REPORT OF THE JOINT COMMITTEE CONSTITUTED IN COMPLIANCE WITH THE HON'BLE NGT (SZ) ORDER DATED SEPTEMBER 01, 2020 IN ORIGINAL APPLICATION NO. 162 OF 2020 IN THE MATTER OF SUO MOTO CASE REGISTERED BY NGT.

1.0 Preamble

The National Green Tribunal (NGT) Southern Zone, Chennai in O. A. No. 162 of 2020 in the matter of SUO MOTO case has passed an order dated September 01, 2020 and the operative portion of the order is reproduced as under and the copy of the NGT order is annexed as ***Annexure 1***:

"15. ……*we feel it appropriate to appoint a joint committee comprising of 1) the District Collector, Chittoor District, 2) a Senior Officer from the Andhra Pradesh State Pollution Control Board as designated by the Chairman of Andhra Pradesh State Pollution Control Board 3) a Senior Officer from the Central Pollution Control Board, Regional Office, Chennai to inspect the unit in question and submit a factual as well as action taken report, including imposition of environmental compensation and compensation for the victims and remedial measures to be provided to avoid such things in future.…."*

2.0 Constitution of the Joint Committee

In compliance with the order dated September 10, 2020; as a nodal agency, Central Pollution Control Board (CPCB), Regional Directorate (RD), Chennai vide letter dated September 29, 2020 requested the concerned organization/departments to nominate an official from their organization. Based on the nomination received from the concerned organization, CPCB vide office memorandum no. Tech/02/legal/RDC/2020-21/660 dated October 13, 2020 constituted a Joint Committee (***Annexure 2***), comprising the following members:

i. Sh. Murali M S, District Revenue Officer, Chittoor, District Chittoor
ii. Sh. Narendra Babu, Environmental Engineer, Regional Office, Tirupati, Andhra Pradesh Pollution Control Board (APPCB).
iii. Smt. Poornima B M, Scientist D, CPCB, RD, Chennai

The Joint Committee over telephone discussed Terms of References (TOR) of the committee and decided to visit the site (M/s Hatsun Agro Production Ltd., Chittoor) on October 15, 2020.

2.1 Terms of References (ToR) of the Joint Committee

The following are the TOR of the joint committee:

a. To inspect the unit in question and submit a factual as well as action taken report.
b. To assess the environmental compensation for the violation committed by the unit applying the 'principle of polluters pay' and also applying the absolute liability principle.
c. To verify whether any steps have been taken to pay compensation to the victims who have suffered on account of the incident.
d. To suggest remedial measures to be provided by unit to avoid such things in future.

3.0 Site visit by the Joint Committee

CPCB (nodal agency) through telephone discussed the action plan to proceed further in compliance to the NGT order. The committee inspected the industry in question (M/s Hatsun Agro Products Ltd., Chittoor) on October 15, 2020 and interacted with industry officials, personnel who were present during the incident on August 20, 2020 and the victims of the incident.

3.1 *About M/s Hatsun Agro Products Ltd.*

3.1.1 General Information: M/s Hatsun Agro Products Ltd. is a dairy industry producing milk & flavoured milk – 25 KLD, curd & paneer-500 TPA, butter milk – 75 KLPA and ghee, cheese/butter – 400 TPA. The unit is located at Sy. No. 821 & 822, Vavilthota village, Bandapalli Panchayath, Puthalapattu Mandal, Chittoor District in about 6.58 acres with built-up area of 1.28 acres and green belt area of 2.0 acres.

M/s Hatsun Agro Products Limited is located at latitudes 13°18'52.0"N; Longitudes 79°06'23.9"E. The industry is surrounded by

North: Agricultural Land
South: Mango garden
East: High way
West: Hillock

The industry has total of 250 persons employed including 110 permanent workers and 140 contract workers.

3.1.2 Statutory Requirement:

The industry has obtained combined consent for operate (CFO) and Hazardous waste authorization valid up to February 28, 2021. In addition, the unit has also obtained Expansion CFO on January 5, 2019 valid up to November 30, 2023 from Andhra Pradesh Pollution Control Board (APPCB). Industry has started its production activities (Expansion) after obtaining the CFO of the Board valid up to November 30, 2023.

3.1.3. Process Description:

Milk is delivered to milk plant /dairy in cans /tankers. The milk in these containers are graded, emptied, measured by weight sample and bulked to provide continuity of supply to the pasteurizing equipment. To improve aesthetic quality of milk, it is filtered by removing visible foreign and suspended foreign particles by passing milk through filters (Nylon filters for cans, Line Filter for Tankers). Then it is chilled to <40C to prevent deterioration in its bacteriological quality during the interim period. Cooling is done through passing the milk in plate chiller with chill water as cooling media. Then it is stored to ensure uniform composition, to facilitate standardization of milk and also to maintain milk at low temperature so as to prevent any deterioration in quality prior to processing / product manufacture.

Description of market milk process:

To render milk safe for human consumption and to improve keeping quality of milk, the milk is processed in three stages viz. Standardization, Homogenization and Pasteurization. After pasteurization milk is immediately chilled to 4˚C to retain the effect of pasteurization. Then it is stored in silos. The milk is packed automatically in Low Density Polyethylene (LDPE) pouches. The pouches are arranged in crates and sent to cold room, where it is stored at ≤5˚C so as to check the bacterial growth. Finally, the pouches arranged in crates are dispatched to consumers in PUF insulated or refrigerated containers vehicles as per the orders received.

As per the consumers requirement, the milk is processed to produce curd, paneer, butter, buttermilk etc.

4.0 Incident at Hatsun Agro Products Limited and causes for incident

An incident occurred in the industry at 6:00 PM on August 20, 2020 (Thursday) during the II shift (2 PM to 10 PM).

4.1 Sequence of events:

The industry has erected new ammonia receiver tank of capacity 2000 kgs in addition to the existing ammonia receiver (2000 kgs capacity) in view of expansion of the production.

August 17, 2020	The new ammonia receiver tank was erected.
August 20, 2020, 6:00 PM	The leak was noticed by technician Sh. N. Balaji while connecting the new ammonia receiver to the existing line. The leak of ammonia gas happened at the pipeline adjacent to the accumulator.
August 20, 2020, 6:02 PM	Sh. Balaji, Technician informed to Sh. A. Sendhil Kumar, senior assistant manager.
August 20, 2020, 6:05 PM	The 25 female were working the stacking of packed pouches of milk & curd into crates. Meanwhile, the workers inhaled the ammonia gas and the management staff evacuated the workers.
August 20, 2020, 6:06 PM	Sh. A. Sendhil Kumar along with electrician Sh. Silambarasan rushed to the spot wearing self-contained breathing apparatus (SCBA).
August 20, 2020, 6:14 PM	Sh. Silambarasan arrested the ammonia leak by tightening the bolts of the filter pipeline
August 20, 2020,6:40 PM	Resumed the operation and stacking of packed pouches started.
August 20, 2020, 7:45 PM	The female workers started symptoms such as eye and throat irritation, vomiting, shortness of breathing, etc. due to inhalation of ammonia gas.
August 20, 2020, 7:50 PM	14 female workers were shifted to Chittoor Govt. Hospital
August 20, 2020, 8:30 PM	News item telecasted in electronic media

4.2 Causes for the incident:

The following are the possible reasons that caused ammonia gas leakage:

i. The new ammonia receiver tank of 2000 kgs capacity was erected and the industry failed to follow the SOPs or proper procedure and started operation. While trying to connect to the existing pipeline charging with ammonia gas, the leakage happened due to the damage of gasket used in the filtration system.
ii. Usually the liquid ammonia is sent to the accumulator through filtration system to arrest any particles before letting into cold storage area.
iii. The industry failed to follow the SOPs and allowed the workers to operate while charging the new ammonia receiver. Once the gas leakage was noticed, failed to evacuate the workers immediately.
iv. The industry failed to install the ammonia gas sensors with alarm system so as to alert the workers during leakage.
v. Though the ammonia gas leak was arrested within 15 minutes duration, the risk assessment was not carried out after arresting the ammonia gas leak and allowed the workers to continue operation, due to which the health of the 14 female workers were affected.
vi. The incident mainly happened due to lack of standard operating procedures (SOPs) for erecting the new ammonia receiver, operational negligence and lack of training to handle the emergency situation.

4.2 Details of the victims:

During the ammonia gas leakage, total of 25 female workers were working in the stacking of packed pouches adjacent to cold storage area. 14 workers inhaled the ammonia gases who were closely working at the incident spot. After 5 minutes of the incident, the workers were evacuated and sent outside the process area. Once the gas leak was arrested, the industry resumed operations and workers started stacking the milk & curd pouches. After one hour, 14 contract workers started the symptoms like eyes & nose irritation, burning sensation of heart, vomiting etc. 11 workers were shifted to Chittoor Govt. Hospital for treatment and 3 workers were shifted to SVIMS hospital at Tirupati due to critical conditions. The list of contract workers is given in the table below:

Table 1: List of contract workers admitted to hospital due to the inhalation of ammonia gas

S. No.	Name	Work area	Age	Address
1	Smt. K. Ammulu	Curd packing	35	M. Bandhapalli
2	Ms. Thenmai	Milk packing	24	Chinnkalagivi
3	Smt. Kanniya kumari	Curd packing	35	M. Bjandhapalli
4	Ms. Amrutha	Packing	25	Bodireddy Kanadriga

5	Smt. Vinu	Security	35	Chinna Bandhapalli Vavil Thota
6	Smt. T. R. Reka	Milk packing	30	Bandhapalli
7	Smt. Valliyamal	Curd packing	42	Chinnakalagiri
8	Smt. Vasanthi	Curd packing	34	Bandhapalli
9	Smt. Manjula	Milk packing	48	Chinnakalakiri
10	Smt. Vijaya P	Curd packing	44	Chinna Bandhapalli
11	Smt. Vijaya M	Milk packing	38	Pethabandri Palli
12	Smt. Visala	Curd packing	37	Chinna Kalagiri
13	Smt. Muthama	Curd packing	48	Chinnakalagiri
14	Smt. Malathi	Milk packing	40	Chinnakalagiri

5.0 Measures taken by Hatsun Agro Products Limited, District Collector, APPCB, Fire Department and Inspector of Factories after the incident

5.1 *Measures taken by M/s Hatsun Agro Products Limited:*

When the workers started showing the symptoms of vomiting, eye & nose irritation, breathlessness, the industry immediately arranged to send the 14 workers to the Chittoor Govt, Hospital located at 14.5 kms. 11 workers were treated at Govt. hospital Chittoor and were at stable conditions. The remaining 3 workers were further shifted to SVIMS hospital at Tirupathi due to the crtical condition. The amount incurred for the treatment was borne by the industry and moral support was extended towards the family members.

However the industry failed to report the incident to APPCB and other concerned authorities, District Collector, Chittoor and APPCB, Regional Office were aware of the incident only after the news published in the local TV channels.

5.2 Immediate measures taken by the Collector & District Magistrate, Chittoor:

As per the instruction of the Collector, Chittoor a joint inspection was carried out by Deputy Chief Inspector of Factories, District Fire Officer, Deputy Commissioner of Labour, General Manager, District Industries Centre, Chittoor, Revenue Divisional Officer, Chittoor; APPCB, Regional Office, Tirupati and Deputy Superintendent of Police, Chittoor on August 20, 2020 at 9:45 PM and August 21, 2020 at 9:00 AM. The detailed enquiry report submitted to the District Collector is enclosed as ***Annexure 3***. As per the report, the causes of the accident are as follows:

i. The proper procedure not followed while erecting the new ammonia receiver.
ii. Failed to prevent the workers working in the area while charging the ammonia.
iii. Failed to provide the ammonia sensors to identify and give alarm to alert the workers if any leak of ammonia is there.
iv. The work permit system thoroughly not checked but issued on 20-08-2020.

5.3 Measures taken by APPCB:

APPCB officials came to know about the accident of ammonia gas leakage from the news published in the local news channels at 8:30 PM on August 20, 2020. The officials immediately informed Deputy Inspector of Factories and rushed to the industry at 9:30 PM and conducted preliminary inspection. The ammonia concentration in ambient air was measured at 9:30 PM on August 20, 2020 with handheld PID gas detector. The concentration of ammonia was 209 µg/m^3 and at ETP was 348 µg/m^3 at the North Side of the industry which is within the standard of 400µg/m^3. The predominant wind direction was N-W to S-E during monitoring. The concentration of ammonia was measured the next day (August 21, 2020) and observed to be 69.65 µg/m^3 at the accident area and no ammonia was detected in other areas.

APPCB also carried out manual ambient air quality monitoring for 24 hrs (August 20, 2020 to August 21, 2020) at the premises of the industry on August 20, 2020. The concentration of ammonia was 25.7µg/m^3 which is within the standard limit of 400µg/m^3. During the monitoring, the industry was not in operation. The copy of the analysis report is enclosed as Annexure 4. From the analysis result it was observed that the concentration of Particulate Matter (PM_{10}) was 196 µg/m^3 against the standard concentration limit of 100µg/m^3 for 24 hrs. It was reported that, during monitoring vehicle movement was observed, hence there was increase in the concentration level of particulate matter.

6.0 Action taken by APPCB, Deputy Chief Inspector of Factories, District Fire Officer and M/s Hatsun Agro Products Limited post-accident.

6.1 Directions issued by APPCB

APPCB issued show cause notice to the industry vide order dated August 21, 2020 for not providing ammonia sensor, failed to handle hazardous chemicals and violation of the consent to operate conditions. On the same day, APPCB Zonal Office, Kurnool issued the Stop Production Order to the industry under Sec.33 (A) of Water (Prevention and Control of Pollution) Amendment Act, 1988 and under Sec.31 (A) of Air (Prevention and Control of Pollution) Amendment Act, 1987 for non-compliance of Board directions and consent conditions.

The industry submitted compliance report and request letter dated August 26, 2020 to APPCB and after compliance verification, APPCB issued Revocation of Stop Production Order vide order dated September 17, 2020 with certain conditions under Sec.33 (A) of Water (Prevention and Control of Pollution) Amendment Act, 1988 and under Sec.31 (A) of Air (Prevention and Control of Pollution) Amendment Act, 1987.

6.2 Directions issued by Inspector of Factories post-accident

A show cause notice RNo.961/2020, dated 25.08.2020 has been issued to the Management Sri D. Sathyanarayanan, Occupier and Sri. M. Bhaskaran, Manager for contraventions of Rules and Acts under the Factories Act 1948 and Andhra Pradesh Rules, 1950.

6.3 Directions by District Fire Officer, Chittoor

After the joint inspection of the industry, show cause notice was issued for not obtaining NOC from the fire department vide order dated 21.08.2020.

6.3 Actions taken by the industry

i. The industry after receiving the Stop Production Order from APPCB, the operation was stopped and initiated actions for procuring ammonia gas sensors (3 nos) and alarm system (4 nos). The ammonia gas sensors (make: Ambetronics and model no GT-2500) and alarms are installed at ammonia receiver station and process hall to alert the workers during any leakage. At the process area, the automatic ventilator is also install to capture and ammonia gas leak and release to the atmosphere.
ii. During inspection, the committee verified the ammonia gas sensors and alarm system and also checked the working condition of the sensors and alarm.
iii. The industry has installed water curtain system at the ammonia receiver tanks to dissolve in case of any accidental leak. The committee verified the working conditions.
iv. The industry has also complied with the other conditions in the Stop Production Order.
v. The industry has replied for the show cause notice issued by the Inspector of Factories vide letter dated. 21.10.2020.
vi. The industry has applied for NOC from the fire department vide letter dated 04.09.2020.

7.0 Assessment of Environmental Compensation

The ammonia gas leakage at M/s Hatsun Agro Products Limited started at 6:00 PM on August 20, 2020 on top of cold storage area in the process hall. It was informed to the committee that the gas leakage was stopped within 15 minutes duration. The capacity of ammonia storage tank was 2tons and as per available records 800 Kgs of ammonia was remaining in the tank. Out of which 1 kgs of ammonia is discharged into the environment due to leakage.

Ammonia is a naturally occurring chemical in the atmosphere, as well as an essential man-made chemical. It is represented by the chemical formula NH3. Ammonia in this form is also known as ammonia gas or anhydrous (“without water”) ammonia. At room temperature, ammonia is a colourless, pungent-smelling gas, lighter than air and has a high affinity for water. If ammonia gas escapes from a refrigeration system or a storage container in dry air, it will tend to rise to high areas or ceilings. However, ammonia may stay low to the ground in moist air, as the reaction between ammonia and water will form a white cloud that is heavier than air.

Ammonia gas is very irritating to the eyes, nose, and respiratory system. These health effects make it easy to detect low concentrations in the air. Depending on the concentration, exposure to ammonia can cause coughing, chest pain, breathing difficulty, bronchopneumonia, pulmonary edema and death from bronchial spasm. According to the Occupational Safety and Health Administration (OSHA), the least amount of ammonia which is found to be irritating to the eyes, nose and throat of the most sensitive individuals is 50 ppm.

In this case of gas leakage, the industry noticed the gas leak and arrested within 15 minutes, however, it was reported that around 1 kg of ammonia was released into air. The workers operating in the process area was evacuated within 5 minutes. The industry started its operation after 30 minutes without taking any risk assessment study and allowed the workers to operate. After one hour of operation, the workers started complaining of eyes, nose and throat irritation, vomiting etc. due to the continuous exposure of ammonia.

In this incident, there was no fatal and grievous, the workers after treatment from the Government Hospital were stable without any serious injuries and were discharged from the hospital.

The assessment of environmental damage is linked with serious cases of pollution, contamination and loss to biodiversity and is often dealt with environmental liability regulations and through environmental compensation under the ambit of 'polluter pays principle'. During visit to M/s Hatsun Agro Products Limited, committee members did not notice any visible damages to the industry, environment, properties and surrounding areas. The incident was confined to the process area and was not spread to outer area. The symptoms due to inhalation of ammonia gas were experienced only by the workers working in the process area. The workers working outside the process area did not experience any symptoms. Hence the committee has not calculated environmental compensation.

8.0 Compensations paid to the victims.

Total of 14 female contract workers working in the stacking area of the process showed the symptoms of ammonia inhalation such as eyes, nose & throat irritation, vomiting, breathing difficulty on August 20, 2020 at 7:40 PM. The workers were taken to Government Hospital, Chittoor for treatment. 11 workers after treatment were stable, however 3 workers whose condition was critical was shifted to SVIMS hospital at Tirupathi for further treatment. It was informed to the committee that, the 11 workers were admitted at Govt. Hospital, Chittoor was discharged from the hospital on August 24, 2020 and August 25, 2020 depending on recovery. The 3 workers admitted in SVIMS hospital was discharged on August 22, 2020 after recovery. The entire expenditure occurred for the treatment was borne the industry.

It was informed to the committee that, the 14 female contract workers were hired from four different agencies. The management after consultation with District Collector and MLA of the Chittoor district decided to pay a compensation of Rs 2 lakhs each for 11 workers and Rs 4 lakh each for 3 workers based on their condition of health during incident. Since the workers were hired through contractors, the compensation amount was realised through online banking on August 24, 2020 to the respective agencies namely M/s Security Intelligence Services In (Rs 2 lakhs), M/s EN Enterprises (Rs 12 lakhs), M/s Recruit India (Rs 12 Lakhs) and M/s Sriu enterprises (Rs 8 lakhs). The contractor's in turn prepared the demand draft and was handed over to the workers by Hon'ble MLA Sri. M002E S. Babu, 26.08.2020. The copy of the online transaction made by the industry to the contractors and demand draft given to workers is attached as ***Annexure 4.***

9.0 Suggested remedial measures to evade such accidents in future.

i. Minor leaks, mainly in the refrigeration plant room (less often in the condenser location) occasionally occur. These leaks are usually from shaft seals, pipe flanges or valve stems. Seals, flanges and gaskets shall be regularly inspected, without dismantling. Leak test should be conducted in all piping, valves, seals, flanges, and other pertinent equipment at frequent intervals.

ii. While erecting any new ammonia receiver or repairing, proper Standard Operating Procedure (SOP) has to be followed to avoid accidents. The SOPs shall be prepared for all industrial activities handling hazardous chemicals.

iii. The industry shall carry out comprehensive safety audit and identify the non-compliances and corrective measures shall be taken for compliances. Emergency plans shall be established to deal with leaks. The risk assessment study shall be carried out to identify the control measures required in an emergency.

iv. The ammonia gas sensors and alarm system with automatic ventilators shall be installed at appropriate places where gas leak is suspected, so that any gas leaked is detected are immediately alerted to the employees. The sensors, alarms and ventilators should be frequently checked and maintained.

v. Trained and qualified operators shall be permitted to operate ammonia systems and hands on training shall be given to all employees working with ammonia. To conduct mock drills to the employees, so that the employees will be prepared for emergency in terms of minor or major accidents.

vi. To fire fighting equipment / fire hydrant system at appropriate locations and to obtain NOC from the fire department.

vii. To develop 33 % of total area as a green belt along the industry premises.

Report dated October 29, 2020

Sh. Murali M S
District Revenue Officer &
Additional District Magistrate
Chittoor

Sh. Narendra Babu
EE, RO- Tirupati
Andhra Pradesh Pollution Control Board

Smt. Poornima B M
Scientist D
Central Pollution Control Board
Regional Directorate - Chennai