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 HCl (generated during chlorination of organic compounds) in pickling operation of Ferrous materials

November, 2024

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

Procedure for grant of authorization by State Pollution Control Boards (SPCBs)/Pollution Control Committees (PCCs) for utilization of Hazardous waste

1) While granting authorization for utilization of hazardous wastes, SPCBs/PCCs shall ensure that authorization is given only to those wastes for which Standard Operating Procedures (SoPs) for utilization have been circulated by Central Pollution Control Board (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) Authorization 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.
   f) Monitor closely the quantity of hazardous waste (spent HCl) being sent by generators and the quantity being utilized by authorized facilities in picking operations.
2) After issuance of authorization, SPCBs/PCCs shall verify the compliance of checklist and SoP on quarterly basis for initial 1 years; followed by random checks during subsequent period for at least once a year. The compliance reports may be submitted to CPCB.
3) In-case of lack of requisite infrastructures with the SPCBs/PCCs, 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.
4) SPCBs/PCCs 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/PCC website, periodically. Such updated list shall be sent to CPCB.
5) Authorization for utilization shall not be given to the units located in the State/Union Territory where there is no Common TSDF, unless the unit ensures authorized captive disposal of the hazardous waste (if any generated during utilization) or its complete utilization or arrangement for transfer to authorized disposal facility.
6) 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 thereof.
7) The source and work zone standards suggested in the SoP are based on E(P)A notified and OSHA standard respectively, however, SPCBs/PCCs may impose more stringent standards based on the location or process specific conditions.
8) SPCBs/PCCs shall ensure that the utilizer of spent HCl shall maintain daily records in National Hazardous Waste Tracking System (NHWTS).

110.0 Utilization of Spent HCl:

Type of HW	Source of generation	Recovery/Product
Spent HCl is categorized as Class B15 Inorganic Acids of Schedule II of HOWM Rules, 2016	Generated during chlorination of organic compounds	In pickling operation of ferrous material

110.1 Source of Waste:

Spent HCl generated during chlorination of organic compounds may be categorized under Class B-15 (Inorganic acids) of Schedule II of HOWM Rules, 2016, which is required to be disposed in an authorized disposal facility in accordance with condition, when not utilized as resource recovery.

Table 1. Typical Characteristics of Spent HCl

Sr. No.	Parameters	Unit	Results
1.	pH	-	< 2.0
2.	Total Acidity as HCl	%	30
3.	Total Organic Carbon	mg/l	<1500
4.	Chemical Oxygen Demand	mg/l	3200
5.	Chloride	%	29
6.	Silica as SiO_2	mg/l	0.5
7.	Iron	mg/l	1
8.	Total Fluoride	mg/l	4
9.	Zinc	mg/l	0.5
10.	Total Chromium	mg/l	0.16
11.	Arsenic	mg/l	BDL
12.	Lead	mg/l	BDL
13.	Manganese	mg/l	BDL

Note: SPCBs/PCCs to check the characteristics of spent HCl prior to issuance of authorization, any significant deviation with respect to typical values mentioned in the table above may be examined with respect to the source or may be referred to CPCB.

110.2 Utilization Process

Pickling process carried out to remove the impurities such as stains, scale, inorganic contaminants and rust from metal surface prior to operations such as galvanizing, electroplating, rolling, etc.

Spent HCl shall be pre-treated to obtain the TOC level <150 mg/L, based on the initial TOC content in the Spent HCl. Further the pickling solution is prepared in pickling tank by mixing spent HCl & water to lower the concentration of acid from 30% to 8-10%. Thereafter, ferrous materials/ steel alloys passes through this pickling tank and the impurities are removed from the surface.

Wastewater (i.e., pickling liquor) shall be treated in the ETP before discharging as per the standards prescribed by concerned SPC/ PCC.

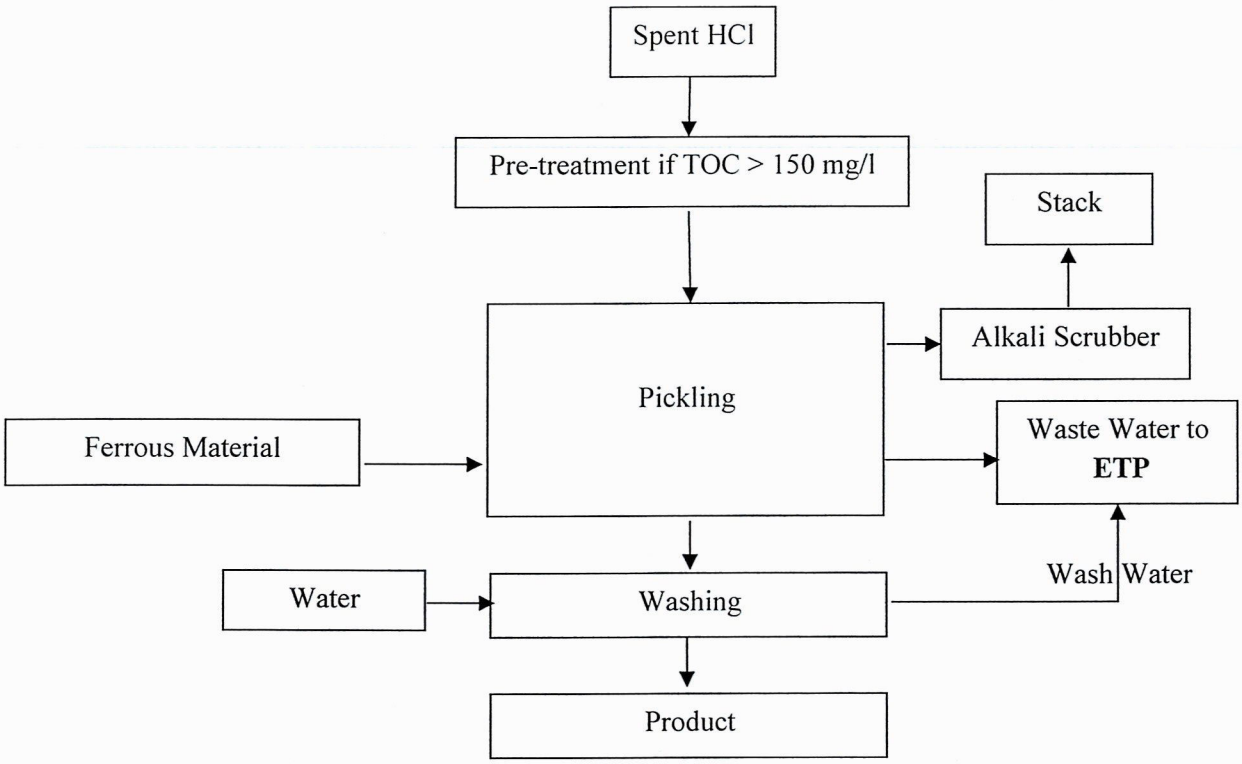

Figure: 1-*Process flow diagram for utilization of spent HCl in pickling process*

110.3 Standard Operating Procedure for utilization

This SoP is applicable only for utilization of spent HCl (generated during chlorination of organic compounds) in pickling operation of ferrous material.

1) The Spent HCl shall be procured only in SPCB/PCC authorized acid proof barrels/closed tanks with acid proof liners, mounted over vehicles fitted with requisite safeguards ensuring no spillage of the acid.

2) There shall be a designated space for unloading of spent HCl to the storage tank made of Stainless steel/tanker with acid proof liners. The receiving storage tank shall be placed above the ground and contained with low raise parapet/bund wall with slope to collect spillages, if any, into the collection pit.

3) The unit shall install storage tanks under cool, dry, well ventilated covered storage shed(s) within premises, as authorized by the concerned SPCB/PCC under HOWM Rules, 2016.

   Further, the unit shall provide separate storage area at designated place which have leak-proof floor tiles with adequate slope to collect spillage, if any, into a collection pit. The spillage from collection pit shall be transferred to ETP, as the cases may be, through chemical process pump.

4) There shall be no manual handling of spent HCl. Spent HCl shall be unloaded from the closed tanker to the storage tank through pipelines using dedicated transfer pump. The

feeding of Spent HCI shall be done through closed loop pipelines using dedicated transfer pump.

5) The unit shall not procure Spent HCl having TOC > 1500 mg/l. Further, the unit shall ensure that prior to utilization at production stage, TOC level of Spent HCl should be less than 150 mg/l. Accordingly, necessary pre-treatment facility with activated carbon treatment system shall be installed.

6) Negative pressure and adequate fume extraction system followed by alkali scrubbing system shall be provided in the working zone of picking operations. Also, the vent of Spent HCl storage tanks shall be connected to the alkali scrubber.

7) The treated gases/fumes shall comply with emission norms prior to dispersion into atmosphere through stack. The stack height shall be minimum of 30 m from ground level or as prescribed by the concerned SPCB/PCC, whichever is higher.

8) Treatment and disposal of wastewater:

   Wastewater generated from floor-washings, spillages, washing, scrubber bleed, pickling liquor etc. shall be treated Physico-Chemically in an ETP or may be sent to CETP ensuring compliance with the prescribed treated water discharge standards.

   In case of zero discharge, treated wastewater from ETP shall meet discharge norms and to be recycled in cooling of hot metal after annealing operation or any other usage as per conditions stipulated by the SPCB/PCC.

9) The treated effluent shall be discharged in accordance with the conditions stipulated in the Consent to Operate issued by concerned SPCB/PCC under the Water (Prevention and Control of Pollution) Act, 1974.

10) The hazardous wastes generated (namely the ETP sludge, residue from pickling tank etc.) shall be collected and temporarily stored in non-reactive drums/ bags under a dedicated hazardous waste storage area and be sent to authorized common TSDF or other authorized facility within 90 days from its generation of the waste in accordance with the authorization issued by the concerned SPCB/PCC as per HOWM Rules, 2016. Such storage area shall be covered with proper ventilation.

11) The unit shall ensure that the Spent HCl is procured from the industries, which have valid authorization from the concerned SPCB/PCC as required under HOWM Rules, 2016.

12) Transportation of Spent HCl shall be carried out by sender (generator) or receiver only after obtaining authorization from the concerned SPCB/PCC under HOWM Rules, 2016. Requisite manifest document shall be followed as laid down under the said Rules.

13) Prior to utilization of Spent HCl, the unit shall obtain authorization for collection, storage and utilization of Spent HCl from the concerned SPCB/PCC under HOWM Rules, 2016.

14) 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.

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, flame proof electrical fittings and on site emergency plan approved by concerned agency.

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.

110.4 Product Usage / Utilization

Pickling solution prepared from spent HCl shall be utilized for pickling of ferrous materials/ steel alloys and shall not be allowed for preparation of solution intended to other than pickling process.

110.5 Record/Returns Filing

1) The unit shall maintain a passbook issued by concern SPCB/PCC and maintain details of each procurement of Spent HCl as mentioned below:
   - Address of the sender
   - Date of dispatch
   - Quantity procured
   - Seal and signature of the sender
   - Date of Receipt in the premises

2) A logbook with information on source and date of procurement of Spent HCl, date wise utilization of the same, hazardous waste generation and its disposal, etc. shall be maintained including analysis report of fugitive emission monitoring & effluent discharged as applicable.

3) The unit shall maintain record of hazardous waste generated, utilized and disposed as per Form-3&also file annual return in Form-4 as per Rule 20(1) and (2) of HOWM Rules, 2016, to concerned SPCB/PCC.

4) 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/PCC.

5) The unit shall use NHWTS to manage the manifest, enter daily records of quantity generated, disposed, etc.

110.6 Standards

1) Source emissions from the stack of scrubber attached to pickling tank shall comply with the following emission standards or as prescribed by the concerned SPCB/PCC, whichever is stringent;

Particulate Matter	150 mg/Nm^3
Acid mist (HCl)	35 mg/Nm^3

2) Fugitive emission in the work zone area shall comply with the following standards:

PM_{10}	5 mg/m^3 *TWA
Acid Mist (HCl)	7 mg/m^3 #
Chlorine	3 mg/m^3

**TWA – Time Weighted Average for 8 hours; #C – Ceiling limit: A ceiling limit is one that may not be exceeded for any period of time, and is applied to irritants and other materials that have immediate effects.*

3) Monitoring of the above specified parameters for source emission shall be carried out quarterly for first year followed by at least annually in the subsequent year of utilization. Fugitive emission for specified parameters shall be carried out quarterly. The monitoring shall be carried out by ISO 17025 accredited or EPA, 1986 approved laboratories and the results shall be submitted to the concerned SPCB/PCC on a quarterly basis.

4) Standard for wastewater discharge: Treated effluent generated (if any) shall be discharged in accordance with the conditions stipulated in Consent to Operate issued by concerned SPCB/PCC under the Water (Prevention and Control of Pollution) Act, 1974. In case of (i) zero discharge as per consent or (ii) non-availability of the common Effluent Treatment Plant (CETP), the unit shall achieve zero discharge by setting up adequate captive treatment facility.

110.7 Siting of Industry

Facilities for utilization of Spent HCl shall be preferably located in a notified industrial area or industrial park/estate/cluster and in accordance with Consent to Establish issued by the concerned SPCB/PCC.

110.8 On-line Detectors / Alarms / Analyzers

In case of continuous process operations, online emission analyzers for PM and HCl (acid mist) in the stack shall be installed and the online data be connected to the server of the concerned SPCB/PCC and CPCB.

110.9 Size of Plant and Efficiency of Utilisation:

Spent HCl is diluted with water and the ferrous sheets/ wires are dipped in the the pickling tank containing dilute acid. Therefore, requisite facilities of adequate size of storage shed and other plant & machineries shall be installed accordingly.

110.10 Checklist of Minimal Requisite Facilities

Sr. No.	Particulars
1.	Storage tanks of adequate capacity to store Spent HCl placed above the ground and contained with low rise parapet/bund wall and acid proof floor with slope to collect spillages, if any, in to collection pit.
2.	Cool, dry well-ventilated covered sheds for Spent HCl storage tanks and process activities within premises and dedicated hazardous storage area for temporary storage of hazardous waste generated during utilization process. Connect storage tanks with fume extraction system.
3.	Fume extraction system should be connected to alkali scrubbing system and a stack.
4.	Mechanized system for transfer of Spent HCl from storage tanks to pickling tanks.
5.	Fume extraction hood over picking tanks connected to alkali scrubbing system and stack.
6.	Pumps, pipes, feeders and equipment for mechanical handling of Spent HCl.
7.	Pre-treatment facility with activated carbon treatment system to ensure that Spent HCl shall meet a limit of TOC < 150 mg/l before utilization, if TOC >150 mg/l.
8.	Adequate ETP for Physico-Chemical treatment of wastewater generated from process, washing, scrubber bleed etc. A system to recycle treated wastewater after meeting discharge norms for re-use in cooling of hot metal after annealing operation, or as prescribed by SPCBs/PCCs.
9.	Adequate fume extraction system followed by alkali scrubber shall be provided as pollution control measures for work zone emission & Spent HCl storage tank.
10.	Stack to have sampling port, platform, access to the platform etc. As per the guidelines on methodologies for source emission monitoring published by CPCB under Laboratory Analysis Techniques LATS/80/2013-14.

*****