

**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 Ammonia Liquor (generated during manufacturing of Pesticide products) in manufacturing of Liquor Ammonia**



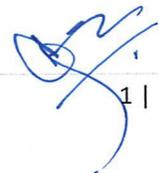
**February, 2022**

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

**Utilization of Spent Ammonia Liquor (generated during manufacturing of Pesticide products) in manufacturing of Liquor Ammonia**

**Procedure for grant of authorization by State Pollution Control Board (SPCBs)/Pollution Control Committee (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 utilisation have been circulated by Central Pollution Control Board (CPCB) ensuring the following:
  - a. The waste (intended for utilization) belongs to same source of generation as specified in SoP.
  - b. The utilization shall be same 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.
- 2) After issuance of authorization, SPCBs/PCCs shall verify the compliance of checklist and SoP on quarterly basis for initial 2 years; followed by random checks during subsequent period for atleast once a year. The compliance reports shall be submitted to CPCB by July every year.
- 3) In-case of lack of requisite infrastructures with the SPCBs/PCCs, they may engage 3rd party institutions or laboratories having EPA, 1986/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) [HOWM] Rules, 2016 to CPCB and also upload the same on SPCB/PCC website, periodically. Such updated list shall be sent to CPCB on half yearly basis i.e., by July and January respectively.
- 5) Authorization for utilisation shall not be given to the units located in the State/Union Territory 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.
- 6) In case of the utilization proposal is not same 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 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/NAAQ standard, respectively. However, SPCBs/PCCs may impose more stringent standards based on the location or process specific conditions.



## Utilization of Spent Ammonia Liquor (generated during manufacturing of Pesticide products) in manufacturing of Liquor Ammonia

### 79.0 Utilization of hazardous waste (H.W.):

Type of HW	Source of generation	Recovery/Product
Spent Ammonia Liquor (Category: 29.1, Schedule-I of HOWM Rules – 2016)	Generated during manufacturing of Pesticide products.	Liquor Ammonia

### 79.1 Source of Waste:

Spent Ammonia Liquor generated during manufacturing of Pesticide product is categorized as Hazardous waste listed at Category: 29.1, Schedule-I of HOWM Rules –2016.

**Table 1. Typical Characteristics of Spent Ammonia Liquor**

Sr. No.	Parameter	Unit	Result
1.	pH	-	12.50
2.	Appearance	-	Hazy White
3.	Purity (By mass)	%	18.42
4.	Specific Gravity (by mass)	%	0.915
5.	Ammonia	%	18.40
6.	Trimethylphosphite (Pesticide)	ppm	BDL
7.	TOC	ppm	1.267

### 79.2 Utilization Process

Spent Ammonia Liquor is transferred to the spent ammonia Process (absorption) tank. The anhydrous ammonia stored in the holding tank is purged in to the absorption tank, and converted into liquor ammonia of required percentage. The spent liquor with lesser percentage of ammonia is converted to desired percentage by purging the anhydrous ammonia.

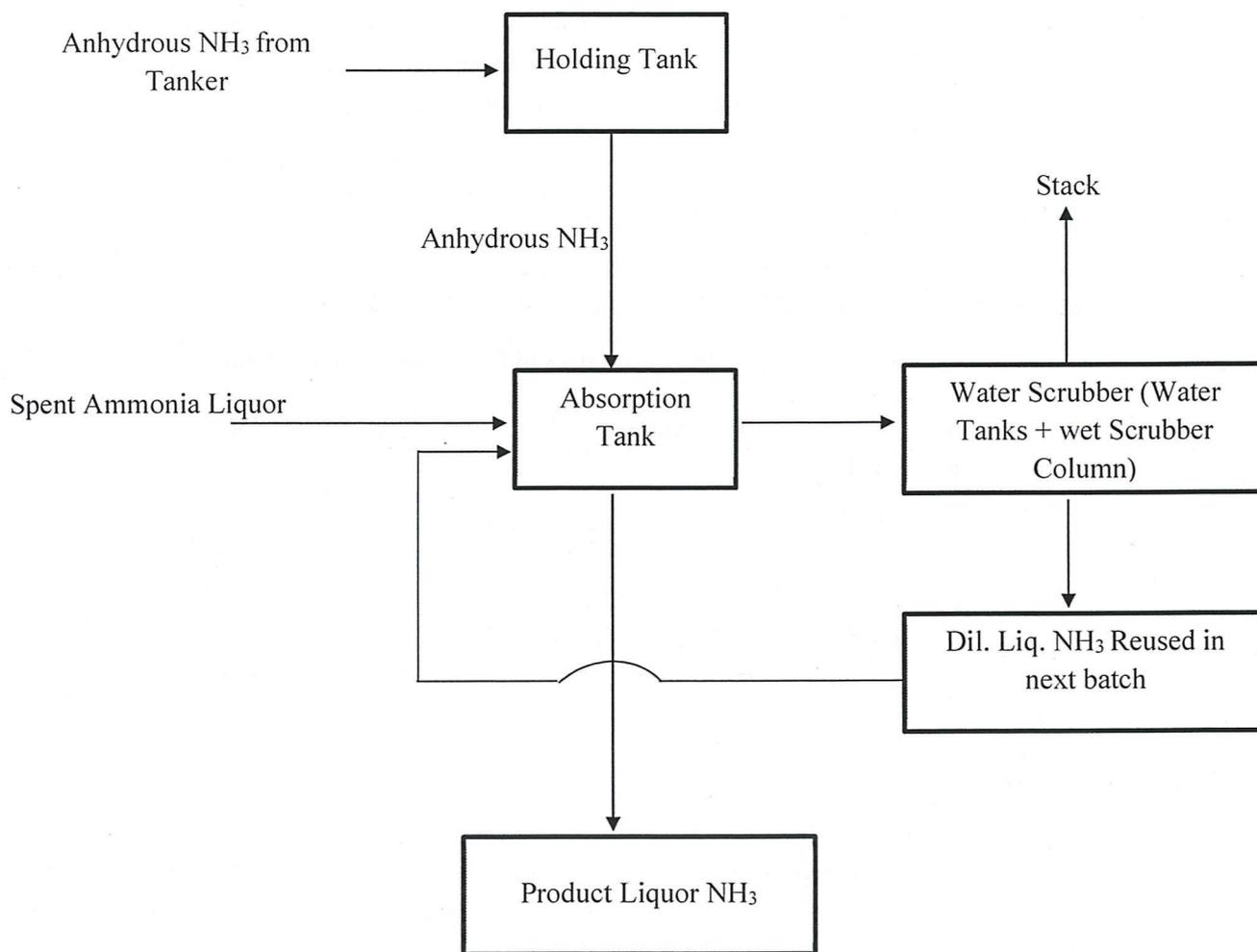
Unabsorbed ammonia gas from the process tank is scrubbed in water tanks followed by scrubber column as air pollution control device (APCD). Generated dilute liquor ammonia from scrubber and the absorbing water tanks is reused back in the process tank.

### 79.3 Product Usage / Utilization

1. The product Liquor Ammonia manufactured by utilizing Spent Ammonia Liquor generated during manufacturing of Pesticide product shall be utilized for Industrial grade only exempting food and pharma industries.
2. The Product i.e. Liquor Ammonia shall comply Bureau of Indian Standards (BIS), for further respective utilization.
3. The unit shall label its product i.e. Liquor Ammonia manufactured by utilizing aforesaid Spent liquor ammonia as *"This Liquor Ammonia has been manufactured by utilizing Spent Ammonia Liquor generated from manufacturing of Pesticide"*.

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**Figure: 1-Process flow diagram for utilization of hazardous waste.**

#### **79.4 Standard Operating Procedure for utilization**

This SoP is applicable only for Utilization of Spent Ammonia Liquor (generated during manufacturing of Pesticide products) in manufacturing of Liquor Ammonia.

- 1) Spent Ammonia Liquor shall be procured only in SPCB/PCC authorized barrels/closed tanks mounted over vehicles fitted with requisite safeguards.
- 2) Spent Ammonia Liquor shall be stored in dedicated storage tanks on acid proof brick lined area under covered storage shed within premises. Further, storage sheds shall have proper slope and seepage collection pit to collect seepage / floor washing. The collected seepage / floor washing shall be channelized to Effluent Treatment Plant for further treatment.
- 3) Transfer of Spent Ammonia Liquor from storage tank shall be carried out through dedicated mechanical transfer pump with fixed pipeline.

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- 4) Material transfer / handling in entire utilization process shall be done without manual interventions in closed system.
- 5) The unit shall provide separate storage tanks for storage of fresh chemicals and hazardous waste. The storage tanks should be at designated place with proper cover and with acid brick lining floors.
- 6) The unit shall obtain necessary permission from Petroleum & Explosives Safety Organization (PESO) for storage of ammonia.
- 7) The unit shall provide jacketed process (absorption) tank with water tanks followed by wet scrubber column as air pollution control device (APCD). Process tank shall have temperature sensors and temperature shall be maintained by circulating cooling media in the jacket.
- 8) The unit shall ensure for measurement of specific gravity of scrubbing water at regular intervals for determination of saturation level.
- 9) The treated gases shall comply with emission norms prior dispersion into atmosphere through stack. The stack height shall be minimum of 30m from ground level or as prescribed by the concerned SPCB/PCC, whichever is higher.
- 10) Continuous automatic sensors / detectors for ammonia with alarm / hooter shall be provided in process area.
- 11) 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.
- 12) Treatment and disposal of wastewater generated from floor-washings, spillages, equipment washing, scrubber bleed shall be reused in the process or treated Physico-Chemically in an ETP or may be sent to CETP for final disposal or be treated further in a captive facility to comply with surface water discharge standards. In case of zero discharge, the treated waste water from ETP may be managed as per conditions stipulated by the SPCB / PCC.
- 13) 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.
- 14) The hazardous wastes generated (if any) 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 generation of the waste in accordance with the authorization issued by the concerned SPCB / PCC. Such storage area shall be covered with proper ventilation.
- 15) The unit shall ensure that the Spent Ammonia Liquor is procured from authorized industries as required under HOWM Rules, 2016.

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- 16) Transportation of Spent Ammonia Liquor shall be carried out by sender (generator) or receiver (utilizer) only after obtaining authorization from the concerned SPCB under HOWM Rules, 2016. Requisite manifest document shall be followed as laid down under the said Rules.
- 17) Prior to utilization of Spent Ammonia Liquor, the unit shall obtain authorization for generation, storage and utilization of Spent Ammonia Liquor from the concerned SPCB/PCC under HOWM Rules, 2016.
- 18) 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.
- 19) The unit shall provide suitable fire safety arrangements and flame proof electrical fittings.
- 20) 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. The unit shall provide suitable fire safety arrangements and flame proof electrical fittings.

**79.5 Record>Returns Filing**

- 1) The unit shall maintain a passbook issued by concern SPCB/PCC and maintain details of each procurement of Spent Ammonia Liquor 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 log book with information on source and date of procurement of Spent Ammonia Liquor, 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 an 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.

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**79.6 Standards**

- 1) Source emissions from the stack connected to reactors/process unit shall comply with the following Emission standards or as prescribed by the concerned SPCB/PCC, whichever is stringent;

Particulate Matter	50 mg/Nm <sup>3</sup>
NO <sub>x</sub>	50 ppm
SO <sub>2</sub>	100 ppm
H <sub>2</sub> S	50 mg/Nm <sup>3</sup>
NH <sub>3</sub>	175 mg/Nm <sup>3</sup>

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

NH <sub>3</sub>	35 mg/m <sup>3</sup> TWA* (PEL)
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*\*PEL - Permissible Exposure Limit.*

*\*time-weighted average (TWA)- measured over a period of 8 hours of operation of process.*

*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. Work zone 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 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 zero discharge or no discharge condition stipulated in the consent or non-availability of the common Effluent Treatment Plant (CETP), zero discharge shall be met.

**79.7 Siting of Industry**

Facilities for utilization of Spent Ammonia Liquor 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.

**79.8 Size of Plant and Efficiency of Utilisation**

Approximately 25MT of Liquor Ammonia (Purity around 25%) is produced by using approximately 23.5MT of Spent Ammonia Liquor (purity around 18%). Therefore, requisite facilities of adequate size of storage shed and other plant & machineries shall be installed accordingly.

**79.9 On-line Detectors / Alarms/ Analyzers**

Continuous automatic sensors / detectors for ammonia with alarm / hooter shall be provided in process area. In case of continuous process operations, online emission analyzers for SO<sub>2</sub>, NO<sub>x</sub>,

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NH<sub>3</sub> in the stack shall be installed and the online data be connected to the server of the concerned SPCB/PCC.

**79.10 Checklist of Minimal Requisite Facilities:**

Sl. No	Particulars
1.	Dedicated storage tank for storage of Spent Ammonia Liquor with acid proof brick lining and proper slope & seepage collection pit.
2.	Ammonia storage tank approved by Petroleum & Explosives Safety Organization (PESO).
3.	Mechanical transfer pumps with fixed pipeline for transportation and handling of Spent Ammonia Liquor.
4.	Jacketed process (absorption) tank with purging provision in water tanks followed by scrubber column as air pollution control device (APCD). Process tank shall have temperature sensors and temperature shall be maintained by circulating cooling media in the jacket.
5.	Material transfer / handling in entire utilization process shall be done without manual interventions in closed system.
6.	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.
7.	Online analyzers for SO <sub>2</sub> , NO <sub>x</sub> , NH <sub>3</sub> emission monitoring in the stack, in case of continuous process operations.

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