

Central Pollution Control Board
(Ministry of Environment, Forest & Climate Change, Government of India)
Parivesh Bhawan, East Arjun Nagar,
Shahdara, Delhi – 110032

P.V.R.

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.

30.0 Captive Utilization of Spent Ion Exchange Resin

Type of HW	Source of generation	Recovery/Product
Spent ion exchange resin- Category 35.2 of schedule-I of HOWM Rules, 2016	Demineralization (DM) plant	For energy recovery in Direct Reduced Iron (DRI) kiln of Sponge Iron Industry

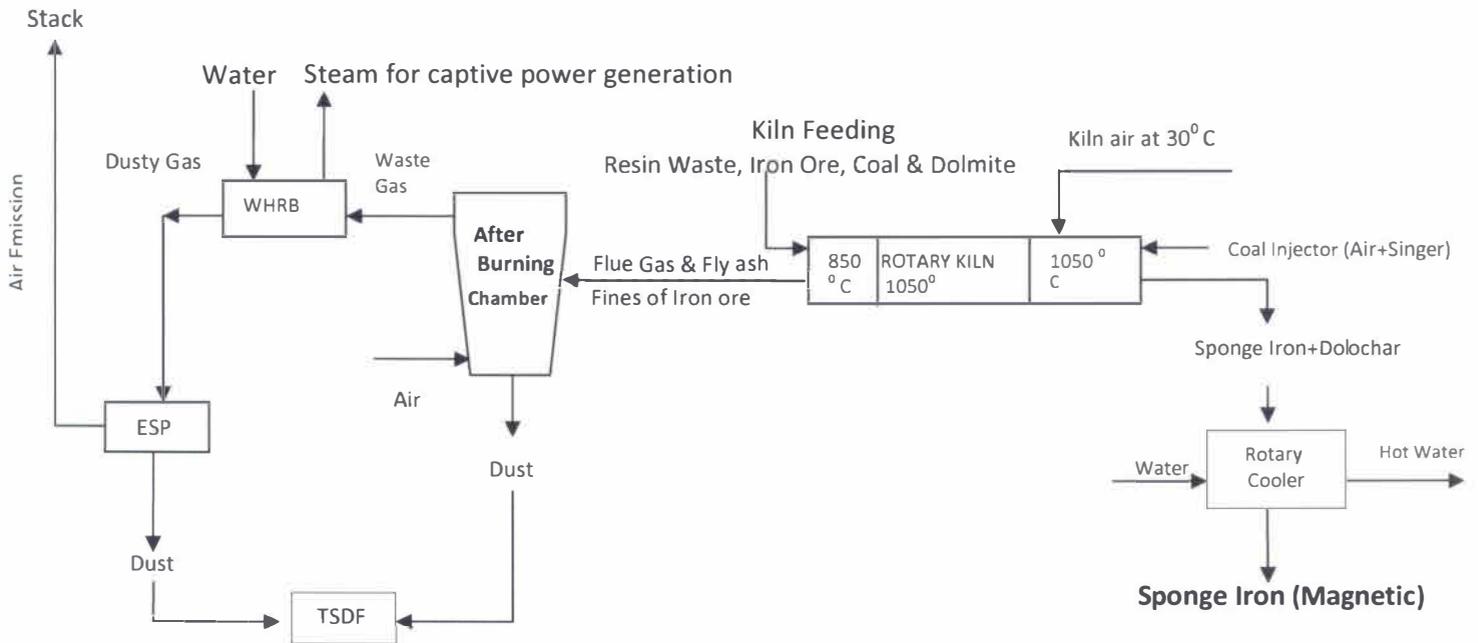
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30.1 Source of Waste

De-mineralised water is required in DRI kiln. 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 HWM Rules, 2016.

30.2 Utilisation Process

The utilisation process involves mixing of Spent ion exchange resin with iron ore, coal and dolomite in a hopper and feeding the mixed material into its own Direct Reduced Iron (DRI) kiln of Sponge Iron Industry, as supplementary energy resource. The flue gas from DRI Kiln is passed through the After Burning Chamber followed by Waste Heat Recovery Boiler and treated in Electrostatic precipitator (ESP)/Bag filter house and then dispersed into atmosphere through stack. The steam generated from the Waste Heat Recovery Boiler is used for captive power generation.



30.3 Product Usage / Utilization

The Spent ion exchange resin mixed with iron ore, coal and dolomite is used as energy resource in its own DRI Kiln of Sponge Iron Industry.

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30.4 Standard Operating Procedure for utilization

This SoP is applicable only for captive utilization of spent ion exchange resin generated from its own Demineralization (DM) plant, as a supplementary energy resource in the DRI Kiln. The steam generated from the Waste Heat Recovery Boiler is used in captive power generation.

- (1) The Spent ion exchange resin 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 uniformly mixed in the ratio of 0.002: 99.998 (Spent ion exchange resin : Coal) along with other raw material i.e. iron ore & dolomite.
- (4) Uniform mixing of coal and Spent ion exchange resin alongwith other raw material i.e. iron ore & dolomite shall be achieved using appropriate mechanized mixing units.
- (5) Uniformly mixed Spent ion exchange resin, coal and other raw material i.e. iron ore & dolomite shall be transferred to the DRI Kiln through mechanized conveyor system.
- (6) Utilisation of Spent ion exchange resin shall not exceed 0.002 % of the coal consumed in the DRI Kiln.
- (7) The DRI Kiln shall maintain the temperature not less than 850°C
- (8) Utilization of Spent ion exchange resin shall not be carried out during unstable/breakdown conditions in the DRI Kiln.
- (9) The hot flue gases transferred through After Burning chamber, Waste Heat Recovery Boiler shall be finally treated in Electrostatic Precipitator (ESP) or Bag filter house followed by stack of height as prescribed by SPCB. The steam generated from the Waste Heat Recovery Boiler shall be used for captive power generation.
- (10) The unit shall ensure that all personnel involved in the plant operation shall wear proper personal protective equipment such as masks, gloves, goggles, shoes etc. for safety.
- (11) The unit shall obtain authorization for generation, storage and utilisation of Spent ion exchange resin from the concerned State Pollution Control Board under the

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

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

- (12) 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.
- (13) 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.

30.5 Record/Return Filing

- (1) The unit shall submit quarterly and annual information on Spent ion exchange resin generated, quantity utilized, 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, 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 generated/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.

30.6 Standards

- (i) Source emission standards for Particulate Matter shall comply with the standards notified vide notification no. S.O. 414 (E) dated 30/05/2008 for Sponge Iron Industry or as prescribed by the concerned SPCB/PCC, whichever is stringent.
- (ii) Monitoring of the above specified source emission parameter shall be carried out quarterly. The monitoring shall be carried out by NABL accredited /EPA approved laboratories and the results shall be submitted to the concerned SPCB quarterly.

30.7 Siting of Industry

This SOP is applicable only for captive utilization of spent ion exchange resin in the DRI Kiln of Sponge Iron Industry already in operation.

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30.8 Size of Plant & Efficiency of utilisation

This SOP is applicable for captive utilisation of Spent Ion Exchange Resin in all the DRI Kiln of the Sponge Iron Industry irrespective of size of plant, however, the unit shall utilise spent ion exchange resin: Coal in the ratio of 0.002: 99.998. Hence, requisite facilities of adequate size shall be installed accordingly as mentioned under para 30.10 below.

30.9 On-line detectors / Alarms / Analysers

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

30.10 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	Loading/unloading space for Spent ion exchange resin with covered shed.
4.	Mechanised systems for handling & transfer of Spent ion exchange resin, iron ore, dolomite and coal
5.	Appropriate mechanised system for mixing of Spent ion exchange resin and coal alongwith other raw materials i.e. iron ore and dolomite.
6.	Direct-reduced iron (DRI) kiln
7.	Dust Settling Chamber connected to DRI Kiln
8.	After Burning Chamber
9.	Waste Heat Recovery Boiler with arrangement for utilising the steam generated for captive power generation
10.	Electrostatic Precipitator/Bag filter house
11.	Stack of height as prescribed by SPCB with easy access to port hole and arrangement of platform, ladder, etc. for conducting stack monitoring.
12.	Online analyzers for Particulate Matter emission monitoring in stack and connection of emission data to the server of SPCB/PCC and CPCB.

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