

wade

Success Stories for Environment Pollution Mitigation

Hazardous and Other Wastes Management

1.0 Utilization of Hazardous and Other Wastes

Rule 9 of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 lays down provisions for utilization of hazardous and other wastes. CPCB prepares Standard Operating Procedures (SOPs) for utilization of Hazardous Waste based on utilization proposals received from applicant (for which SOPs have not been prepared earlier) under the aforesaid provisions of Rule 9 of HOWM Rules, 2016. As per the said Rule 9, trial run is conducted for particular waste with respect to particular utilization. Upon demonstration of compliance to the environment standards during the trial run, CPCB develops SOP for such utilization of particular hazardous waste as a resource or for any other use (other than co-processing in cement kiln) and the same is being circulated to all SPCBs/PCCs for enforcement.

CPCB has so far developed 54 SOPs for various types utilization of different categories of hazardous waste (appended as **Annexure I**). These SoPs are also available on CPCB website at <https://cpcb.nic.in/sop-for-hw-specific/>.

National Hazardous Waste inventory report for the year 2017-18 shows that there are 480 authorized utilizers (utilising hazardous waste as per the SOPs prepared under Rule 9) having authorized capacity of 1.95 Million MT, where 0.34 million MT of HW has been utilized. Thereby, utilization of hazardous and other wastes in accordance with Rule 9 of HOWM Rules, 2016 has reduced disposal of such HW in secured landfills.

2.0 Guidelines for effective implementation of HOWM Rules, 2016

Technical guidelines w.r.t identification, management and handling of HW, impact assessment, proper up keeping, monitoring and operation of HW management facilities, enforcement of HOWM Rules, 2016 etc. have been prepared by CPCB to enhance effective implementation of HOWM Rules, 2016.

(a) Guidelines on Framework on Identification of Materials Generated from Industrial Processes as Wastes or By-products, 2019 stipulates the criteria for identification of material generated from industrial processes as “wastes” and “by-products”. The objective is to provide clear differentiation between product, by-product and waste so that useful by-products could be separated from waste and reducing burden of disposal of the same. Copy of the guidelines is available at CPCB website https://cpcb.nic.in/uploads/hwmd/Guidelines_HW_2.pdf

3.0 Success case study report for utilization of hazardous waste shared by Gujarat PCB

Gujarat is having Novel Spent Acid Management facility for management of spent acid generated from various dyes and dye intermediates and other chemicals (Cat: 26.3 of Sch-I & B-15 of Sch-II). The concentration of sulphuric acid in the spent acid is normally in the range of 20-30% and Chemical Gypsum (80% Purity) is generated which is sent to

Cement manufacturing units (resource recovery). This facility is commissioned in December 2009 with a total project cost of Rs 30 Crore. Board has issued permission for utilization of spent acid 2,70,000 MTPA for manufacturing of chemical gypsum 1,47,600 MTPA. At present about 700 MT/Day of spent acid is received and neutralized with lime stone powder and Hydrated Lime and generated wastewater is treated in in-house ETP which is further sent to CETP for ultimate treatment. Facility is also having 50,000 MT of gypsum storage area (approximately 3 months storage area for monsoon period). Facility is having 207 member units. Since December-2009 to till date @ 4.45 Lakh MT of chemical gypsum sent to Cement Plants.

Annexure I

List of SOPs prepared by CPCB for utilisation of hazardous waste as per Rule 9 of HOWM Rules, 2016

S. No	Name of HW	Source of generation	Type of utilization/Intended use
1	Spent Solvent (containing Toluene, Xylene, Cyclohexane, Acetone, Methyl isobutyl ketone, Methanol, Isopropyl alcohol, Methylene Dichloride, Tetra Hydro Furan, Ethyl Acetate, Iso Propyl Ether, Dimethyl formamide, Butyl acetate, Methyl Acetate, Butanol, Benzene, Ethanol and Methyl Ethyl Ketone)	Industrial use of solvents; production or industrial use of synthetic dyes, dye intermediates and pigments; production/formulation of drugs/pharmaceuticals and healthcare products and production and formulation of pesticides including stockpiles	Recovered solvents/mixed solvents for Industrial use
2	APCD Dust/ Residue	LD Furnace/Electric Arc Furnace (EAF)/Blast Furnace of Steel Plant/captive Blast Furnace and Ferro-Alloy Plant	As Briquettes for further use in blast furnace to produce pig iron.
3	Spent Catalyst containing precious metals and ETP Sludge containing platinum	Petrochemical process and pyrolytic operation, petroleum refining, production of acids, production of nitrogenous and complex fertilizers, production/formulation of drugs/pharmaceuticals and ETP sludge	Recovery of Precious metals - Platinum, Iridium, Osmium, Palladium, Rhodium, Ruthium, Rhenium, Gold & Silver
4	Spent H ₂ SO ₄	Pickling operations of MS rods / sheets	Ferrous Sulphate <i>(Not to be used in drinking water purification and to be used only for industrial purposes)</i>
5	Spent Acid - Containing Molybdenum	Filament and bulb Industry	Molybdenum Trioxide
6	Spent HCl	Metal surface cleaning in steel and rolling industry	Ferric Chloride <i>(Not to be used in drinking water purification or agriculture applications and to be used only for industrial purposes)</i>
7	Used Anode butt	Aluminium Smelter units	Carbon pellets and high energy coke for use in Steel furnaces/foundries
8	Used Anode butt	Aluminium Smelter units	Carbon blended coke/ electrode carbon paste/carburizer for use in Steel or Ferro Alloy furnaces
9	Used Anode butt (Pre-processed)	Aluminium Smelter units	Green anodes for use in Aluminium Smelters
10	Used Anode butt (Pre-processed)	Aluminium Smelter units	Carbon Electrode Paste for use in Ferro Alloy Plants
11	Coal Tar/Tarry Residue	Coal gasifier units	As supplementary fuel in furnace of sodium silicate units
12	Contaminated Container/ barrels/ drums	Pharmaceuticals, food processing, cosmetic, textile,	Cleaned barrel and drums for industrial use and/or

S. No	Name of HW	Source of generation	Type of utilization/Intended use
		paint formulation and beverages industries	production of plastic granules.
13	Process and primary sludge of ETP – Pulp and Paper	Paper & Pulp Industry	Paper Board/ Mill Board / Card Board
14	Aluminium Dross	Refining and casting house of Aluminium smelter units	To recover aluminium metal (captive use)
15	Aluminium Dross	Refining and casting house of Aluminium smelter units	To recover aluminium metal
16	Oil based iron sludge	Grinding mill section of Ball & Roller bearings	Ferrous Sulphate <i>(Not to be used in drinking water purification or agriculture applications and to be used only for industrial purposes)</i>
17	Spent catalyst - Containing Mercury and mercury waste	Various industry	Mercury
18	Spent H ₂ SO ₄ containing organic compounds	Dye and Dye intermediates units	Chemical Gypsum for use in cement plants
19	Spent fixer (hypo) solution	Photography / X-rays films	Silver metal for various use
20.	Hydro fluoro silicic acid – Acidic scrubber solution	Single Super Phosphate manufacturing industry	Recovered Sodium Silico Fluoride (Sodium fluorosilicate)for use in Glass industry.
21.	Spent Sulphuric Acid	Para Nitro Toluene Ortho Sulfonic Acid/Oxadiargyl Anthraquinone manufacturing industry	Ferrous Sulphate
22.	Vanadium Sludge	Alumina refineries	Vanadium metal
23.	Phenolic Waste water	Coal Gasifier condensate water	Quenching of hot gases in After Burning Chamber of Direct-reduced iron (DRI) kiln of Sponge Iron Industry
24.	Chemical sludge(Primary sludge) of ETP	Pulp & Paper Industry	For energy recovery in Atmospheric Fluidized Bed Combustion (AFBC) Boiler/Pressurized Fluidized Bed Combustion (PFBC) Boiler/Circulating Fluidized Bed Combustion (CFBC) Boiler for steam or electricity generation
25.	Spent Carbon (Carbon Slurry)	Urea manufacturing plant	Quenching of carbon slurry in the reactor for manufacturing carbon black.
26.	Spent Acid containing Molybdenum compound	Bulb filament manufacturing industries	Ammonium Molybdate

S. No	Name of HW	Source of generation	Type of utilization/Intended use
27.	Resin Waste (mixture of Bisphenol A and Epichlorohydrin)	Resin impregnation of electrical coils power/hydro equipments industries	For manufacturing of High Tension/Low Tension Insulators
28.	Spent Alumina	Polymerization in SWING unit of Petrochemical Plant	For manufacturing of Refractory material like Insulation bricks, Mortar, Castables, High Alumina bricks
29.	Spent Ion Exchange Resin	Demineralization (DM) Plant	For energy recovery in boiler for steam or power generation
30.	Spent Ion Exchange Resin	Demineralization (DM) Plant	For energy recovery in Direct-reduced iron (DRI) kiln of Sponge Iron Industry
31.	Tungsten Scrap	Metal cutting operation (using Tungsten carbide insert), mining tool buttons and worn out drills	For manufacturing Tungsten Carbide Powder.
32.	Spent Pot Lining	During production of Primary Aluminium from Alumina Smelting Industries	As a supplementary resource for manufacturing of Carbon Mineral Fuel
33.	Spent Sulphuric Acid	During manufacturing of 4,4 Diaminobenzene Sulphanilide	Isolation and purification of 2-NADSFA & 6-Acetyl APSA
34.	Coal Tar/Tarry Residue	Coal gasifier units	As supplementary fuel in furnace for energy recovery in Frit manufacturing units
35.	Gasifier Slag containing Nickel & Spent Catalyst containing Molybdenum	Nitrogenous Fertilizer Industry	For manufacturing of Alloy steel ingots and stainless steel ingots
36.	Synthetic Oil based mud/drill cuttings	Generated from Oil & Natural Gas Exploration	Road Construction / Oil recovery
37.	Flue Gas Cleaning Residue	Bag filter connected to steel scrap melting induction furnace	Zinc Metal extraction
38.	Spent Sulphuric Acid and Spent Sodium Thiosulphate	Spent Sulphuric Acid (generated during manufacturing of 3, 5-Dichloro Nitro Benzene) and Spent Sodium Thiosulphate (generated during manufacturing of 3, 5-Dichloro Aniline and m-Chloro Aniline)	For manufacturing of Nitrosyl Sulphuric Acid (NSA)
39.	Spent Phosphoric Acid	Generated during manufacturing of	Dibasic Calcium Phosphate
40.	Spent Sulphuric Acid	Generated during manufacturing of Vinyl Sulphone	For production of H-acid
41.	Waste Dichromate Solution	Generated during manufacturing of Ibuprofen	For production of Basic Chromium Sulphate

S. No	Name of HW	Source of generation	Type of utilization/Intended use
42.	Used Waste Thinner	Generated during cleaning of paint feeding lines using solvents	For manufacturing of Industrial Primer to be used as Automotive Paints
43.	Spent Aluminium Chloride	Generated during the production of CPC Green and 2, 4, 6-Trimethyl Benzoyl Chloride	As a supplementary resource to manufacture liquid Aluminum Hydroxide Chloride/ Poly Aluminum Chloride for further use in ETP (as coagulant) and paper industry (as sizing material) .
44.	Spent Sulphuric Acid	generated during manufacturing of G-Salt	for production of R-Complex and Gamma-acid
45.	Spent Ammonium Chloride	generated during manufacturing of Hexamethyl Disilazane	production of Ammonium Chloride
46.	Spent Sulphuric Acid	generated during manufacturing of 4, 4-Diaminobenzesulfanilide (DABSA)	for manufacturing Para Amino Benzene Sulphonic Acid (PABSA)
47.	Spent Liquid Glauber Salt	generated from ethoxylation step of Para Base Vinyl Sulphone manufacturing process	for manufacturing of Reactive Dye (Reactive Orange 2R)
48.	Spent Alkali Bromide and Spent Acid Bromide	Generated during manufacturing of pesticides, pharmaceuticals, and organic chemicals.	For production of liquid bromine
49	Spent Sulphuric acid	Generated during dye & dye intermediates and chemical manufacturing process.	As a neutralizing agent in CETP/ETP
50	Spent Ammonium Carbonate	Generated during manufacturing of Copper Pthalocyanin blue (CPC Blue)	For manufacturing of zinc carbonate and copper carbonate
51	Spent Aluminium dross residue/ rejects	Generated from aluminium smelting process	For production of calcium aluminate (synthetic slag)
52	Tarry residue waste	From coal gasifier unit	For production of Creosote oils and Coal tar pitch
53	Spent Sulphuric Acid	From dyes & dyes intermediate industries	production of another dyes and dye intermediate products
54	Aluminium dross residues	Generated from separation of metal from Aluminium dross or Aluminium dross reprocessing units	For manufacturing of Alum

Type of wastes till 54th SoP is 40.