

BEFORE THE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

Original Application No. 106 of 2020

IN THE MATTER OF OA. NO. 106/2020 SUBMITTED TO HON'BLE NATIONAL GREEN TRIBUNAL, PRINCIPAL BENCH, DELHI IN COMPLIANCE TO HON'BLE NGT ORDER DATED 6th JULY, 2020.

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(T. Rajendra Reddy)
Joint Chief Environmental Engineer
A.P. Pollution Control Board
Zonal Office, Visakhapatnam

Date: 26.10.2020

Place: Visakhapatnam

Report of the Joint Committee in the matter of OA No. 106/2020

REPORT OF THE JOINT COMMITTEE COMPRISING OF REPRESENTATIVES OF CENTRAL POLLUTION CONTROL BOARD (CPCB), ANDHRA PRADESH POLLUTION CONTROL BOARD (APPCB) AND DISTRICT MAGISTRATE, VISAKHAPATNAM, PROF. CH. V. RAMACHANDRA MURTHY, ANDHRA UNIVERSITY, VIZAG AND PROF. PULIPATI KING, HEAD OF CHEMICAL ENGINEERING DEPARTMENT, ANDHRA UNIVERSITY, VIZAG IN THE MATTER OF OA. NO. 106/2020 SUBMITTED TO HON'BLE NATIONAL GREEN TRIBUNAL, PRINCIPAL BENCH, DELHI IN COMPLIANCE TO HON'BLE NGT ORDER DATED JULY 06, 2020



Submitted to

Hon'ble National Green Tribunal

Principal Bench, New Delhi

1.0 Preamble

An accident occurred at M/s Sainor Life Sciences Pvt Ltd, Visakhapatnam on 29.06.2020 and Hon'ble National Green Tribunal Principal Bench in light of newspaper report of 30.06.2020 “two persons died and four injured on account of benzimidazole gas leakage accident at Sainor Life Sciences factory at Parawada in industrial area on the outskirts of Visakhapatnam” have initiated Suo-moto case. The newspaper report also mentions that similar incident happened three years back due to reactor blast resulting in two deaths and injury to five persons. The Hon'ble NGT, vide order dated July 06, 2020 has constituted a joint committee comprising of representatives of CPCB, State PCB, District Magistrate, Visakhapatnam, Prof. Ch V. Rama Chandra Murthy, Andhra University, Vizag and Prof. Pulipati King, Head of Chemical Engineering Department, Andhra University, Vizag to assess final compensation to the victims and for restoration of the environment and suggestions for precautions in future.

2.0 Orders of the Hon'ble Tribunal dated 06.07.2020

“We further direct constitution of a Committee comprising representatives of CPCB, State PCB, District Magistrate, Visakhapatnam, Prof. Ch V. Rama Chandra Murthy, Andhra University, Vizag and Prof. Pulipati King, Head of Chemical Engineering Department, Andhra University, Vizag to assess final compensation to the victims and for restoration of the environment and suggestions for precautions in future. The Committee may give its report within three months by e-mail at judicial-ngt@gov.in preferably in the form of searchable PDF/OCR Support PDF and not in the form of Image/PDF. State PCB will be the nodal agency for compliance. The Committee may visit the site, consider the view point of management, workers or any other stakeholders. The Chief Secretary, Andhra Pradesh may identify and take appropriate action against persons responsible for failure in overseeing the execution of on-site and off-site emergency plans and holding of mock drills as per statutory requirement. MoEF&CC may look into this incident also while furnishing its report in OA 73/2020, In re: Gas Leak at LG Polymers Chemicals Plant in RR Venkatapuram Village, Visakhapatnam in Andhra Pradesh.” Copy of the Hon'ble NGT order dated 06.07.2020 is placed as **Annexure-I**. APPCB and CPCB submitted preliminary reports to Hon'ble NGT which was considered during the hearing dated 06.07.2020. In compliance to Hon'ble NGT order, committee comprising of following members was composed:

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1. Sh. R. Govinda Rao, Joint Collector (Asara & Welfare), Visakhapatnam representing District Magistrate, Visakhapatnam
2. Prof. Ch V. Rama Chandra Murthy, Andhra University, Visakhapatnam
3. Prof. Pulipati King, Head of Chemical Engineering Department, Andhra University, Visakhapatnam
4. Smt. Mahima T, Scientist-D, Central Pollution Control Board, Regional Directorate, Chennai
5. Sh. T. Rajendra Reddy, JCEE & Zonal Officer, Andhra Pradesh Pollution Control Board, Visakhapatnam (Nodal agency)

III Scope of Committee

The Committee has been vested with the mandate to visit and inspect the site in question and vested with following scope vide the Order dated 06.07.2020:

- a. Sequence of events, Causes of failure, ascertain facts
- b. Determine responsibility
- c. Extent of damage to human life and environment
- d. Assess final compensation for the victims and environment
- e. Steps taken for compensating the victims and for restoration of the environment
- f. Measures to prevent recurrence and other incidental issues
- g. to consider the view point of all the stakeholders.
- h. Quantification of final compensation and preparation of restoration plan

IV Site Visit by the Committee

The committee convened its first meeting on 08.08.2020 through video conference (VC) and devised an action plan to proceed further in the case. The committee inspected the unit on 13.08.2020, interacted with unit officials, unit personnel who were present during the night of the accident and with officials working in neighbouring industries. During the accident two persons died and four were hospitalized due to gas inhalation. Out of the four personnel hospitalized, the committee interacted with Sh. Anand Babu and remaining three were interacted over phone. APPCB has issued Closure order and electricity was disconnected. The accident occurred on the night of 29.06.2020 in reactor 107. The Committee monitored the VOC levels in the first floor, in the production block, near to reactor 107, ETP area etc during the visit using handheld VOC

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meter and observed that the VOC readings varied from 8mg/m³ to 55mg/m³ (near vent of reactor).

V About M/s Sainor Lifesciences Pvt Ltd, Visakhapatnam

V.a. General information: M/s Sainor Life Sciences located in plot No. 59-E, in J N pharmacy, Parwada, Visakhapatnam is involved in the manufacture of intermediates and Active Pharmaceutical Ingredients mainly anti-ulcerative and anti-allergic drugs. The unit is spread in an area of 12000m². The unit was established in 2010.

The unit is having consent and Hazardous Waste authorization from APPCB valid upto 31.05.2021 with a maximum production capacity of 1266.67 Kg/day of any 7 products out of total 102 consented products. Manufacture of products involves different stages and after every stage of reaction mother liquor/ mixed liquor is generated which cannot be further used in the process and it is High TDS (HTDS) effluent and it is sent to Effluent treatment plant. After completion of the reaction, the contents are emptied from the reactor and then the reactors are cleaned with water and wash water is sent to ETP. The effluent so generated both HTDS and low TDS is collected in separate tanks and sent to Ramky Common effluent treatment plant for further treatment and disposal. During Covid-19 pandemic the unit was in operation as it was involved in the production of essential drugs. Unit has installed flow meter and camera for LTDS and HTDS streams. Copy of CFO is enclosed as **Annexure-II**. The unit has one 3TPH coal fired boiler and two DG sets of 320 KVA and 50 KVA. The hazardous waste generated from the unit is disposed in Ramky TSDF.

V.b Process description: The unit has a production block, administration block, solvent storage section and ETP. The production block has 28 reactors in first floor, driers & blender in 2nd floor and scrubber & cooling tower on terrace. The centrifuge is provided in ground floor. On the day of the accident the unit was involved in the manufacture of benzimidazole an intermediate of omeprazole. The unit was initially procuring benzimidazole from other industries and later started manufacturing within the unit.

The manufacture of Benzimidazole involves four stages. In the stage-I, paraanisidine, acetic acid and water are processed. Stage-I output is taken to stage-II. Stage-I mother liquor contains acetic acid and is acidic in nature. Similarly stage-II output is taken to stage-III. During stage-III,

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sodium di-sulphide, carbon disulphide, ammonium sulphate & water are added to stage-II output and processed in the reactor. In Stage-IV, stage-III mixture is reacted with NaOH flakes and then filtered using activated carbon. After each stage of reaction, mother liquor is transferred to different reactor and the reaction mass is taken for next stage. The mother liquor (ML) so transferred is analysed and after ascertaining that recovery is not possible then ML is sent to ETP. On 29.06.2020, gas leak occurred in the unit while transferring stage-III ML to reactor-107 containing stage-I ML.

VI Sequence of Events and Causes of Accident

VI.a. The sequence of events are described as follows

26.06.2020	:	The unit started stage-I of benzimidazole an intermediate of omeprazole which is a four stage process. Stage-I reaction time is around 16-19 hrs, after completion of reaction, mother liquor was transferred to reactor-107 and component was taken to reactor 102 for stage-II. Before sending the mother liquor to ETP, mother liquor(ML) is tested for the presence of raw materials and products, if the products can be recovered from MLs, then it is reused in process or else sent to Effluent treatment plant(ETP). After transferring MLs to ETP, standard procedure is to wash the reactors with water and to send wash water to ETP after which reactor is suitable for fresh process. It was informed to the committee that for safety reasons, the reactors are normally used for particular reactions/ process. If the reactor is used for a different stage/ product/reaction, then extensive cleaning with water/solvents/ caustic is carried out. Reactor 107 was previously used for storing stage-I mother liquor which is acidic in nature but lately the reactor-107 was used for storing ML of stage-III. With that confusion, after completion of stage-I, ML's are transferred to reactor-107
27.06.2020	:	Stage-II reaction was started and total time is around 24 -26 hrs. stage-II component is transferred to reactor-105 and mother liquor transferred to ETP
28.06.2020	:	stage-III reaction is started in reactor 105 and batch time required is 30-36 hrs.

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29.06.2020	:	It is reported by K. Simhalam, Shift-B chemist that while change of shift in the night hours, he informed Sh. Narendra, C-shift Incharge that almost all ML's from reactor 107 is sent to ETP but reactor is not cleaned and to arrange for cleaning of reactor.
29.06.2020 Around 23:00 hrs	:	Stage-III reaction completed. Sh. Gowrishankar was searching for nipple since the nipple available in the first floor was not fitting to the reactor-107. During the same time Sh. Janaki Ram- Trainee chemist, Sh, Anand Babu and Sh. Chandra Sekar were working near reactor 102 and are wearing masks due to Covid-19. Sh. Suryanarayana, Chemist was working near reactor-109. It is informed by Sh. Janakiram that Sh. Gowrishankar enquired about suitable nipple & pipe of reactor-107 with the latter but they could not find the suitable nipple of reactor-107. Stage-III mother liquor is alkaline in nature and it contains H ₂ S in dissolved form and also sulphide in combined form as sodium thiosulphate- Na ₂ S ₂ O ₃ , carbon disulphide-CS ₂ , sodium sulfate- Na ₂ SO ₄ and NaSH. Stage-I ML contains acetic acid.
29.06.2020 Around 23:25 hrs	:	Sh. Suryanarayana, Chemist working near reactor-109 informed to Sh. Gowrishankar that he will come in 15 minutes and went to ground floor.
29.06.2020 23:30hrs	:	Mother liquor of stage-III transferred to reactor-107 by directly inserting a hose pipe into the 2 inch nozzle without nipple arrangement. Due to acidic nature of leftovers in the reactor H ₂ S gas and CO gas has evolved through nozzle of reactor. Sh. Gowrishankar, Chemist (not wearing PPE) working near reactor 107 was exposed to high concentration of gas and immediately collapsed on the floor. Sh. Janakiram went out to call shift Incharge and others for help.
29.06.2020 23:35 hrs	:	Shift Incharge Sh. Narendra (without wearing PPE) and Sh. Janaki Ram came to first floor. Sh. Janaki Ram noticed that within few minutes that the body of Sh. Gowrishankar, Chemist had become cold.
29.06.2020 23:40 hrs	:	Shift Incharge stopped the pump during which 30 liters was transferred. Though transfer was stopped but 50liters of stage-I ML has reacted with

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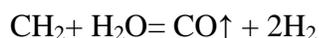
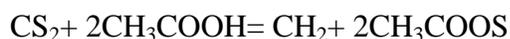
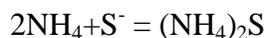
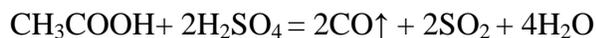
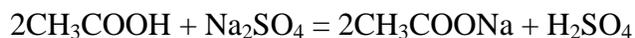
		30 liters of stage-III ML liberating H ₂ S and CO gas. Sh. Narendra, Shift Incharge also collapsed on floor. Sh. Janaki Ram has noticed strong pungent smell.
29.06.2020 incidents that happened after 23:40 hrs	:	Sh. Janaki Ram after taking few steps and reaching near stairs, he fell unconscious. Sh. A. Suryanarayana, Chemist was coming to first floor from stairs and he fell unconscious on stairs. Sh. Chandra Shekar and Sh. Anand Babu present in shop floor fell unconscious on the stairs. Out of the six people exposed to gas, two of them shift incharge Sh. Narendra and Sh. Gowri Shankar died and other four were completely unconscious and don't remember what happened after that. By the time they gained conscious, they were in hospital. Other personnel working in the unit are not aware of how accident happened but they shifted these six members to ground floor and then to hospital.
30.06.2020 00:00 hrs to 01:00 hrs	:	The gases released from reactor-107 was localised to the production block and gradually it vented out from the openings and diluted. No further impacts or injuries were reported.
30.06.2020 after 02:00 hrs	:	The District Administration informed PCB officials about the incident. Soon after receiving the news, APPCB officials arrived to the spot, evacuated the personnel from the unit. Started primary investigation and identified the major gas released as H ₂ S and measured the gas concentrations at various locations using handheld VOC meter. Wherever high concentrations were observed, APPCB officials cautioned everyone to avoid going near these locations. Started ambient air quality monitoring from 07:00 hrs.

The reactions that has taken place are as follows:

Stage-I mother liquor (acidic in nature)	+	Stage-III mother liquor (alkaline in nature)	=	Gas release
Acetic acid+ water	+	H ₂ S in dissolved form+ sulphide in combined form as Na ₂ S ₂ O ₃ , CS ₂ , Na ₂ SO ₄ & NaSH+ NH ₄		H ₂ S + CO

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The reactions likely to have taken place on transfer of 30 liters alkaline ML of stage-III into reactor-107 containing 50 liters of acidic ML of stage-I is as follows:



The gases that are released during the reaction are CO and H₂S. The material balance of stage-I and stage-III reaction is as follows:

Stage-I								
500 kgs of paraanisidine	+	450 Kgs of acetic acid	+	2000 Kgs of Water	=	610 kgs Stage-I reaction mixture	+	2280 Kgs of Mixed Liquor (206 Kgs of acetic acid+ 2074 Kgs of water)
2950 Kgs of raw material				=	2950 Kgs output in stage-I (reaction mixture and mixed liquor) 2280 Kgs of mixed liquor contains 206 Kgs of acetic acid 4.52 Kg of acetic acid is present in 50 Lts of ML			
Stage-III								
600 kgs of stage-II mixture + 900 Kgs of sodium sulphide + 470 Kgs of carbon di-sulfide + 50 Kgs NH ₄ SO ₄ + 5400 Kgs of water				=	510 Kgs stage-III reaction mixture+ 632 Kgs of Na ₂ S ₂ O ₃ + 272 Kgs CS ₂ +54 Kgs Na ₂ SO ₄ +68 Kgs NH ₄ + 440 Kgs NaSH+ 13 Kgs H ₂ S + 5407 Kgs H ₂ O+ 24 Kgs Process water			
				=	7420 Kgs			

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	1398 of combined sulphide + 13 Kgs of dissolved H ₂ S are present in 7420 Kgs of mixed liquor In 30 liters of stage-III ML 2.55kg of Na ₂ S ₂ O ₃ + 1.099Kgs CS ₂ +0.218Kgs Na ₂ SO ₄ +0.274 Kgs NH ₄ + 1.79 Kgs NaSH+ 0.052 Kgs H ₂ S + 21.86 Kgs H ₂ O
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Reactor-107 contains 50 Lts of stage-I mixed liquor. 8Kgs of acetic acid reacts with 3.54 Kgs of sulphide and 0.053 Kgs of H₂S present in dissolved form is liberated. The committee has calculated the quantity of emissions considering that 50Liters of stage-I ML was present in reactor and 30liters of stage-III ML's was transferred.

2CH ₃ COOH	+	Na ₂ S ₂ O ₃	=	2CH ₃ COONa	SO ₂	S-	H ₂ O
2x 60.052 g/mol		158.11 g/mol		2x 82.03 g/mol	64.066 g/mol	32.065 g/mol	18.01 g/mol
1.941032 Kgs		2.555 Kg		2.65 kgs	1.035 Kgs	0.518 Kgs	0.291
		4.49 Kgs		4.49 Kgs			

2CH ₃ COOH	+	Na ₂ SO ₄	=	2 CH ₃ COONa	H ₂ SO ₄	
2 x 60.052 g/mol		142.04 g/mol	=	164.06 g/mol	98.079g/mol	
0.184333kgs		0.218 Kgs	=	0.2517 Kgs	0.15053 Kg	
0.402333kgs			=	0.4023 Kgs		
CH ₃ COOH	+	2 H ₂ SO ₄	=	CO	SO ₂	2H ₂ O
60.052 g/mol	+	98.079 g/mol	=	28.01 g/mol	18.01 g/mol	64.066 g/mol
0.092167kg	+	0.30103kg	=	0.0859 kg	0.1966kg	0.1105kg
0.393kg			=	0.393kg		

NASH	+	H ₂ O	=	NAOH	H ₂ S
56.062 g/mol		18.01 g/mol		39.997 g/mol	34.08 g/mol
1.79 kg	+	0.575 Kg	=	1.277 Kg	1.088 Kg

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2.365 kgs		=	2.365 Kgs		
2CH ₃ COOH	+	CS ₂	=	CH ₂	2CH ₃ COOS
2 X 60.05 g/mol	+	76.1407 g/mol	=	14.02 g/mol	2x 91.109 g/mol
1.733 Kg		1.099 Kg	=	0.202 Kg	2.63 Kg
CH ₂	+	H ₂ O	=	CO	H ₂
14.02 g/mol	+	18.01 g/mol	=	28.01 g/mol	2 g/mol
0.202 Kg	+	0.259 Kg	=	0.4033 Kg	0.058 Kg

Total quantity of H ₂ S & CO likely released	=	0.053Kg present in dissolved form in 30 L	+	1.088Kg of H ₂ S from reaction+ 0.4892 Kg of CO
	=	1.141 Kgs of H₂S gas is released		
	=	0.4892 Kg of CO gas is released		

VI.b. Causes of Accident: The immediate trigger to the accident is **operational negligence** to transfer stage-III ML to reactor-107 which already contained stage-I ML directly by inserting a hose pipe without nipple arrangement. But the other causes responsible for the accident

1. The normal procedure is, the ML's are stored in reactor, analysed whether recovery is possible or not, if recovery is possible then products are recovered or else ML's is sent to ETP. This entire exercise is completed within 24 hrs. But in this particular incident even after a lapse of around 50 hrs, though stage-I MLs were transferred to ETP but reactor was not fully emptied and cleaned. Shift-B chemist Sh. Simhachalam has informed Shift-C Incharge Sh. Narendra that almost all stage-I MLs is transferred to ETP and to arrange for cleaning of reactor-107. From the statement of Sh. Simhachalam, it is clear that there was only oral communication. Not complying with SOP's regarding cleaning of reactors and lack of systematic & organised communication in the unit.
2. In addition to oral communication, there needs to be system in place such as master control facility where the reactors that are empty, reactors that require cleaning, reaction taking place in reactor, whether safety norms are complied etc are all indicated. Compliance with standard operating procedures (SOP's), labelling of reactors on status of cleaning etc was absent. Through the master control facility, personnel working in

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process area can be instructed to carry out desired activities. This will minimize human intervention and inturn human error.

3. It is a regular practice to transfer the ML's into reactors using nipple arrangement, to secure the openings and the gases whatsoever liberated during reaction will be released through the vent pipe and will be scrubbed off. When a hose pipe is directly inserted into the nozzle, gases liberated will come out through the side openings. On the day of the accident, H₂S and CO released have come out through side openings and spread in first floor. If there was a nipple arrangement, the gases would have escaped through the vent pipe and then scrubbed off. This implies that either the unit is not having proper SOP's for transferring of ML's or the employees were not fully aware of the SOP's.
4. As a safety measure, all personnel working in first floor have to wear PPE's such as mask, safety glasses, boots, gloves. Cartridge masks and other PPE's are available in production department of the unit under the control of Shift Incharge which indicates that only whenever required the employees have to get the PPE issued by shift incharge. Emergencies are unexpected, hence the employees must ensure safety at all times. But Sh. Gowrishankar, Chemist and Sh. Narendra, Shift Incharge were not wearing masks and hence were exposed to high concentration of gas leading to death. The unit has to issue PPE's to all its employees and ensure that employees wearing PPE only enter process area/ production block.
5. Gas sensors or alarm system to alert the personnel about gas leakage was not present in the first floor. It is suspected that CO and H₂S were present in high concentration near the reactor vent (immediately at the time of reaction) due to which the employees fell unconscious within few minutes, but there were no gas sensors or alarm system in the unit to alert the presence of these gases.
6. Lack of training and poor emergency preparedness of the personnel
7. Recruitment of under qualified and less experienced personnel: There were total 27 persons working in the unit during the shift-C on 29.06.2020 out of which six persons were working or were near first floor when the accident occurred. Among these six persons, three were permanent employees and remaining three were contractual employees. Sh. Anand Babu and Sh. Chandra Sekar contractual helpers had joined to duty on the same day on 29.06.2020 and Sh. Janaki Ram, Chemist employed on

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contractual basis had completed only 12 days in the unit, these freshly employed persons were allowed by the unit to work in process area which is one of the most critical & sensitive area of the unit. This indicates the casual nature of the unit where persons without proper training and prior experience are employed & engaged for work in sensitive zones. Accidents are most unfortunate and unpredictable but as a precautionary measure it is essential to engage trained, experienced and qualified personnel in the production block.

8. The accident occurred during manufacture of benzimidazole an intermediate of omeprazole. But the unit is consented to manufacture Omeprazole starting from 3,5-dimethoxy 4-Nitro Pyridine-N Oxide and from 5-methoxy-2-(5-methoxy-3,5-dimethyl-pyridine-2-ylmethylsulfanyl)-1H-Benzimidazole but the unit was involved in the manufacture of benzimidazole as against the consent.
9. Operational Negligence, operator fault, Lack of standard operating procedure for transfer of material from one reactor to another and on cleaning of reactors, lack of awareness of personnel on SOP's, Non-compliance of safety practices by employees, Non-issuance of Personnel protective equipment by unit & non-usage of PPE by employees, no proper labelling on reactors regarding status of reactors, non-compliance of SOP's, absence of gas sensors & alarm system in first floor to detect gases & alert the personnel of possible leakages, engaging newly recruited contractual persons for work in process area, lack of training & emergency preparedness, lack of communication are all the causes of accident.

VI.d. Qualification & experience of deceased/ injured employees: 27 persons were present during shift-C in the unit.

Table 1: Details of deceased and injured persons due to accident

Sl.No	Name of the deceased	Age	Designation	Qualification	Experience in the unit	
1	Late Sh. Ravi Narendra	33 yrs	Shift Incharge	M.Sc, Chemistry	13 months	
2	Late Sh. Gowri Sankar	27 yrs	Chemist-production	B.Sc- Chemistry	3 years	
Details of Injured: All the four injured have reported bad smell at the time of accident						
Sl.No	Name of the deceased	Age	Designation	Qualification	Experience in the unit	Present condition
3	Sh. Meesala	31	Chemist-	B.Sc-	2.4 yrs	Feeling tired and

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	Appala Suryanarayana	yrs	production	Chemistry		breathlessness while climbing stairs & during heavy work, chest pain, leg pain, nervous problems
4	Sh. Duggu Janakiram	24 yrs	Trainee-Chemist	B.Sc-Chemistry	12 days	Breathlessness & uneasiness while climbing the stairs & doing heavy work.
5	Sh. Pothala Ananda Babu	41 yrs	Helper	-	Joined on the same day	Reported to have suffered internal fracture due to fall from stairs, breathlessness while climbing stairs
6	Sh. Lingudu Veera Chandra Sekhara Rao	27 yrs	Helper		Joined on the same day	Experiencing breathlessness while performing heavy works. Rarely severe headache

VI.c. Effects of gases released

Carbon monoxide (CO) is a colorless, odourless and tasteless gas and has higher affinity towards haemoglobin and myoglobin as compared to oxygen. When a person is exposed to carbon monoxide, CO binds with haemoglobin **reversibly** to form carboxy-haemoglobin. At low concentrations, CO exposure may cause headache, dizziness, stomach upset, loss of consciousness. At high concentrations, it causes seizures, Coma and death. Carbon monoxide is an asphyxiant in humans. Inhalation of carbon monoxide causes tissue hypoxia by preventing the blood from carrying sufficient oxygen. CO has more affinity towards cardiac myoglobin causing myocardial depression/ myocardial pale, hypotension, serious tissue hypoxia and then death.

Hydrogen Sulfide: Hydrogen sulfide is a colorless toxic gas and has pungent rotten egg smell. But in high concentrations > 100ppm, olfactory sense or sense of smell is lost. It is heavier than air and accumulates at lower elevation or bottom of poorly ventilated spaces.

In this incident, the committee suspects the presence of both hydrogen sulphide and carbon monoxide due to following reasons:

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1. Based on the chemical reactions involved, there is a possibility of a generation of both gases CO and H₂S
2. During monitoring on 30.06.2020 by APPCB, H₂S is detected during monitoring and also APPCB officials have smelled mild rotten egg smell in the ground floor below the staircase and in centrifuge area.
3. The post-mortem examination reports of the deceased persons were compared with typical characteristics of death due to CO & H₂S poisoning which confirmed that both these gases were released during the accident. One of the significant characteristics of CO poisoning that is witnessed during post-mortem examination is the blood accumulates in right side of the heart and left side of heart will be empty. The total quantity of gases released is less but since six employees were present near the point of generation of gas, it has effected them. Later the gases has spread & diluted. Since the quantity of gas released is less and it has diluted so other employees & neighbouring industries could not sense any smell or any discomfort is observed. Concentrations of H₂S \geq 500ppm and CO \geq 600ppm causes sudden unconsciousness, coma followed by death. The committee can not precisely confirm the concentration of the gases but opines that H₂S may be present in concentration range of 150ppm to 500ppm and CO in the range of 500ppm to 1000ppm when the first operator.

Typical characteristics of death due to CO	PME of Late Sh. Gowri Shankar, 26 yrs	PME of Late Sh. Narendra	Typical characteristics of death due to H ₂ S	PME of Late Sh. Gowri Shankar	PME of Late Sh. R. Narendra- 33 yrs
Cherry pink appearance of skin	No	No	Cyanosis	Yes. Bluish color of nails & lips	Yes
Left side of heart is empty	-	Yes. Left ventricle empty	Rotten egg Smell	Unpleasant chemical smell	Yes. Mild unpleasant chemical

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					smell
Myocardial infarction	-	Yes, myocardial pale	Petichiae, congestion, oedema	-	Petichiae on surface of lungs, congestion and oedema
Foam or froth caused due to oxygen deprivation	Froth in nostrils. Red color froth noted in bronchi	Frothing in nostrils and trachea and bronchi	Foam or froth caused due to oxygen deprivation	Froth in nostrils. Red color froth noted in bronchi	Frothing in nostrils and trachea and bronchi
Congestion of organs	Yes	Yes	Congestion of organs	Yes	Yes
Dark red color of blood/ organs	-	Yes			
Edema	-	Yes			

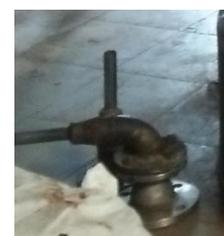
Symptoms of exposure to CO	Symptoms in four exposed persons	Symptoms of exposure to H ₂ S	Symptoms in four exposed persons
Tachycardia, sweats, abdominal pain, seizures, high blood sugar, headache, vomiting, unconsciousness	Abdominal pain, excessive sweating, palpitations, breathlessness. SOB, unconsciousness, vomiting, headache observed in four exposed persons. High blood sugar observed in Sh. Suryanarayana.	Rapid breathing	Yes. All four taken to hospitals have complained about breathlessness

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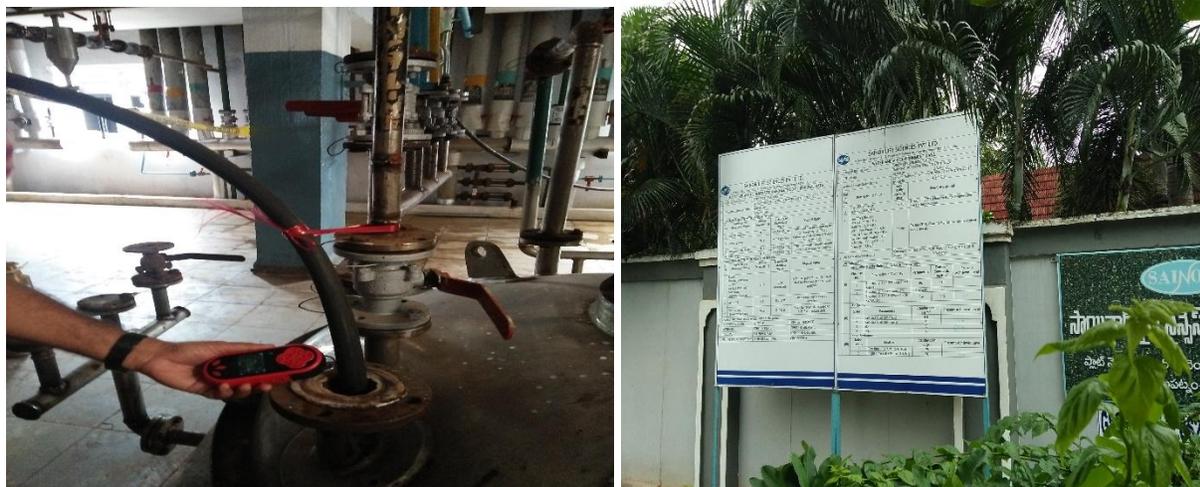
The binding of carbon monoxide with haemoglobin and myoglobin is a reversible reaction and in oxygen rich atmosphere or by artificially administering 100% oxygen, oxygenation of tissues can be restored. But however if any serious damage has occurred due to either CO or H₂S poisoning restoration may be difficult or even impossible.



Insertion of hose pipe directly into nozzle. Gases released through the side openings.



Standard practice is to insert nipple



VI.d. Who is responsible for accident: It is the primary responsibility of the unit to recruit qualified and competent staff, to provide PPE's to employees and ensure that the PPE's are easily accessible, to provide safe working environment to employees, to prepare standard operating procedure for all industrial activities and ensure that employees are trained as per SOP's, to install gas sensors and alarm system to detect any gas leakage & and to alert the employees and to provide safe working conditions to its employers. Equal responsibility also lies with employees to comply with standard operating procedures stipulated by the unit, careful attitude & dedication towards work, proper communication, to wear PPE's. It is the responsibility of the unit to comply with all statutory, regulatory, safety clearances stipulated by various concerned departments. **In this particular incident the committee observed that the unit M/s Sainor Life Sciences Ltd and its employees, both are responsible for the accident.**

VII Damage Assessment and Calculation of Compensation

The accident of H₂S and CO gas release occurred at M/s Sainor Life Sciences Ltd and it was most unfortunate but fortunately the gas was confined only to production block of the unit. The gases H₂S and CO released from reactor 107 spread out and got diluted and did not cause any harm outside the unit. The damages that occurred due to accident are as follows:

VII.a. Loss of life and status of award of compensation: 27 persons were present in the unit at the time of accident. Six persons were exposed to gases in the first floor (production block) out of which two persons died in the accident spot and four employees survived.

VII.a.i Late Sh. Ravi Narendra Shift Incharge aged 33 years collapsed in the unit.

Sh. K. Srinivas Rao aged 33 years collapsed in the unit on exposure to gas while trying to shift Sh. Gowrishankar. The shift incharge turned off the pump and stopped the transfer of stage-III ML's which prevented the severity of mishap. As per the post-mortem examination, edema, myocardial pale, smell in the lungs, frothing in nostrils are observed, all of which confirm the fact that the death is caused due to gas exposure in the unit and is liable to be compensated. The unit has deposited the employer share of Rs.35.00 lakhs per deceased person with the District Magistrate of Visakhapatnam same is disbursed to the dependents of the deceased.

VII.a.ii Late Sh. Gowri Shankar, Chemist aged 27 years- Deceased

Sh. Gowri Shankar collapsed in the unit on exposure to gas. As per the post-mortem examination report smell on incision of lungs, frothing in bronchi confirms that death is due to accident and is liable to be compensated. The unit has deposited the employer share of Rs.35.00 lakhs per deceased person with the District Magistrate of Visakhapatnam same is disbursed to the dependents of the deceased.

To ascertain the adequacy of compensation, the committee has calculated compensation by two methods: 1. As per the Judgement dated 16th August 2019 of Hon'ble Supreme Court of India in civil appeal No. 6339 of 2019 and judgement in the matter of Sunita Tokas vs New Inda Insurance Co. Ltd. & civil appeal No.3483 of 2008 and as per Employee Compensation Act, 1923 and the highest among two is taken to determine whether compensation of Rs.50.00 lacs paid to the dependents of the deceased is adequate or not and assessment of calculation is explained in table 1 and table 2. The compensation fixed by the State of A.P is Rs. 35,00,000/- by the employer and Rs. 15,00,000/- by the State Government. Based on Hon'ble Supreme Court of India in civil appeal No. 6339 of 2019 & civil appeal No.3483 of 2008 and as per Employees Compensation Act, 1923 the compensation amount of Rs.50.00 lacs/per person **fixed by the State of A.P is adequate**. The unit has deposited the employer share of Rs.35.00 lakhs per deceased person with the District Magistrate of Visakhapatnam same is disbursed to the dependents of the deceased.

Table 1: Assessment of compensation

Name of the deceased	A*	OR	B
	Amount of compensation in INR as per Hon'ble Supreme Court Judgement in civil appeal No. 6339 of 2019 and civil appeal No.3483 of 2008	Whichever is more is considered by the committee to ascertain the adequacy of compensation	As per Employee Compensation Act, 1923
Late Sh. Ravi Narendra Shift Incharge aged 33 years	Rs. 27,19,200/-		Compensation= fifty percent of the monthly wages of the deceased x relevant factor = Rs. 7500/- x 203.85 ^{&} = Rs. 15,28,875/-
Late Sh. Gowri Shankar, Chemist aged 27 years	Rs. 28,70,400/-		Compensation= fifty percent of the monthly wages of the deceased x relevant factor = Rs. 7500/- x 215.28 ^{&} = Rs. 16.14,600/-

* A → calculation is explained in table-2.

& → As per EC Act, 1923 the Central Government has specified has specified Rs.15,000/- as monthly wages with effect from 03.01.2020. The relevant factor as per EC Act, 1923 is (the completed years of age on the last birthday of the workman immediately preceding the date on which the compensation fell due).

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Table 2: A → Amount of compensation in INR as per Hon'ble Supreme Court Judgement in civil appeal No. 6339 of 2019 and civil appeal No.3483 of 2008

Name	DOB & Age at the time of death	Qualification & Designation	Salary per month for permanent employee	Future prospects (40% of the income)	less tax if any as per the prevailing tax slabs	Salary after deducting tax	Deduction towards personal expenses	Loss of monthly income to the dependents	Annual income	loss of future income	Expenses for shifting mortal remains and Loss of estate & funeral expenses (app. cost)	Loss of Love and affection	Hon'ble Supreme Court Judgement in civil appeal No. 6339 of 2019 and civil appeal No.3483 of 2008 Compensation	As per Employee compensation Act
			A	B	C	D	$E^T = 50\%$ of D	$F = D - E$	$G = F * 12$	$H^\# = G * M$	I	J &	$L = (F * G * H) + I + J$	
Late Sh. Ravi Narendra Shift Incharge	33	M.Sc Chemistry	18000	7200		25200	12600	12600	151200	241920	100000	200000	2719200	1528875
Late Sh. Gowri Shankar, Chemist	27	B.Sc Chemistry	18000	7200		25200	12600	12600	151200	257040	100000	200000	2870400	1614600

^T Deduction towards personal expenses varies @50% for age of the deceased 20yrs to 50yrs

[#] Depending on the age, the factor is fixed. 16 for age group 31-35 years and 17 for age group 26 to 30 years

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& The committee fixed the amount as Rs.2,00,000/- for loss of love and affection

@ The committee fixed the amount as Rs.1,00,000/- for loss of estate, funeral expenses and for shifting mortal remains

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VII.a.iii Sh. Meesala Appala Suryanarayana, Sh. Duggu Janakiram, Sh. Pothala Anand Babu and Sh. Lingudu Veera Chandra Sekar

These four employees were exposed to gas and fell unconscious. The unit has taken responsibility towards treatment of the injured employees. During the hospital stay, the injured people have developed symptoms like breathlessness, abdominal pain, vomiting, sob (mild seizures), headache, rapid breathing and tachycardia. Three injured employees namely Sh. Appala Suryanarayana, Sh. Duggu Janakiram and Sh. Pothala Anand Babu were discharged from RK hospital on July 3, 2020 and Sh. Chandra Sekar on July 6, 2020 from Care hospital in stable condition. Though no external physical injury or damage was seen but exposure to high concentration of gas has caused short-term effects and may also cause long-term impacts. There may be permanent damage to certain tissues which may manifest at later stages but however the committee can't comment with certainty on the likely future impacts on the employees exposed to gas. The committee interacted with Sh. Anand Babu personally on 14.08.2020. Remaining three were interacted over telephone on 11.09.2020 and during the telephonic conversation, all four have informed that they have not yet completely recovered and they feel tired, weak and breathlessness while climbing stairs and performing heavy work. The unit has borne their medical expenditure and granted them paid leave till July 30, 2020 for recovery. The unit has not informed the committee on status of salary for the months of August & September. If the employees are in stable condition and if they are willing to continue their work in the unit, then unit may consider their willingness and may re-instate them. As per Employers Compensation Act, 1923, the injured employers are liable to be compensated if the accident causes partial disablement (temporary/ permanent) and this partial disablement reduces the earning capacity of an employee in any employment in which he was engaged at the time of accident. Loss of earning capacity in relation to injuries suffered and disablement caused by the accident has to be assessed by qualified medical practitioner. Hence, the health condition of the injured employees and assessment of temporary or permanent disablement or no damage in accordance with Employers Compensation Act, 1923 shall be done by a qualified medical practitioner and the expenditure incurred towards this assessment shall be borne by the unit. Based on the assessment and recommendations of qualified medical practitioner (preferable appointed by the District Collector), whether the employers are liable for compensation and the amount of compensation can be decided by District Magistrate.

In addition to above, the unit shall tie-up with a hospital (identified by APPCB) and the health profile of employees exposed to gas shall be monitored for a minimum period of two years (once in six months health check-up). During the period of the monitoring, if the hospitals observe variations in the health profile and if the doctors are able to establish that it is due to accident then the unit shall undertake responsibility for their treatment in accordance with Employers Compensation act, 1923. The expenditure incurred towards testing and monitoring shall be completely borne by the unit. The employees must also support for the health check-up but if the employees fully deny for health check-up then such employees may be left out from check-up. The six-monthly health reports of employees shall be submitted to district administration and APPCB. Further the health profile of the employees may be reviewed annually by a qualified medical practitioner. In addition, the unit shall carry out annual health-check-up of all its employees to assess for any diseases due to occupational exposure. The unit shall practice job-rotation in accordance with Occupational Safety and Health Administration's guidelines to minimise employee exposure. It was brought to the notice of the committee that the unit has not deposited Rs. 20.0 Lakhs with District Magistrate, Visakhapatnam towards interim compensation to the 4 injured as directed by Hon'ble NGT.

VII.b. Contribution of Emissions into the atmosphere: Though the gases CO & H₂S released during accident are confined to the production block but later spread into atmosphere.

Total quantity of H ₂ S & CO likely released	=	0.053Kg present in dissolved form in 30 L	+	1.088Kg of H ₂ S from reaction+ 0.4892 Kg of CO
	=	1.141 Kgs of H₂S gas is released		
	=	0.4892 Kg of CO gas is released		

European Union has published Handbook of Environmental Prices EU28 version where in prices are expressed in Euros per kilogram pollutant emitted into the environment. The committee has used the document as reference to calculate the prices of the pollutants emitted into environment. The document indicates three types of pricing lower, central and upper depending quantity of emissions. The committee has used higher limit because though the total quantity of gases emitted is less but acute exposure resulted in two casualties. In the document, environmental

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prices for H₂S is not assigned, When released into the environment, hydrogen sulfide dissipates into the air and it may form sulfur dioxide and sulfuric acid. Hence the committee has used the environmental prices assigned to SO₂ for calculating damage due to H₂S. H₂S gas is having rotten egg smell and is respiratory and throat irritant. The environmental price of CO is 0.152 €₂₀₁₅/Kg emission and H₂S/ SO₂ is 38.7 €₂₀₁₅/Kg emission (which is used by committee for pricing of H₂S).

Environmental Compensation for emissions contributed	=	1.141 Kg of H ₂ S x Environmental price of H ₂ S	+	0.4892 Kgs of CO x Environmental price of CO
	=	1.141Kg of H ₂ S x 38.7 €/Kg (1€= 71.2 in 2015)+(3.34*71.2/100)		0.4892Kgs *0.152 €/kg * (1€= 71.2 in 2015)+(3.34*71.2/100)
	=	3146	+	8INR
	=	Rs. 3154		

* 1€ conversion = Euro to INR conversion during 2015 + inflation rate from 2015 to 2020
 = (1€= 71.2 in 2015)+(3.34*71.2/100)

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Officials from APPCB, regional office Visakhapatnam tirelessly worked in the accident site on from early hours of 30.06.2020 till conditions were normal. APPCB have monitored H₂S in the unit premises and monitoring results are as follows:

Monitoring conducted by : Zonal laboratory, APPCB, Visakhapatnam.

S.No.	Location		H ₂ S (ppm)				
			TIME				
			07.00 AM	08.00 AM	09.00 AM	10.00 AM	11.00 AM
1.	Production Block	Near centrifuge in ground floor	16.9	13.0	12.2	5.5	3.5
		Near reactor in first floor	6.9	5.1	2.7	0.8	1.0
2.	Outside the production block		0.2	0.3	0.2	BDL	0.1
3.	Industry Main Gate		BDL	BDL	BDL	BDL	BDL
4.	Outside the Industry premises		BDL	BDL	BDL	BDL	BDL

S.No.	Location		TVOC (ppm)				
			TIME				
			07.00 AM	08.00 AM	09.00 AM	10.00 AM	11.00 AM
1.	Production Block	Near centrifuge in ground floor	10.2	8.4	7.3	3.8	2.4
		Near reactor in first floor	4.3	2.9	1.8	0.4	0.6
2.	Outside the production block		0.1	0.1	0.1	BDL	0.1
3.	Industry Main Gate		BDL	BDL	BDL	BDL	BDL
4.	Outside the Industry premises		BDL	BDL	BDL	BDL	BDL

VII.c. Environmental Compensation on account of non-compliances: From the available records, it is observed that the unit has manufactured Benzimidazole an intermediate of omeprazole since April, 2020. The unit is not consented to manufacture benzimidazole hence the committee has calculated EC as per CPCB formula:

$$EC = PI \times N \times R \times S \times LF$$

Where,

EC = Environmental Compensation in INR

PI = Pollution Index of industrial sector (red-80)

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N = Number of days of violation took place (start of unit operation to date of accident)

R = A factor in Rupees for EC (Rs. 250/- may be assumed)

S = Factor for scale of operation (medium-1)

LF = Location factor (present in vizag population is more than 10 lakh=2)

- i. Pollution Index of industrial sector (PI): Andhra Pradesh Pollution Control Board has categorized this industry into red category of industries and accordingly the Combined consent & Authorisation have been granted. For red category of industries, average pollution index is 80.
- ii. Number of days of violation (N): The number of days for which violation took place is considered as the period between the day of violation observed and day of compliance verified by the CPCB/ APPCB. From the available records, it is observed that unit has violated consent conditions and manufactured benzimidazole from 01.01.2020. Based on the criteria, 180 days (from 01-01-2020 to 29-06-2020 including both the days) is considered for calculation of period of violation for estimating EC.
- iii. Scale of operation (S):The industry is considered as medium as per the capital investment by the industry is around Rupees Seven crores. Thus, scale of operation (S) for EC estimation is considered as 1.
- iv. Location factor (LF): The industry is located in Ramky pharmacy and the total population within municipal boundary and up to 10 km distance from the municipal boundary of the city is 10 million and above. Thus location factor (LF) is considered as 2 for EC estimation
- v. Factor in Rupees (R) (Rs):As per the environmental compensation estimation guidelines, factor of rupees may be minimum of Rs 100/- and maximum of Rs 500/-. The factor of rupees is considered as Rs. 250/- for estimating environmental compensation for this industry, considering its pollution potential.

S.N	Period of non-compliance	PI	S	LF	R (Rs)	N (days)	Environmental compensation (Rs)

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1	01.05.2020 to 29.06.2020	80	1	2	250/-	60	24,00,000/-
Total EC for violating						60	24,00,000/-
Rupees Twenty four lakhs only							

VII.d. Total Compensation M/s Sainor LifeSciences Ltds liable to Pay

- a. Compensation to the deceased persons → Rs.70,00,000/-
- b. Environmental Compensation on account of contribution of emissions into environment → Rs. Rs. 3154/-
- c. Environmental Compensation for operating the unit violating SOP's → Rs 24,00,000/-

The unit has paid the compensation of Rs.35.00 lakhs each to the dependents of the deceased and disbursed through the District Magistrate. M/s Sainor LifeSciences Ltd shall pay the Environmental compensation of. 24,03,155/- (Rupees Twenty four lakhs three thousand one hundred and fifty four only) and same shall be deposited with APPCB.

VII.e. Action Taken by APPCB: After the accident, APPCB issued “Closure order” to the unit, copy placed as **Annexure-III** and Deputy Chief Inspector of Factories, Visakhapatnam issued prohibitory orders and copy placed as **Annexure-IV** The unit had 28 reactors and at the time of accident, reactions were taking place in 10 reactors. The industry requested APPCB for allowing to process the held up batches in the reactors to bring them to safe mode. The Deputy Chief Inspector of Factories vide order dt.13.07.2020 accorded permission to the industry for safe shutdown. APPCB also issued temporary revocation of closure order vide order dt. 31.07.2020 for a period of 48 hours to process the held up batches in the reactors for safe shutdown. The power supply was restored to the unit on 03.08.2020 for carrying out operations for two days and the power supply was disconnected to the unit on 05.08.2020 after safe shutdown. The industry is under closure only. On the day of inspection, the committee observed electricity connection was not given to unit. The unit was granted permission for safe shutdown during which period, few reactions were completed and reactors were cleaned but few reactions were brought to a safe mode and reaction mixture was still present in the reactors. The effluent so generated was sent to Ramky CETP. Reactor 107 from the gas leakage occurred is not cleaned. The committee was

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informed that the unit was instructed not to perform any actions, clean-up in reactor 107. Hence, the hosepipe inserted into nozzle of reactor is also not removed. During the committee visit, VOC's were monitored and values ranged from 11ppm to 1182ppm at the mouth of the reactor. Though the committee gave oral instructions to the unit to clean the reactor but since there was no electricity connection, they could not perform any action.

The committee suggests that APPCB and Chief Inspector of Factories shall verify the compliance of the unit, safety of installations and after ensuring compliance by the regulatory authorities, electricity connection may be resumed to the unit and unit may be permitted for operation. Reactor 107 shall be cleaned by the unit under the supervision of APPCB, Inspector of Factories and representatives of District Magistrate. The contents of the reactor-107 shall be safely disposed to Ramky CETP (HTDS effluent) after which the reactor will be cleaned and wash water will also be sent to CETP. The personnel involved in clean-up shall wear PPE's. The unit shall take all safety measures during cleaning of reactor. The unit shall submit a report to District Magistrate, Vizag, APPCB and committee on the quantity of contents transferred to CETP and nature of the contents by analysing the same. The reactors containing reaction mixtures shall be processed and further storage in reactor is not suggested by the committee.

There is no other physical damage or damage to properties / vegetation. Hence other than cleaning of reactor, the committee does not suggest any restoration measure but however from safety point of view the committee recommends the unit to increase the vegetation cover in the unit.

VIII View Points of Stakeholders and neighbouring industries

The committee interacted with industry personnel, injured employees and representatives from the surrounding industries who were present in their respective industry at the time of accident at M/s Sainor Life Sciences Ltd.

VIII.a. Sh. S.V. Srinivasa Rao, Managing Director, M/s Sainor Life Sciences Ltd.,

The MD of the unit informed to the committee that the accident occurred due to negligence of the Shift Incharge Late Sh. Narendra and Chemist Late Sh. Gowri Shankar. The

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committee was informed that Late Sh. Narendra, Shift Incharge was given three trainings on benzimidazole product process but he failed to guide his subordinates during the time. The MD informed that the three main causes for accident are:

- i. Shift Incharge Late Sh. Narendra failed to arrange for cleaning of reactor-107 inspite of receiving information from previous shift chemist that the reactor is not cleaned.
- j. Chemist Late Sh. Gowrishankar failed to comply with SOP's and inserted the hose pipe directly into reactor without nipple arrangement which caused the gases to leak.
- iii. PPE's are given to all employees but the employees are not wearing it.

VIII.b *Employees present during the accident*

The committee interacted with around 15 employees (excluding injured persons) present in shift-C on 29.06.2020. But these employees are not aware of how accident happened but they helped in shifting the injured persons to hospital. They have not witnessed smell or any other symptoms.

VIII.c *M/s Synergene Active Ingredients Pvt. Ltd.,*

M/s Synergene industry is located adjacent to M/s Sainor life sciences on west direction and on early hours of 30.06.2020 the security guard of M/s Synergene informed to Asst. Manager Production that gas leakage took place in Sainor. Immediately, all persons working in night shift in Synergene were alerted. The employees from Synergene have informed that they have not sensed any pungent smell or uncomfort breathing.

VIII.d. *M/s Metrochem API Pvt. Ltd.,*

M/s Metrochem is located adjacent to Sainor. The security guard from Metrochem on 30.06.2020 around 4:00 AM informed to the Safety division about gas leakage. Then the Safety division has alerted all its employees and also went to M/s Sainor and asked them whether they need any help for which M/s Sainor management has informed that Government officials have visited the spot and have taken complete control over the premises. The employees of Metrochem during their visit to the unit or while working have not observed any pungent smell or breathing discomfort.

VIII.e. *M/s Jahanavi Life Sciences Pvt. Ltd.,*

The employees of M/s Jahnvi Life Sciences came to know about accident on 30.06.2020 around 3:30 AM and they became alert but they have not observed any smell or breathing issues.



Figure: Satellite image showing the location of M/s Sainor and neighbouring industries

IX Suggested remedies to avert such accidents in future: The committee suggests following remedial measures

1. The units shall manufacture only those products specified in the Consent. If the unit intends to manufacture any additional products or intermediates, then same shall be submitted to SPCB's for including in the consent. The SPCB's after inspection, verification and assessment of pollution load shall take a decision for including in consent.
2. To prepare standard operating procedure for all consented products and to impart training to all employees on SOP's, production process, safety aspects. The employees shall be given hands on experience with the production process under the supervision of senior

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employees. The units only after ensuring that adequate training is imparted to its employees will engage the employees for independent works. Overall the industries should be prepared for emergency response readiness & effectiveness in terms of major accidents.

3. To conduct mockdrills to the employees in controlled environment on actions to be taken during failures, gas leakage etc.
4. To install suitable gas sensors and alarm system in the unit at appropriate locations where emission of gas is suspected so that any gas leaked is detected and the employees are immediately alerted. In sensitive areas of the unit where gas leakages are suspected, the unit shall work out an emergency prepared plan to vent out the gases safely.
5. The flow meters, sensors, measuring devices have to be regularly calibrated.
6. The unit shall issue essential Personnel protective equipment like nose mask, Helmets, Safety Shoes, Safety Glasses, Acid-Alkali Proof Gloves to all its employees and make it mandatory that the employees have to wear PPE's during working hours.
7. The unit shall ensure that the pipes, nipples, pumps, nozzles, screws, nuts, bolts, safety devices etc required for transferring of reagents, raw materials, mother liquors, reaction mixture or during emergency shall be easily assessable.
8. The unit shall recruit qualified and experienced staff especially for working in sensitive areas like production block
9. MSDS of raw materials, intermediates, products, suspected gases shall be made available in the unit at easily accessible points.
10. In addition to oral communication, the unit shall establish written communication or system through which the process details, reactor details and other essential details are communicated. The reactors shall be properly labelled indicating the crucial details such as status of reaction, product being manufactured etc. Since the unit is operating in different shifts, proper labelling and written communication will avoid confusion. During shift change, the shift incharges of closing shift shall record the essential details in a register or on reactor labels etc and upcoming shift incharge will read it and acknowledge it by signing to avoid confusion during shift change.
11. The unit shall practice job-rotation in accordance with Occupational Safety and Health Administration's guidelines to minimise employee exposure

12. The unit will carry out health checkup of all employees once in a period of 6 months, to ascertain the health status of all the employees in respect of occupational health hazards to which they are exposed.

X Concluding remarks:

1. The immediate trigger to the accident is transfer of stage-III ML to reactor-107 which already contained stage-I ML directly by inserting a hose pipe without nipple arrangement.
2. Operational Negligence, Operator fault, Lack of standard operating procedure for transfer of material from one reactor to another and on cleaning of reactors, lack of awareness of personnel on SOP's, non-compliance of SOP's by employees, Non-compliance of safety practices by employees, Non-issuance of Personnel protective equipment by unit & non-usage of PPE by employees, no proper labelling on reactors regarding status of reactors, absence of gas sensors & alarm system in process area to detect gases & alert the personnel of possible leakages, engaging newly recruited contractual persons for work in process area, lack of training & emergency preparedness, lack of systematic and organised mode of communication in the unit are all the causes of accident.
3. Both the unit M/s Sainor Life Sciences Ltd and its employees are responsible for the accident.
4. The compensation amount of Rs. 50.00 lacs per deceased (Rs. 35.00 lacs to be paid by unit and Rs.15.00 lacs by State of A.P) fixed by state of A.P is found adequate as per Hon'ble Supreme Court of India in civil appeal No. 6339 of 2019 & civil appeal No.3483 of 2008 and as per Employees Compensation Act, 1923. The unit has paid the employer share of compensation of Rs.35.00 lakhs each to the dependents of the deceased and disbursed through the District Magistrate.
5. M/s Sainor Life Sciences Ltd., shall pay the Environmental compensation towards environmental damages and for violation of Consent conditions issued by APPCB of Rs.

24,03,154/- (Rupees Twenty four lakhs three thousand one hundred and fifty four only) and same shall be paid to APPCB.

6. The health condition of the four employees who were exposed to gas shall be assessed by a qualified medical practitioner identified by District Magistrate and the expenditure incurred towards this assessment shall be borne by the unit. Based on the assessment and recommendations of qualified medical practitioner, whether the employers are liable for compensation and the amount of compensation can be decided by District Magistrate.
7. In addition to above, the unit shall tie-up with a hospital (identified by APPCB) and the health profile of four employees exposed to gas shall be monitored for a minimum period of two years (once in six months health check-up). During the period of the monitoring, if the hospitals observe variations in the health profile and if the doctors are able to establish that it is due to accident then the unit shall compensate the employees in accordance with Employees Compensation Act, 1923. The expenditure incurred towards health profile monitoring shall be completely borne by the unit. The employees must also co-operate for the health check-up but if the employees fully deny for health check-up then such employees may be left out from health profile monitoring and compensation.
8. The committee suggests that APPCB and Chief Inspector of Factories shall verify the compliance of the unit, safety of installations and after ensuring compliance by the regulatory authorities, electricity connection may be resumed to the unit and unit may be permitted for operation. Reactor 107 shall be cleaned by the unit under the supervision of APPCB, Inspector of Factories and representatives of District Magistrate. The contents of the reactor-107 shall be safely disposed to Ramky CETP (HTDS effluent) after which the reactor will be cleaned and wash water will also be sent to CETP. The personnel involved in clean-up shall wear PPE's. The unit shall take all safety measures during cleaning of reactor. The unit shall submit a report to District Magistrate, Vizag and APPCB on the quantity of contents transferred to CETP and nature of the contents by analysing the same. The reactors containing reaction mixtures shall be processed. Long-term storage in reactor is not suggested by the committee. After ensuring compliance and safety of

installations, APPCB and Chief Inspector of Factories may permit the unit for normal operation.

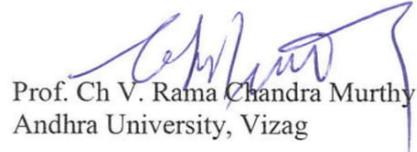
9. The total quantity of gases released is less but since six employees were present close to the point of generation of gas, it has effected them. Later the gases has spread & diluted. Since the quantity of gas released is less and it has diluted so other employees & neighbouring industries could not sense any smell or face health effects. The effects of emissions was confined to first floor of production block only. There is no other physical damage or damage to properties / vegetation. Hence other than cleaning of reactor, the committee does not suggest any restoration measure but however from safety point of view the committee recommends the unit to increase the vegetation cover in the unit.
10. The committee humbly submits that the action taken against the industry and levying of EC from the unit will strengthen “Polluter Pay Principle” and will also be a lesson to other industries that they have to ensure self-monitoring, self-compliance and comply with statutory guidelines, safety measures, and directions issued by MOEFCC, CPCB, APPCB, Directorate of Factories and other Regulatory Authorities.
11. The Regulatory Authorities shall take immediate action against erring industries as per prevailing Rules. In addition the Regulatory Authorities shall sensitize the industries about safety norms, industrial best practices, industry specific emission & effluent standards etc.
12. The committee humbly submits that the industries have to ensure self compliance and the industry and its personnel are solely responsible for this negligent act which resulted in the accident. The committee humbly submits that the regulatory authorities can not involve & check on the day to day activities of the industries. It shall be the primary responsibility of the industries to ensure compliance. Self-monitoring and Self Compliance shall be enforced by all the industries. The Regulatory Authorities shall exercise periodic check & review of the industries as per the mandate. The sole responsibility of recruiting competent staff, imparting Industrial, Environmental and Safety training to the staff, obtaining necessary clearances, NOC's from various

Report of the Joint Committee in the matter of OA No. 106/2020

departments lies with the industry. The committee humbly submits to Hon'ble NGT that it should uphold the principle of "Polluter Pay Principle". This will lay the foundation for the industries to exercise "Self- Compliance".



R. Govinda Rao
Joint Collector, Visakhapatnam
(A&W)



Prof. Ch V. Rama Chandra Murthy
Andhra University, Vizag



Prof. Pulipati King
Head of Chemical Engineering Department,
Andhra University, Vizag



Mahima T
Scientist-D
Central Pollution Control Board
Regional Directorate, Chennai



T. Rajendra Reddy,
JCEE & Zonal Officer, Andhra Pradesh Pollution
Control Board, Vishakhapatnam

Annexure-I

Item No. 02 & 03

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

(By Video Conferencing)

Original Application No. 106/2020

In Re: News item published in the local daily "Economic Times" dated
30.06.2020 titled "Another Gas Leakage at Vizag Factory kills two,
critically injures four..."

AND

Original Application No. 107/2020

In Re: News item published in the local daily "Indian Express Sunday
Express" dated 28.06.2020 titled "Gas Leak in Agro Company Claims life
of one"

Date of hearing: 06.07.2020

**CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE S. P. WANGDI, JUDICIAL MEMBER
HON'BLE DR. SATYAWAN SINGH GARBYAL, EXPERT MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER**

For Respondent(s): Mr. Raj Kumar, Advocate for CPCB
(in OA 106/2020) Mr. Mahfooz A. Nazki, Advocate for State of AP
Mr. Padyala Venkaiah Naidu, Advocate for Sainor Life Sciences

ORDER

1. Proceedings have been initiated *suo-motu* in these two matters in the light of newspaper reports. In first matter, report is that two persons died and four were injured on account of Benzimidazole gas leakage accident at Sainor Life Sciences factory at Parawada in industrial area on the outskirts of Visakhapatnam on 30.6.2020. Similar incident happened three years back due to reactor blast resulting in two deaths and injury to five persons. In second matter, report is that there was Ammonia gas leakage accident at Nandyal in Kurnool District, Andhra Pradesh in Spy

Agro Industry on 26.06.2020 resulting in death of one person and injury to three workers in respect of second matter.

2. On 01.07.2020, the Registry issued advance notice of hearing to the Central Pollution Control Board (CPCB), State Pollution Control Board (State PCB), District Magistrate, Visakhapatnam and M/s. Sainor Life Sciences Pvt. Ltd., Visakhapatnam, Andhra Pradesh in respect of first matter and on 3.7.2020 to the Member Secretary, State PCB, CPCB, District Magistrate, Kurnool and M/s Spy Agro.

3. In first matter, State PCB has filed its response on 04.07.2020 to the effect that the District Collector constituted a four-members Committee on 30.06.2020 comprising Revenue Divisional Officer, General Manager District Industries Centre, Dy Chief Inspector of Factories and Environmental Engineer, APPCB and based on inspection conducted, the said Committee gave its report on the same day as follows:

*“M/s. Sainor Life Sciences Pvt Ltd. Producing **Omeprazole Sulphide** in which **Benzimidazole** is one of the Intermediate. During the transferring of Mother Liquor of the Benzimidazole Stage-III through AOD Pump into the Reactor SSR-107 H₂S gas was released, as the hose pipe was directly inserted through the nozzle instead of nipple arrangement. H₂S gas was spread in the Production Block which led to the exposure of the workers in the Production block. Only the workers present in the Production Block are exposed. There is no impact beyond the factory premises.*

*As per the preliminary investigation, **the gas release took place due to failure of the safety practice i.e. hose pipe was directly inserted through the nozzle instead of nipple arrangement while transferring Mother Liquor into the Reactor. Further non usage of Respiratory Protective Equipment are the reasons for the above said accident.**”*

4. Mr. Padyala Venkaiah Naidu, Advocate has put in appearance on behalf of the unit and made oral submissions. The District Magistrate, Visakhapatnam has also filed response on 05.07.2020. Reference has

been made to the constitution of the Committee and furnishing of the report mentioned above. Sequence of events and reasons of the accidents are mentioned in the report as follows:

“Sequence of events of the accident:

1. *M/s. Sainor Life Sciences Pvt Ltd was producing **Benzimidazole** which is the intermediate of **Omeprazole** having 4 stages.*
2. *On 29th night at 11:30 PM stage-3 product 3rd lot centrifugation was started. After centrifugation, the Mother liquor of IIIrd stage Benzimidazole is transferred to the SSR-107 reactor by AOD pump through Hose pipe by putting it directly into the reactor through the nozzle without fixing it properly with the nipple arrangement for air tightening.*
3. *Reactor 107 was previously used for storing of stage-I mother liquor. The chemist without checking the left over Mother Liquor of 1" stage Benzimidazole started pumping 3rd stage Benzimidazole Mother Liquor.*
4. *The 1st stage Mother Liquor was acidic in nature as it is containing acetic acid.*
5. *The acetic acid mother liquor of 1st stage reacted with the unreacted excessive sodium sulphide present in the 3rd stage mother liquor in the reactor resulting in H₂S gas generation.*
6. *The H₂S gushed through the gap between pipe and nozzle spreading the H₂S in the production block.*
7. *M. Gowri Shankar, Chemist working nearby the reactor inhaled the gas and fell unconscious. Then D. Janaki Ram other Chemist working nearby noticed the affected operator and informed to the shift incharge Mr. R.Narendra and others.*
8. *The Chemist stopped the AOD pump which is feeding the mother liquor to the reactor to stop the further release of H₂S. Further generation of H₂S gas was stopped.*
9. *The committee enquired the employees worked in the surrounding factories. As per their information, H₂S gas had not spread outside M/s. Sainor Life Sciences Pvt Ltd factory premises.*

Reasons for the accident:

1. *The Mother liquor of IIIrd stage Benzimidazole is transferred to the SSR-107 reactor by AOD pump through Hose pipe by putting it directly into the reactor through the nozzle without fixing it properly with the nipple arrangement for air tightening.*
2. *The Mother liquor of IIIrd stage Benzimidazole is transferred to the SSR-107 reactor without ensuring free from left over Mother Liquor of 1" stage Benzimidazole.*
3. *The workers did not use suitable respiratory breathing apparatus while carrying out rescue operation. The*

management of the company has not maintained sufficient number of suitable breathing apparatus.

4. **The management manufacturing of Benzimidazole, Omeprazole Sulphide, Fexo-10 without submitting HARA and HAZOP reports and its compliance to the recommendations made in the report.**
5. **The Standard operating procedures with safety integration are not developed for the storage and transfer of Mother liquor.**
6. **The workers are not imparted effective training about the potential Hazards which may arise during the course of work.**

Details of the deceased and affected workers:

Names& details of the workers:	1	Ravi Narendra, Shift-In-charge S/o R.Naga Seshulu, Age 33 years. Married, D.O.J 25-05-2019, Qualification M.Sc., (Organics), Experience: 11 Yrs.
	2	Mahanthi Gown Sankar, Chemist, S/o Lakshmu Naidu, ESI covered 7010410113, Married D.OJ 15-06-2019, B. Sc., (Chem). Experience: 3 Yrs

Name & details of affected workers:	1	Sri. Meesala Surya Narayana, Chemist, S/o M. Parameswara Rao, Age 31 years, ESI Covered 7010376119, Married, D.O.J 01-04-2019, B.Sc. (Chem). Experience: 7 Yrs
	2	Sri. Duggu Janakiram, Trainee Chemist (through S/o. D. Trinadha Rao, Age 24 ESI covered 7010834186, Unmarried, D.O.J. 17-06-2020, B.Sc. (Chem).
	3	Sri Pothula Anand Babu, Helper(through contractor), S/o. P. Sambhu Naidu, Age:40Yrs, Workmen's compensation Act applicable Married, D.O.J 29-06-2020, Inter & ITI
	4	Sr. LV. Chandra Sekhar, Helper(through contractor), S/o

	Adinarayana, Age 27 Years, Workmen's compensation Act applicable, Unmarried, D.OJ 29-06- 2020, B.Com.
--	--

Present Status:

1. *In this accident two employees died namely R. Narendra, Shift in charge, G.Gowri Shankar-Chemist and 4 others affected and admitted in hospital. **Three of them were discharged who were undergoing treatment at R.K Hospital. The other one is undergoing treatment at Care Hospital.***
2. *After the accident the industry stopped production activity.*
3. *The management announced compensation Rs.35 lakhs to the families of deceased.*
4. *The police has filed FIR under section 304-11, 278, 284, 285, 337, 338 of IPC at Parawada Police Station, Visakhapatnam.*
5. *A.P Pollution Control Board issued closure order to the industry.*
6. *Factories Department issued prohibitory order to the industry.”*

5. It is clear from the above, the unit in question is dealing with **Benzimidazole** and **Omerprazole Sulphide** gases which are mentioned as hazardous chemicals in Schedule-I to the “Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989” (1989 Rules). Once it is so, there is statutory liability to prepare and execute on-site emergency plan under Rule 13(by the occupier), and off-site emergency plan (by the statutory authorities) under Rule 14. Consistent with such plan, mock drill is required to be conducted every six months and report given to the concerned authority. This aspect has not yet been looked into. On being asked, learned counsel have not been able to give any response. The authorities have also not gone into the issue of planning remedial measures to prevent such occurrence in future and assessing the compensation to be paid to the heirs of the deceased and to the injured and for restitution of the environment. Under the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 (The

1996 Rules), Crisis Alert Systems are required to be established and made functional. The State Chief Inspector of Factories (CIFs) is to look into the safety issues under the Factories Act, 1948 and Petroleum and Explosives Safety Organization (PESO) is the nodal agency to approve the site of the industrial installation. We are of the view that these aspects need to be looked into.

6. Dealing with another incident of leakage of hazardous gas at VIZAG on 07.05.2020, this Tribunal, vide order dated 01.06.2020 considered various aspects including the quantification of compensation to be paid, remedial measures to prevent recurrence in future and looking into the failure of the regulatory framework. The Tribunal also referred to need for revamping of regulatory mechanism in the light of finding in various cases recorded by this Tribunal to the effect that there was need to do so. The Tribunal inter-alia directed:

- “iii. Final quantification of compensation may be assessed by a Committee comprising representatives of MoEF&CC, CPCB and NEERI. The said Committee will be at liberty to associate/co-opt any other expert institution or individual. The Secretary, MoEF&CC may ensure constitution of such Committee within two weeks from today. The Committee may give its report within two months thereafter. MoEF&CC will be the nodal agency for the purpose.*
- iv. The Chief Secretary, Andhra Pradesh may identify and take appropriate action against persons responsible for failure of law in permitting the Company to operate without statutory clearances within two months and give a report to this Tribunal*
- v. In view of the stand of the State PCB and the Company that it will not recommence its operation without requisite statutory clearances, we direct that if any such statutory clearances are granted and the Company proposes to recommence, this aspect must be brought to the notice of this Tribunal so that compliance of law is ensured.*
- vi. The MoEF&CC may also constitute an Expert Committee to suggest ways and means to revamp monitoring mechanism to check and prevent violation of environmental norms and preventing any such recurrence in future in any of the establishments dealing with hazardous chemicals. A special*

drive may be initiated in this regard. An action taken report may be furnished within three months from today.

vii. This order will not prejudice any criminal or other statutory proceedings in accordance with law.”

7. In the first case, while it is stated that compensation of Rs. 35 lakhs each has been given in respect of two deceased, no compensation has been paid to the injured already identified and noted above. Such compensation has to be paid by the Occupier company. We fix interim compensation to be Rs. 5 lakhs for each of the four injured. An amount of Rs. 20 lakhs be deposited with the District Magistrate, Visakhapatnam within two weeks from today failing which the amount be recovered by the District Magistrate using coercive means. The District Magistrate may disburse the amount directly to the injured by transfer to their bank account. In view of the report, there is failure of safety practice in running of the unit on account of which the State PCB withdrew the consent for operation of the industry and directed closure in the interest of public health and the environment.

8. We further direct constitution of a Committee comprising representatives of CPCB, State PCB, District Magistrate, Visakhapatnam, Prof. Ch V. Rama Chandra Murthy, Andhra University, Vizag and Prof. Pulipati King, Head of Chemical Engineering Department, Andhra University, Vizag to assess final compensation to the victims and for restoration of the environment and suggestions for precautions in future. The Committee may give its report within three months by e-mail at judicial-ngt@gov.in preferably in the form of searchable PDF/OCR Support PDF and not in the form of Image/PDF. State PCB will be the nodal agency for compliance. The Committee may visit the site, consider the view point of management, workers or any other stakeholders. The

Chief Secretary, Andhra Pradesh may identify and take appropriate action against persons responsible for failure in overseeing the execution of on-site and off-site emergency plans and holding of mock drills as per statutory requirement. MoEF&CC may look into this incident also while furnishing its report in *OA 73/2020, In re: Gas Leak at LG Polymers Chemicals Plant in RR Venkatapuram Village, Visakhapatnam in Andhra Pradesh.*

9. The second matter relates to leakage of **ammonia** gas from Spy Agro in Kurnool District in the course of storage of Liquefied CO₂ gas to the bottling plant in the unit for chilling purposes. The said gas is also covered by the Schedule to the 1989 Rules (serial no. 31).

10. No response has been received to the advance notice. We direct that M/s Spy Agro may deposit a sum of Rs. 15 lakhs as an interim compensation for the heirs of the deceased and Rs. 5 Lakhs each for the injured to the District Magistrate, Kurnool within two weeks from today, if no compensation has so far been paid or lesser compensation than this amount has been paid. On failure, the District Magistrate may recover the amount by coercive measures. The amount may be disbursed to the heirs of the deceased and the injured by direct transfer to their accounts. The above Committee (with substitution of District Magistrate) may enquire into this matter also in the same manner and give its report. Further directions in the first matter will also apply to *will* also apply to the second matter in respect of the Chief Secretary, Andhra Pradesh and the MoEF&CC.

A copy of this order be sent to Chief Secretary, Andhra Pradesh, CPCB, State PCB, District Magistrates, Visakhapatnam and Kurnool, Prof. Ch V. Rama Chandra Murthy, Andhra University, Vizag and Prof.

Pulipati King, Head of Chemical Engineering Department, Andhra University, Vizag by e-mail.

List for further consideration on 03.11.2020.

Adarsh Kumar Goel, CP

S. P. Wangdi, JM

Dr. Satyawan Singh Garbyal, EM

Dr. Nagin Nanda, EM

July 6, 2020
OA No. 106/2020 &
OA No. 107/2020
DV



ANDHRA PRADESH POLLUTION CONTROL BOARD
D.No.33-26-14D/2, Near Sunrise Hospital, Pushpa Hotel Centre,
Chalamalavari Street, Kasturibaipet, Vijayawada - 520 010
Phone. No.0866-2436217, Website : www.appcb.ap.nic.in

RED CATEGORY
CONSENT & AUTHORIZATION ORDER
BY REGISTERED POST WITH ACKNOWLEDGEMENT DUE

Consent Order No : APPCB/VSP/VSP/12927/HO/CFO/2018-

Date: 10.04.2018

CONSENT is hereby granted for Operation under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act 1981 and amendments thereof and Authorisation under Rule 6 of the Hazardous & Other Wastes (Management and Transboundary, Movement) Rules, 2016 and the rules and orders made there under (hereinafter referred to as 'the Acts', 'the Rules') to:

M/s. Sainor Life Sciences Pvt. Ltd.,
(Change of product mix)
Plot No. 59-E, J.N. Pharma City,
Parawada,
Visakhapatnam District - 521 021
E-mail: gmpplant@sainorlifesciences.com / brahmareddy@sainorlifesciences.com

(Hereinafter referred to as 'the Applicant') authorizing to operate the industrial plant to discharge the effluents from the outlets and the quantity of emissions per hour from the chimneys as detailed below:

(i) Outlets for discharge of effluents:

Outlet No.	Outlet Description	Max Daily Discharge KLD	Point of Disposal
1	High TDS effluents : Process - 14.90 KLD	14.90	To MEE of CETP, Pharmacy for Evaporation and further disposal.
2	Low TDS effluents: Process - 6.40 KLD + Washings - 5.0 KLD + Boiler - 2.50 + Cooling tower blow down - 9.0 KLD + DM Plant - 1.00 KLD + R&D - 2.0 KLD + Scrubber - 2.0 KLD + Domestic - 4.0 KLD	31.90	To the CETP, Pharmacy for further treatment and disposal.

ii) Emissions from chimneys:

Chimney No.	Description of Chimney	Quantity of Emissions at peak flow (m ³ /hr)
1	Attached to 3.0 TPH coal fired boiler	--
2	Attached to 1 x 320 KVA + 1x 50 KVA DG sets	--

iii) HAZARDOUS WASTE AUTHORISATION (FORM - II) [See Rule 6 (2)]:

M/s. Sainor Life Sciences Pvt. Ltd., Plot No. 59-E, J.N. Pharma City, Parawada, Visakhapatnam District is hereby granted an authorization to operate a facility for collection, reception, storage, treatment, transport and disposal of Hazardous Wastes namely:

• HAZARDOUS WASTES WITH DISPOSAL OPTION:

Sl. No	Name of Hazardous Waste	Stream	Quantity	Method of disposal
1.	Organic residue	28.1 of Schedule - I	666.86 Kg/day	To TSDF, Parawada, Visakhapatnam District / Cement plants for co-processing.
2.	Spent Carbon	28.3 of Schedule - I	90.23 Kg/day	
3.	ETP Sludge	35.3 of Schedule-I	50 Kg/day	TSDF, Parawada, Visakhapatnam District for secured land filling.
4.	Inorganic solid waste (from process)	28.1 of Schedule - I	251.81 Kg/day	

• HAZARDOUS WASTES WITH RECYCLING OPTION:

Sl. No	Name of Hazardous Waste	Stream	Quantity	Method of disposal
1.	Spent Solvents	28.6 of Schedule - I	12.0 KLD	To TSDF for incineration / Cement industry for co-processing
2.	Waste oil & grease	5.1 of Schedule - I	150 LPM	To Authorized agencies for reprocessing / Recycling
3.	Empty barrels / containers / liners contaminated with hazardous chemicals / wastes	33.1 of Schedule - I	250 Nos/month	After complete detoxification, shall be disposed to outside agencies

This consent order is valid for manufacturing of the following products with quantities indicated only :

S. No.	Name of the Product	Quantity in Kg/Day	No. of Stages	Name of the Starting Raw Material	Quantity in Kg/Day
Permitted Products					
1	Atorvastatin calcium	66.67	6	Tert-butyl-2-(4R,6S)-6-(cyano methyl)-2, 2-dimethyl-1-,3-dioxan-4-yl) acetate	44.3
2	Biperiden hydrochloride	16.67	4	Cyclopentadiene	5.0
3	Cetirizine Dihydrochloride	33.33	4	4-chlorobenzhydryl chloride	16.7
4	Clopidogrel Bisulfate	33.33	4	2-(2-chlorophenyl) glycine hydrochloride	15.7
5	Domperidone	133.33	1	5-chloro-1-piperidin-4-yl-1,3-dihydro-2H-benzimidazol-2-one (DOM-IX)	120.1
6	Donepezil hydrochloride	16.67	2	1-benzyl piperidine-4-carboaldehyde	10.0
7	Duloxetine hydrochloride	16.67	3	N-methyl N-acetylamine-1-thiphen-2-naphthoxy propane hydrochloride	75.0

8	Esomeprazole magnesium trihydrate	100.00	2	5-methoxy-2-[(4-methoxy-3,5-dimethyl-2-pyridinyl)methyl thio]-1H-benzimidazole (Omeprazole Sulphide)	90.0
9	Fexofenadine hydrochloride	200.00	3	Methyl 2-[4-(4-chlorobutanoyl)phenyl]-2-methyl propanoate	128.5
10	Itraconazole	100.00	1	2-sec-Butyl-4-{4-[4-(4-hydroxy-phenyl)-piperazin-1-yl]-phenyl}-2,4-dihydro-[1,2,4] triazol-3-one (IT-VII)	63.0
11	Lansoprazole	33.33	5	2,3-lutidine	14.0
12	Levocetirizine dihydrochloride	16.67	10	P-Chloro benzophenone	25.0
13	Linezolid	16.67	3	R-3-(3-fluoro-4-morpholinophenyl)-2-oxooxazolidin-5-yl-) methyl methane sulfonate	35.0
14	Lithium carbonate	33.33	1	Lithium chloride	48.0
15	Lithium chloride	40.00	1	Lithium	8.0
16	Montelukast sodium	16.67	9	7-chloro quinaldehyde	13.3
17	Moxifloxacin hydrochloride monohydrate	50.00	4	Boric acid	102.1
18	Olanzapine	10.00	3	Malononitrile	3.0
19	Olmesartan	66.67	5	2-propyl-1H-imidazole-4, 5-dicarboxylic acid diethyl ester	45.3
20	Omeprazole (Starting from 3,5 dimethoxy 4-Nitro Pyridine-N oxide)	100.00	4	3,5-Dimethoxy-4nitro pyridine N-Oxide	47.3
21	Omeprazole [(Starting from 5-methoxy-2-(5-methoxy-3,5- dimethyl-pyridine-2-yl)methylsulfanyl)-1H-Benzimidazole]	166.67	1	5-methoxy-2-(5-methoxy-3,5-dimethyl-pyridin-2ylmethyl sulfanyl)-1-h-benzimidazole	200.0
22	Omeprazole Sodium	33.33	1	5-methoxy-2-[(4-methoxy-3,5-dimethylpyridin-2-yl)methyl sulfinyl]-1H-benzimidazole	31.3
23	Omeprazole Magnesium	33.33	1	5-methoxy-2-[(4-methoxy-3,5-dimethylpyridin-2-yl)methyl sulfinyl]-1H-benzimidazole	31.3
24	Loperamide Hydrochloride	33.33	2	N, N-Dimethyl (tetra hydro-3,3-diphenyl)-2-furyliden ammonium bromide (Furanumium bromide)	23.3
25	Ketorolac Tromethamine	33.33	4	Phenyl(1H-pyrrol-2-yl)methanone	16.7
26	Pantoprazole sodium	166.67	2	2-Chloromethyl-3,4-dimethoxy-pyridine hydrochloride	108.6
27	Pregabalin	33.33	5	Isoveraldehyde	32.7
28	Rabeprazole sodium	33.33	7	2,3 Lutidine	15.3

29	Tamsulosin hydrochloride	10.00	2	(S)-5-(2-aminopropyl)-2-methoxy benzene sulfonamide	6.2
30	Telmisartan	50.00	6	Methyl-4-(butyramido)3-methyl-5-nitrobenzoate	36.5
31	Topiramate	16.67	1	2,3,4,5-bis-O-(1-methylethylidene)-β-D-fructopyranose	8.0
32	Dex-Lansoprazole	16.67	1	2-[[[3-methyl-4-(2,2,2-trifluoroethoxy)-2-pyridinyl] methyl] thio]-1H-benzimidazole	18.3
33	Quetiapine Hemi fumarate	33.33	2	11-piperazine-1-yl-dibenzo [b, f] thiazepine	25.0
34	Cinnarizine	33.33	1	1- (diphenyl methyl) piperazine	25.0
35	Domperidone maleate	33.33	1	Domperidone	30.0
36	Dapoxetine	16.67	1	5,8-dihydro naphthalene-1-ol	8.3
37	Ranolazine	16.67	1	N-(2,6-dimethylphenyl)-2-(piperazine-1-yl) acetamide	11.7
38	Sertraline Hydrochloride	16.67	1	Racemic Sertraline HCl	41.7
39	Lamotrigine	16.67	2	((2Z)-2-[cyano(2,3-dichlorophenyl) methylidene	25.3
40	Drotaverine Hydrochloride	16.67	3	((2Z)-2-[cyano(2,3-dichlorophenyl) methylidene	25.3
41	Phenol	33.33	1	Phenol Crude	34.4
42	Parachloro Phenol	33.33	1	Para Chlorophenol Crude	34.4
43	Guaiacol	100.00	2	Catechol	100.0
44	Lathanol	16.67	2	Dodecan-1-ol	10.0
45	Dexamethasone Acetate	16.67	1	Dexamethasone	15.8
46	Camphor	33.33	1	Camphor crude	36.7
47	Eugenol	16.67	1	Eugenol crude	18.3
48	Beechwood creosote	16.67	1	Beechwood creosote crude	18.3
49	Trolamine	16.67	1	Trolamine crude	18.3
50	Tropic Acid	16.67	2	Methyl phenyl acetate	18.3
51	Picloxydine dihydrochloride	16.67	2	Piperazine di hydrochloride	6.0
52	Myristalkonium chloride	16.67	1	N, N-Dimethyl benzyl amine	16.7
53	Cetalkonium chloride	16.67	1	N, N-Dimethyl benzyl amine	16.7
54	Pentatic Acid	50.00	2	N-(2-aminoethyl) ethane-1,2-diamine	13.3
55	Doripenem	33.33	3	4-nitrobenyl (2S,4S)-4-Acetyl thio-2-[[N-sulfanoyl-N-(tert-butoxycarbonyl) amino} Methyl] Pyridine-1-carboxylate	43.3
56	Meropenem	33.33	2	(4R,5S,6S)-3-(diphenyl-oxy) phosphoryloxy-6-[(1R)-l-hydroxyethyl]-4-methyl-7-oxo-1-azabicyclo [3,2,0] hept-2-ene-2-carboxylate	56.7

57	Imipenem	16.67	4	6-(1-Hydroxy-ethyl)6-methyl-3,7 dioxo-1-aza-bicyclo [3.2.0] heptanes-2-carboxylic acid 4-nitro-benzyl ether	21.7
58	Cloxacillin Sodium	66.67	1	6- Aminopenicillanic acid	33.3
59	Piperacillin	33.33	1	Amino benzylpenicillin	26.7
60	Tazobactam	40.00	1	Tazobactam benzhydryl	63.2
61	Rosuvastatin Calcium	16.67	1	Tert-butyl 2-((4R,6S)-6-((E)-2-(4-(4-fluorophenyl)-6-isopropyl-2-(N-methyl methyl sulfonamido) pyrimidin-5-yl) vinyl)-2,2-dimethyl-1,3-dioxan-4-yl) acetate (KSM)	20.8
62	Venlafaxine Hydrochloride	16.67	1	1-[2-Amino-1-(4-methoxy phenyl)ethyl] cyclohexanol	15.8
	Proposed new Products				
63	Cefaclor	33.33	1	7-Amino-3-chloro cephalosporanic acid	23.3
64	Verapamil Hydrochloride	100.00	4	(3,4-dimethoxyphenyl) Acetonitrile	80.0
65	Etodolac	33.33	3	(2-ethylphenyl) hydrazine Hydrochloric Acid	66.7
66	Biperiden Sodium	66.67	4	Cyclopentadiene	26.7
67	Rivastigmine	33.33	4	1-(3-hydroxyphenyl) ethanone	18.3
68	Cabergoline	33.33	1	6-allyl-8-β-carboxy-ergoline	26.7
69	Carvedilol	50.00	2	4-(2,3-Epoxypropoxy) Carbazole	40.8
70	Sumatriptan Succinate	16.67	4	(4-Hydrazinyl phenyl) methane sulfonyl chloride	17.3
71	Bilastine	16.67	2	(1-(4-Bromophenethyl) piperidin-4-yl)-1-(2-ethoxyethyl)-1H-benzo[d] imidazole	23.3
72	Azilsartan	16.67	4	Methyl 3-((2'-cyanobiphenyl-4-yl) methyl)-2-ethoxy- 3H-benzo [d] imidazole-4-carboxylate	25.0
73	Repaglinide	33.33	1	3-Methyl-1-(2-piperidin-1-yl-phenyl)-butylamine	23.3
74	Fluvastatin Sodium	66.67	2	(S, E)-tert-Butyl-7-(3-(4-fluorophenyl)-1-isopropyl-1H-indol-2-yl)-5-hydroxy-3-oxohept-6-enoate	84.0
75	7-Chloro-1-Cyclopropyl-6-fluoro-1,4-dihydro-4-oxo-3-quinoline carboxylic acid (Q-Acid)	166.67	1	Methyl-2,4-Dichloro-5-Fluorobenzoyl-3-Cyclopropyl amino acrylate	250.0
76	Paraformaldehyde	66.67	1	Formaldehyde	133.3

77	Terty-butyl-2-((4R,6S)-2,2-dimethyl-6-(2-oxoethyl)-1,3-dioxan-4-yl) acetate (Rosuvastatin Calcium Int.)	33.33	1	Tert-butyl 2-((4R,6S)-6-(acetoxymethyl)-2,2-dimethyl-1,3-dioxan-4-yl) acetate	46.7
78	[R-(R*, R*)-2-(4-Fluorophenyl)-dioxane-5-(1-methyl)-3-Phenyl-4-[(phenylamino)carbonyl]-1H-pyrimole-1-tert (Atorvastatin Calcium Int.)	16.67	2	2-Benzylidene-4-methyl-3-oxopentanoic acid phenyl amide	11.3
79	(R)-5-(2-aminopropyl)-2-methoxybenzene sulfonamide hydrochloride (Tamsulosin Int.)	200.00	1	2-methoxy-5-(2-oxopropyl) benzene sulfonamide	240.0
80	(2-[2-(2,2,2-Trifluoroethoxy)Phenoxy] ethyl methane sulphonate (Silodosin Int.)	66.67	1	2-[2-(2,2,2-trifluoroethoxy) phenoxy] ethanol	60.0
81	6-Benzyl-5H-pyrimolo[3,4-b]ridine-5,7(6H)-dione (Moxifloxacin Int.)	66.67	1	Pyridine-2,3-dicarboxylic Acid	50.0
82	Sodium (1[[[(1R)-1[3[(1E)-2-(7-Chloro-2-quinolinyl) ethynyl] phenyl]-3[2-(1-hydroxy-1-methyl) phenyl]-propyl] sulfanyl] methyl] cyclopropyl] acetate(Montelukast Int.)	66.67	2	(S, E)-1-(3-(2-(7-Chloroquinolin-2-yl) vinyl) phenyl)-3-(2-(2-hydroxypropan-2-yl) phenyl) propan-1-ol	76.0
83	Calcium bis [(3R, 5S,6E)-7[4-(4-Fluorophen-yl)-6-(1-methylethyl)-2-[methyl(methylsulfonyl)amino]pyrimidin-5-yl-3,5-dihydroxyhept-6-enoate-Prified (Rosuvastatin Calcium Intermediate)	33.33	1	Tert-butyl 2-((4R,6S)-6-((E)-2-(4-(4-fluorophenyl)-6-isopropyl-2-(N-methyl methyl sulfonamido)pyrimidin-5-yl) vinyl)-2,2-dimethyl-1,3-dioxan-4-yl) acetate (KSM)	41.7
84	(R)-Benzyl 2-(5-bromo-1H-indole-3-carbonyl) pyrrolidine-1-carboxylate (Eletriptan Int.)	52.00	2	D-Proline	40.0
85	1-(sec-butyl)-4-(4-(4-(4-hydroxyphenyl) piperazin-1-yl) phenyl)-1H-1,2,4-triazol-5(4H)-one (Itraconazole Int.)	33.33	2	4-(4-(4-(4-Methoxyphenyl) piperazin-1-yl) phenyl)-1H-1,2,4-triazol-5(4H)-one	48.5
86	2-(2-nitrophenylamino)-5-methylthiophene-3-carbonitrile (Olanzapine Int.)	33.33	2	Malononitrile	13.3
87	1-Cyclopropyl-6,7-difluoro-1,4-dihydro-8-methoxy-4-oxo-3-quinoline carboxylic acid ethyl ester (Gatifloxacin Int.)	33.33	1	1-Cyclopropyl-6,7-difluoro-1,4-dihydro-8-methoxy-4-oxo-3-quinoline carboxylic acid ethyl ester (Crude)	40.0
88	5-Benzyl-2,3,1-pyrrolizine-1-carboxylic acid (Ketorolac Intermediate)	13.33	3	Pyrrole	6.7
89	Fluconazole	50.00	4	1,3-Difluoro benzene	25.0
90	Hydrochlorothiazide	200.00	1	5-Chloro-2,4-disulfamyl aniline	210.0
91	Etoricoxib	50.00	5	Thiophenol	40.0
92	Meclizine Hydrochloride	33.33	3	1-(Chloromethyl)-3-methylbenzene	16.7
93	Rupatadine Fumarate	33.33	2	Desloratadine	26.7
94	Tapentadol Hydrochloride	40.00	4	1-Bromo-3-methoxy benzene (3-Bromo Anisole)	80.0
95	Triclabendazole	16.67	7	2,3-Dichlorophenol	16.7

96	Glimepiride	16.67	4	3-Ethyl-4-methyl-2,5-dihydro-1H-pyrrole-2-one	8.3
97	Gliclazide	166.67	2	N-Amino Azabicyclo Octane Hydrochloride	110.0
98	Ketoconazole	16.67	2	Cis-2-(2,4-Dichlorophenyl)-2-(1H-imidazol-1-ylmethyl)-1,3-dioxolane-4-methanol	16.7
99	Ebastine	16.67	2	4- (Diphenyl methoxy) piperidine hydrochloride (4 DMP)	16.7
100	1-(6-methylpyridin-3yl)-2- [4-(methyl sulfonyl) phenyl] ethenone - Keto Sulfone (Etoricoxib Intermediate)	40.00	3	Thiophenol	32.0
101	Rifaximin	43.33	1	Rifamycin-O	52.7
102	Validation Products	33.33		--	-
	TOTAL (Maximum of Any 7 Products)	1266.67			

* The industry shall manufacture any 7 products at any given point of time with a maximum production capacity of 1266.67 Kg/day

This order is subject to the provisions of 'the Acts' and the Rules' and orders made thereunder and further subject to the terms and conditions incorporated in the schedule A, B & C enclosed to this order.

This combined order of consent & Hazardous Waste Authorization shall be valid for a period ending with the 31st day of May, 2019.

Bandla Siva Sankar Prasad
Sankar Prasad
Digitally signed by Bandla Siva Sankar Prasad
Date: 2018.04.10 13:10:43 +05'30'
MEMBER SECRETARY

To
M/s. Sainor Life Sciences Pvt. Ltd.,
(Change of product mix)
Plot No. 59-E, J.N. Pharma City,
Parawada,
Visakhapatnam District - 521 021

Copy to :

1. The Commissioner of Industries, First floor, Government Regional Printing Press Buildings, Mutyalampadu, Vijayawada - 520 011
2. The JCEE, Zonal Office, Visakhapatnam for information and necessary action.
3. The JCEE, Unit-II, APPCB, Vijayawada for information.
4. The JCEE (HWM), APPCB, Vijayawada for information.
5. The Environmental Engineer, Regional Office, Visakhapatnam for information and necessary action. He is directed to inspect the industry in the 1st week of May, 2018 and submit the compliance report on the conditions stipulated in the CFO order to the Head Office.

SCHEDULE-A

1. Any up-set condition in any industrial plant / activity of the industry, which result in, increased effluent / emission discharge and/ or violation of standards stipulated in this order shall be informed to this Board, under intimation to the Collector and District Magistrate and take immediate action to bring down the discharge / emission below the limits.
2. The industry should carryout analysis of waste water discharges or emissions through chimneys for the parameters mentioned in this order on quarterly basis and submit to the Board.
3. All the rules & regulations notified by Ministry of Law and Justice, Government of India regarding Public Liability Insurance Act, 1991 should be followed as applicable.

4. The industry should put up two sign boards (6x4 ft. each) at publicly visible places at the main gate indicating the products, effluent discharge standards, air emission standards, hazardous waste quantities and validity of CFO and exhibit the CFO order at a prominent place in the factory premises.
5. Notwithstanding anything contained in this consent order, the Board hereby reserves the right and powers to review / revoke any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Acts by the Board.
6. The industry shall file the water cess returns in Form-I as required under section (5) of Water (Prevention and Control of Pollution) Cess Act, 1977 on or before the 5th of every calendar month, showing the quantity of water consumed in the previous month along with water meter readings. The industry shall remit water cess as per the assessment orders as and when issued by Board.
7. The applicant shall submit Environment statement in Form V before 30th September every year as per Rule No.14 of E(P) Rules, 1986 & amendments thereof.
8. The applicant should make applications through Online for renewal of Consent (under Water and Air Acts) and Authorization under HWM Rules at least 120 days before the date of expiry of this order, along with prescribed fee under Water and Air Acts and detailed compliance of CFO conditions for obtaining Consent & HW Authorization of the Board. The industry should immediately submit the revised application for consent to this Board in the event of any change in the raw material used, processes employed, quantity of trade effluents & quantity of emissions. Any change in the management shall be informed to the Board. The person authorized should not let out the premises / lend / sell / transfer their industrial premises without obtaining prior permission of the State Pollution Control Board.
9. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules 1982, to Appellate authority constituted under Section 28 of the Water(Prevention and Control of Pollution) Act, 1974 and Section 31 of the Air(Prevention and Control of Pollution) Act, 1981.

SCHEDULE-B

WATER POLLUTION:

1. The LTDS effluents sent to CETP, Pharmacy shall not contain constituents in excess of the tolerance limits mentioned below, as per their MoU with M/s Ramky Pharma City.

Outlet	Parameter	Concentration in mg/l
2*	pH	6.50 - 8.50
	Temperature °C	< 45°C
	TDS	12,000 mg/l
	TSS	600 mg/l
	BOD	3,000 mg/l
	COD	8,000 mg/l
	Oil and Grease	20 mg/l
	Chromium Hexavalent (as Cr+6)	2 mg/l
	Chromium (total) (as Cr)	2 mg/l
	Ammonical Nitrogen (as N)	30 mg/l
	Cyanide (as CN)	0.20 mg/l
	Lead (as Pb)	1 mg/l
	Nickel (as Ni)	3 mg/l
	Zinc (as Zn)	15 mg/l
	Arsenic (as As)	0.20 mg/l
Mercury (as Hg)	0.01 mg/l	

(* The industry shall segregate the HTDS and LTDS effluent streams and the effluents which are not meeting the above standards shall be treated as HTDS effluents and shall be sent to MEE of Pharmacy for evaporation.).

2. The source of water is JNPC Supply. The following is the permitted water consumption:

Sl. No.	Purpose	Quantity (KLD)
1	Industrial cooling, boiler feed.	71.00
2	Domestic & Gardening purposes.	8.00

3	Process, whereby water gets polluted and pollutants are easily bio degradable.	--
4	Processing, whereby water gets polluted and the pollutants are not easily bio - degradable.	25.50
Total		104.50

Separate meters with necessary pipe-line shall be maintained for assessing the quantity of water used for each of the purposes mentioned above for Cess assessment purpose.

3. The industry shall provide containers detoxification facility. Container & Container liners shall be detoxified at the specified covered platform with dyke walls and the wash wastewater shall be routed to low TDS collection tank.
4. The LTDS and HTDS effluents shall be stored in above ground collection tanks separately.
5. The industry shall maintain HDPE tanks in the effluent collection tank (both locations at block and common collection point). The effluent shall be connected to the HDPE tanks and from the HDPE tanks, effluent shall be pumped to the ETP. Free space shall be maintained around the HDPE tanks to observe leakages if any.
6. The industry shall submit the details of quantity of High TDS and Low TDS effluents sent to CETP of Pharmacy every month to the RO, Visakhapatnam.
7. The industry shall maintain proper manifest system for effluent transported to CETP. They shall submit monthly reports to the E.E., RO-Visakhapatnam.
8. Effluents shall not be discharged onland or any water bodies or aquifers under any circumstances. Floor washings shall be admitted into effluent collection system only and shall not be allowed to find their way into storm water drains or open areas.
9. The industry shall evaluate the performance of solvent recovery system for each stream-wise and shall furnish plan of action to maintain the efficiency of solvent recovery more than 95% for each stream wise.

AIR POLLUTION:

10. The emissions shall not contain constituents in excess of the prescribed limits mentioned below:

Chimney No.	Parameter	Emission Standards
1	Particulate matter	100 mg/Nm ³

11. The industry shall comply with ambient air quality standards of PM10 (Particulate Matter size less than 10µm) - 100 µg/ m³; PM2.5 (Particulate Matter size less than 2.5 µm) - 60 µg/ m³; SO₂ - 80 µg/ m³; NO_x - 80 µg/m³, outside the factory premises at the periphery of the industry.

Standards for other parameters as mentioned in the National Ambient Air Quality Standards CPCB Notification No.B-29016/20/90/PCI-I, dated 18.11.2009.

Noise Levels: Day time (6 AM to 10 PM) - 75 dB (A)
Night time (10 PM to 6 AM) - 70 dB (A)

12. The industry shall comply with emission limits for DG sets of capacity upto 800 KW as per the Notification G.S.R.520 (E), dated 01.07.2003 and G.S.R.448(E), dated 12.07.2004 under the Environment (Protection) Act Rules. In case of DG sets of capacity more than 800 KW shall comply with emission limits as per the Notification G.S.R.489 (E), dated 09.07.2002 at serial no.96, under the Environment (Protection) Act, 1986.
13. The industry shall operate the two stage scrubbers for scrubbing of process emissions at all emission sources. The industry shall maintain online pH meters to the scrubbers. Scrubbed liquid shall be recycled as far as possible and finally sent to CETP of Pharmacy for further treatment.
14. The evaporation losses in solvents shall be controlled by taking suitable measures, which include:
 - i. Chilled brine circulation to effectively reduce the solvent losses into the atmosphere.
 - ii. Transfer of solvents by using pumps and closed conveyance instead of manual handling.
 - iii. Closed centrifuges be used due to which solvent losses are reduced drastically.
 - iv. The reactor vents connected with primary & secondary condensers to catch the solvent vapours.
 - v. All the solvent storage tanks are connected with vent condensers to prevent solvent vapours.

15. The industry shall not use odour causing substances such as Mercaptan or cause odour nuisance in the surroundings.

GENERAL:

16. As committed vide letter dated 04.04.2018
- The industry shall install Bag filter as Air pollution control equipment to 3 TPH coal fired boiler by 30.04.2018.
 - Provide data logger to the pH meter by 30.04.2018.
 - Shall install water meters for boiler, cooling towers makeup and domestic usages by 30.04.2018
17. If the industry fails to comply with the conditions stipulated in the CFO Order, the industry shall submit a Bank Guarantee as per the Board's Circular Memo dt 28.05.2012.
18. The industry shall provide above ground level effluent collection tank at block within 30 days.
19. The industry shall provide closed hood on the top of the effluent storage tanks and vent connected to the scrubber.
20. The industry shall install online pH meter with auto recording facility and VOC meter immediately.
21. The industry shall dispose the spent solvents / mixed spent solvents to APPCB authorized recyclers.
22. The industry shall maintain dry condition outside drains in un-rainy season.
23. The industry shall enter an agreement with the Cement industries for disposal of incinerable waste or shall dispose to Alternative Fuel Raw material facility (AFRF) OR to TSDF for co-incineration.
24. The industry shall transport the hazardous waste to cement industries through GPS vehicle.
25. The industry shall maintain online real time monitoring (web camera) facilities to flow meters as per CPCB guidelines.
26. The industry shall not manufacture any product, other than those mentioned in this order.
27. The industry shall maintain VOC analysers with recording facility at all the strategic locations.
28. The industry shall maintain flow meters preferably Electro Magnetic flow meters with totalisers for water and effluent quantity measurements for different streams of effluents and different categories of water usage stipulated in this order.
29. The drums containing chemicals / solvents shall be stored under a roof on elevated platform with a provision to collect leakages / spillages in the collection pit.
30. The industry shall comply with CPCB directions dated 05.02.2014 / 02.03.2015 and guidelines issued regarding online monitoring systems issued from time to time. The online monitoring system shall be calibrated periodically as per equipment suppliers manual / CPCB guidelines.
31. The industry shall maintain the following records and the same shall be made available to the inspecting officers of the Board:
- Daily production details (ER-1 Central Excise Returns).
 - Quantity of Effluents generated, treated, recycled/reused and disposed to CETP.
 - Log Books for pollution control systems.
 - Characteristics of effluents and emissions.
 - Hazardous/non hazardous solid waste generated and disposed.
 - Inspection book.
 - Manifest copies of effluents / hazardous waste.
32. The industry shall submit AAQ monitoring reports conducted by Authorised Agency every month.
33. The industry shall develop green belt in all the vacant places. In future, excess green belt over and above 33 % of total area can be utilized for industrial activity as per requirement of industry.

SCHEDULE - C

[See rule 6(2)]

[CONDITIONS OF AUTHORISATION FOR OCCUPIER OR OPERATOR HANDLING HAZARDOUS WASTES]

- All the rules and regulations notified by Ministry of Environment and Forests, Government of India under the E(P) Act, 1986 in respect of management, handling, transportation and storage of the Hazardous wastes should be followed.
- The industry shall not store hazardous waste for more than 90 days as per the Hazardous & Other Wastes (Management and Transboundary Movement) Rules, 2016.

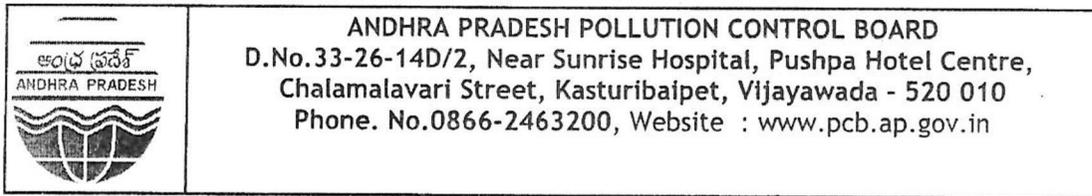
3. The industry shall store Used / Waste Oil and Used Lead Acid Batteries in a secured way in their premises till its disposal to the manufacturers / dealers on buyback basis.
4. The industry shall maintain 6 copy manifest system for transportation of waste generated and a copy shall be submitted to concerned Regional Office of APPCB. The driver who transports Hazardous Waste should be well acquainted about the procedure to be followed in case of an emergency during transit. The transporter should carry a Transport Emergency (TREM) Card.
5. The industry shall maintain proper records for Hazardous & other wastes stated in Authorisation in FORM-3 i.e., quantity of Incinerable waste, land disposal waste, recyclable waste etc., and file annual returns in Form- 4 as per Rule 6 (5) of the Hazardous & Other Wastes (Management & Transboundary Movement) Rules, 2016 and amendments thereof.
6. The industry shall submit the condition wise compliance report of the conditions stipulated in Schedule A, B & C of this Order on half yearly basis to Board Office, Hyderabad and concerned Regional Office.

Bandla Siva
Sankar Prasad
MEMBER SECRETARY

Digitally signed by Bandla
Siva Sankar Prasad
Date: 2018.04.10 13:11:11
+05'30'

To

M/s. Sainor Life Sciences Pvt. Ltd.,
(Change of product mix)
Plot No. 59-E, J.N. Pharma City,
Parawada,
Visakhapatnam District - 521 021



Order No. APPCB/VSP/VSP/12927/CFO/HO/2019

25/06/2019

AUTO RENEWAL OF CONSENT AND HAZARDOUS WASTE AUTHORISATION ORDER FOR OPERATIONS

In response to your CFO & HWA application dt: 24.05.2019 & 27.05.2019 for Auto Renewal of Consent for Operation and Hazardous Waste Authorisation, the A P Pollution Control Board hereby extends the validity period of CFO & HW Authorisation order No. APPCB/VSP/VSP/12927/HO/CFO/2018, dated 10.04.2018, valid up to 31.05.2019 for a further period up to 31.05.2021 under Section 25/26 of Water (Prevention and Control of Pollution) Acts, 1974, under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 and Rule 6 of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 with the following additional conditions.

1. All other conditions mentioned in Schedules A, B & C of the CFO & HWA order issued by the Board vide order dated 10.04.2018 will remain same.
2. The industry shall comply with the Regulation of Persistent Organic Pollutants Rules, 2018 notified by the MoEF&CC Notification vide G.S.R. 207 (E) dated 05.03.2018. As per the notification, the following 7 chemicals are prohibited to manufacturer, trade, use, import and export:
 - i. Chlordecone,
 - ii. Hexabromobiphenyl,
 - iii. Hexabromodiphenyl ether and heptabromodiphenyl ether (commercial octa-BDE),
 - iv. Tetrabromodiphenyl ether and pentabromodiphenyl ether (commercial penta-BDE),
 - v. Pentachlorobenzene,
 - vi. Hexabromocyclododecane and
 - vii. Hexachlorobutadine.
3. There shall not be any POPs generation from process operations.
4. The industry shall comply with the Standard Operating Procedure (SoP) and Checklist of Minimal Requisite Facilities for Utilization of Spent Solvent for Recovery of Solvent specified for Solvent Recovery Units issued by CPCB.
5. The industry shall follow the SOP for Safe and Scientific Spent Solvent Handling, Processing and Storage.
6. The industry shall update the information in OCEMS- Industry Information Data Entry

Digitally Signed By Bandla Siva Sankar Pra

Software for Compliance Reporting Protocol in Part - II (Sections F & G) Every Quarter on 1st January, 1st April, 1st July and 1st October through this software system.

7. The industry shall maintain dry condition outside drains in non-rainy season.
8. The industry shall obtain Public Liability Insurance Policy which includes Environment Relief Fund.
9. The industry shall comply with the standards issued by MoEF&CC / CPCB from time to time.
10. The industry shall submit the compliance report to all the stipulated conditions for Consent for Operation for every six months i.e. on 1st of January and 1st of July of every year.
11. In case of false certification, non compliance of conditions / directions and discrepancy in furnishing the information by the industry, the Board can withdraw the auto renewed consent and take action under provisions of relevant Acts & Rules.

**BANDLA SIVA SANKARA PRASAD,
CHAIRMAN, O/o CHAIRMAN-APPCB**

To

M/s. Sainor Life Sciences Pvt. Ltd.,
Plot No. 59-E,
JN Pharma City, Parawada,
Visakhapatnam District
E-mail: gmplant@sainorlifesciences.com

Copy to:

1. The JCEE, Zonal Office, Visakhapatnam for information and necessary action.
2. The Environmental Engineer, Regional Office, Visakhapatnam for information and necessary action. He is directed to verify the compliance status of the CFO conditions and refer to the Task Force in case of violations.



**ANDHRA PRADESH POLLUTION CONTROL BOARD
ZONAL OFFICE :: VISAKHAPATNAM**

D.No.39-33-20/4/1, Madhavadhara Vuda Colony, Visakhapatnam - 530018.

Ph: 0891-2719380

Order No. 8293/PCB/ZO-VSP/Tech./2020

Dt. 30.06.2020

Sub : APPCB-ZO-VSP - **M/s. Sainor Life Sciences Pvt. Ltd., Plot No. 59-E, JN Pharma City, Parawada, Visakhapatnam District** – Chemical accident occurred at 11.30 pm on 29.06.2020, two persons died and few other people hospitalized due to exposure to the gas – **Withdrawal of CFO order – Closure Order Issued** – Reg.

- Ref : 1. CFO & HWA Order No. APPCB/VSP/VSP/12927/HO/CFO/2018, Dt. 10.04.2018 valid up to 31.05.2019.
2. Auto renewal CFO & HWA Order No. APPCB/VSP/VSP/12927/CFO/HO/2019, Dated 25.06.2019 valid up to 31.05.2021.
3. Instructions of the Chairman & the Member Secretary A.P. Pollution Control Board dated 30.06.2020.
4. Preliminary investigation report of DCIF, EE, APPCB, GM DIC & RDO dt. 30.06.2020.

* * *

WHEREAS, you are operating the industry in the name and style of M/s. Sainor Life Sciences Pvt. Ltd., at Plot No. 59-E, JN Pharma City, Parawada, Visakhapatnam District.

WHEREAS, A.P. Pollution Control Board vide ref. 1st & 2nd cited issued CFO to your industry to operate Bulk drugs & drug intermediates with certain conditions which is valid up to 31.05.2021.

WHEREAS, the team consisting of Dy. Chief Inspector of Factories, EE, APPCB, GM DIC & RDO vide reference 4th cited reported that Chemical accident occurred in your industry at 11.30 pm on 29.06.2020 and two persons have died and few other people working in the industry are injured due to exposure to the hydrogen sulphide gas.

In view of the above A.P. Pollution Control Board here by withdraw your Consents issued vide reference 1st & 2nd cited and also issues the **Closure Order** under section 33(A) of the Water (Prevention and control of pollution) Amendment Act, 1988 and under Section 31(A) of Air (Prevention and Control of Pollution) Amendment Act, 1987 in the interest of Public Health & Environment.

You are directed to take note that if you continue to operate your unit even after receipt of this order, you will be liable for prosecution in the court of Metropolitan Magistrate or Judicial Magistrate of the first class under section 41 (2) of Water (Prevention and Control of Pollution) Act, 1974 and under section 37 (1) of Air (Prevention and Control of Pollution) Act,

1981, the punishment for which includes imprisonment for a term which shall not be less than one year six months which may be extended to six years and with fine.

This order comes into effect from today i.e., 30.06.2020.

This order is issued with the approval of the Member Secretary, A.P. Pollution Control Board.

**Rajendra
Reddy Thuraka**

Digitally signed by
Rajendra Reddy Thuraka
Date: 2020.06.30
17:57:23 +05'30'

JOINT CHIEF ENVIRONMENTAL ENGINEER

**To
M/s. Sainor Life Sciences Pvt. Ltd.,
Plot No. 59-E,
JN Pharma City, Parawada,
Visakhapatnam District.**

Copy to :

1. The Chairman, APPCB, Board Office, Vijayawada for favour of kind information.
2. The Member Secretary, APPCB, Board Office, Vijayawada for favour of kind information.
3. The Chairman/Managing Director, A.P Eastern Power Distribution Company Ltd, Visakhapatnam for favor of information.
4. The Joint Chief Environmental Engineer (UH-2), APPCB, Board Office, Vijayawada for information.
5. The Environmental Engineer, Regional Office, Visakhapatnam for information and necessary action. He is directed to report the compliance of the orders within 48 hrs.



**ANDHRA PRADESH POLLUTION CONTROL BOARD
ZONAL OFFICE :: VISAKHAPATNAM**

D.No.39-33-20/4/1, Madhavadhara Vuda Colony, Visakhapatnam - 530018.

Ph :0891- 2719380

Order No. 8293/APPCB/ZO-VSP/VSP/2020

Date: 30.06.2020

Sub: APPCB – ZO VSP - **M/s. Sainor Life Sciences Pvt. Ltd., Plot No. 59-E, JN Pharma City, Parawada, Visakhapatnam District** – Chemical accident occurred at 11.30 pm on 29.06.2020, two persons died and few other people hospitalized due to exposure to the gas – Disconnection of Power Supply - Orders – Issued – Reg.

Ref: Order No. 8293/APPCB/ZO-VSP/VSP/2020, Date: 30.06.2020.

A.P Pollution Control Board vide reference cited has issued closure orders to **M/s. Sainor Life Sciences Pvt. Ltd., Plot No. 59-E, JN Pharma City, Parawada, Visakhapatnam District** under Section 31 (A) of Air (Prevention and Control of Pollution) Amendment Act, 1987 and under Section 33(A) of the Water (Prevention & Control of Pollution) Amendment Act, 1988 for cause of death of two people and few other people hospitalized due to exposure to the gas. A copy of the closure order is herewith enclosed.

Under the powers vested under Section 31 (A) of Air (Prevention and Control of Pollution) Amendment Act, 1987 and under Section 33(A) of the Water (Prevention and Control of Pollution) Amendment Act, 1974 and condition no.42.2 of APSEB terms and conditions of supply, the APEPDCL is hereby directed by AP Pollution Control Board to disconnect the Power supply to **M/s. Sainor Life Sciences Pvt. Ltd., Plot No. 59-E, JN Pharma City, Parawada, Visakhapatnam District** with effect from the date of this order.

You are requested to carry out the orders of the Board and report compliance within 48 hrs.

The orders will come into effect from today i.e., 30.06.2020.

Rajendra

Reddy Thuraka

JOINT CHIEF ENVIRONMENTAL ENGINEER

Digitally signed by
Rajendra Reddy Thuraka
Date: 2020.06.30 17:57:50
+05'30'

To
The Superintending Engineer (Operations),
Eastern Power Distribution Company of A.P. Ltd,
Visakhapatnam.

Copy to:

1. The Chairman, APPCB, Board Office, Vijayawada for favour of kind information.
2. The Member Secretary, APPCB, Board Office, Vijayawada for favour of kind information.
3. The Chairman/Managing Director, A.P Eastern Power Distribution Company Ltd, Visakhapatnam for favor of information.
4. The Joint Chief Environmental Engineer (UH-2), APPCB, Board Office, Vijayawada for information.
5. The Environmental Engineer, Regional Office, Visakhapatnam for information and necessary action. He is directed to report the compliance of the orders within 48 hrs.

**GOVERNMENT OF ANDHRA PRADESH
FACTORIES DEPARTMENT**

-:-

From:
Sri. K B S Prasad,
B.E. (Mech),
Deputy Chief Inspector of Factories,
Visakhapatnam.
D. No. 50-50-35/8, Guru CharanMarg,
Visakhapatnam.
B.S. Layout, Seethammadhara,
Visakhapatnam -13.
Ph: 0891-2550294.

To:
Sri. S.V. SrinivasaRao,
Occupier,
Sri. E. Srinivasa Rao
Manager,
M/s. Sainor Life Sciences Pvt. Ltd.,
Plot No. 59E, Road No.3
J.N. Pharma City,
Parawada (M),
Visakhapatnam – Dist.

Lr. No. A/244270/ 2020, Dated: 04- 07-2020.

Sir,

Sub:- Factories Act. & Rules – Accident on 29-06-2020 at 11:30 P.M, in
M/s. Sainor Life Sciences Pvt. Ltd, Plot No. 59E, Road No. 3, J.N. Pharma
City, Parawada (M), Visakhapatnam – Dist.–Prohibitory Orders – Issued –
Regarding.

With reference to the above cited, an accident that has taken place
on 29-06-2020 at 11:30 PM, you are informed that soon after the receipt of
information about the accident. The Deputy Chief Inspector, Visakhapatnam
accompanied with the Joint Chief Inspector of Factories, Visakhapatnam have
immediately rushed to the factory and commenced the investigation and examined
the witness. The injured workers in this accident 1) Sri. A.Suryanarayana, Chemist,
2) Sri.D.Janakiram, Trainee Chemist have also examined in the R.K Hospital,
Gajuwaka by the Deputy Chief Inspector, Visakhapatnam accompanied with the
Joint Chief Inspector of Factories, Visakhapatnam and the Inspector of Factories,
Visakhapatnam-I on 01-07-2020 and also obtained witness statement from Venu
Naidu, chemist and K. Simhachalam, chemist on 02-07-2020 at our office.

As a result of this investigation, it was found that the said accident had
taken place at the reactor SSR-107 in production block while transferring of Mother
Liquor of the Benzimidazole Stage-III through AOD pump into the reactor SSR-107
H₂S gas was released, as the hose pipe was directly inserted through the nozzle
instead of nipple arrangement. H₂S gas was spread in the production block which
led to the exposure of the workers in the production block first floor. Two workers
namely 1). Sri R. Narendra, shift in-charge, 2) Sri M. Gowri Shankar, Chemist, died
on the same day while other 4 workers 1) Sri. A. Suryanarayana, Chemist,
2) Sri.D.Janakiram, Trainee Chemist, 3) Sri. P. Anand Babu, Helper, and
4) Sri. L.V. Chandra Sekhara Rao, Helper have hospitalized.

Contd..2/-

-:2:-

It was found that the said accident and its consequences had taken place as a result of noncompliance of various legal obligations pertaining to not following standard operating procedures. With this Accident, there is a reason to believe that there is an imminent danger to the safety of the persons employed therein, if the similar situation is allowed to continue. Hence the following orders are issued.

PROHIBITORY ORDER

1. Section 40 (2):-

The usage, handling, transferring of solvents, chemicals in the factory is hereby **prohibited with immediate effect**, until further orders issued based on the compliance of the following (except execution and clear of in process batches for Safe shutdown)

- (i) Standard operating procedures for the operations involving usage, transferring, handling and storage of flammable solvents and Hazardous chemicals in the factory shall be revised /updated duly furnishing details of safety integration into procedures. The workers shall be retrained adequately on all such revised SOPs and an undertaking shall be obtained from each worker about their understanding of such SOPs and their declared intention of abiding by them. Further, the facilities and personal protective appliances required for satisfactory compliance of such SOPs shall be made available to the workers. A detailed action taken report duly enclosing all the evidences shall be submitted to this office.
- (ii) The manufacturing process of products 1) Benzimidazole 2) Omeprazole sulphide 3) Fex-10 shall not be carried on unless HARA and HAZOP Study reports covering these products are prepared and submitted in this office along with the compliance of recommendations if any in the reports.
- (iii) The products namely 1) Omeprazole 2) Esomeprazole Magnesium Trihydrate 3) Fexofenadine Hydrochloride 4) Domperidone 5) Pantoprazole Sodium Sesquihydrate 6) Guaiacol are being produced without getting the HAZOP studies done. Get the HAZOP studies done for all products and submit in this office along with compliance of recommendations if any in the said reports.

LBSP2020
4/7/2020

Deputy Chief Inspector of Factories
Visakhapatnam

Copy Submitted to the Director of Factories, A.P. Vijayawada.

Copy Submitted to the Joint Chief Inspector of Factories, Visakhapatnam.

Principal Joint Chief Inspector

As per the format Approved in Govt. Memo. No. 4384 La 1995, ED/AFW Dept. Govt. Of Andhra Pradesh Dt. 23-8-1998

REPORT OF POSTMORTEM EXAMINATION

Government of Andhra Pradesh

ANDHRA MEDICAL COLLEGE/ K. G. H.

VISAKHAPATNAM-530002

FORENSIC MEDICINE & TOXICOLOGY DEPARTMENT



POST-MORTEM No. 0659/2020

DATE: on 30th June, 2020

Date and hour of receipt of body: on 30-06-2020 at 03.00 a.m.

P.M. Requisition received at 03:15 p.m. on 30th June, 2020

Requisition from: The Inspector of Police, Steel Plant P.S., Visakhapatnam city

Crime No: 245/2020 of Parawada P.S., Visakhapatnam city

Body identified by PC No. 2849, Sri P.V. Trinadh Rao of Parawada P.S., Visakhapatnam city

Date and time of commencement of PME / Autopsy: at 03:30 p.m. on 30th June, 2020

Autopsy/PME conducted at: Modern Mortuary, Andhra Medical College/KGH, Visakhapatnam

By Dr. S. Krishnam Raju, Assistant Professor, Forensic Medicine & Toxicology, AMC, Visakhapatnam

A. GENERAL

1. Deceased Name MAHANTHI. GOWRI SANKAR S/o Lakshmu Naidu

2. Sex Male 3. Apparent Age About 26 years

4. Height (measure length of body) 162 cm 5. Weight-----

6. Physique Moderate 7. Nutritional state Moderate

8. Identification marks	9. Death particulars as per the records / Form 80
a) A black mole present on left side of chest	Brought dead to Casualty/KGH/Visakhapatnam at 02.07 a.m. on 30-06-2020 O.P. No. 29841
b) A black mole present on right side of chest	

10. **External appearance:** Body wrapped in a white coloured hospital bed sheet. Body dressed in blue colour jean pant, white with green checks shirt and white coloured under wear. Both eyes closed, conjunctivae congested. Lips and nails are bluish discoloured. Both nostrils are whitish froth stained. Mouth closed and tongue clinched between teeth. External genitalia nothing particular.

Brief History as per the inquest report: On 29-06-2020 at 11.30 p.m. deceased fell unconscious along with five persons at Sainor Life Science Pvt. Ltd. Company due to inhalation of poisonous H₂S gas leakage from SSR 107 Reactor. Immediately he was shifted to RK Hospital, Visakhapatnam and again shifted to KGH, Visakhapatnam. He was declared brought dead at Casualty, KGH, Visakhapatnam on 30-06-2020 at 02.07 a.m.

11. **Post-mortem changes:**

- a) Temperature: Sub-normal, Body kept in cold storage.
- b) P.M. Lividity: Present on back of body.
- c) Rigor mortis: Present
- d) Putrefactive signs: Nil.

12. **INJURIES:** nil

Dr. S. KRISHNAM RAJU

2020 08 15

Typed by me

PTO

Duggirala Manoj

17/07/2020

Scanned with CamScanner

INTERNAL EXAMINATION FINDINGS

(B) HEAD & NECK

Scalp	Nothing particular.
Skull	Nothing particular, un pleasant chemical smell is noted on opening cranial cavity.
Brain and meninges & cerebral vessels	1230 gm, Brain congested
Orbital, Nasal	Nothing particular.
Aural, Oral Cavities:	Nothing particular.
Mouth, Teeth, Tongue and Pharynx	Nothing particular.
Condition of neck tissues	Nothing particular.
Thyroid and other cartilage	Nothing particular.
Trachea	Congested and froth stained

(C) CHEST

Ribs & Chest wall	Intact
Mediastinum, Thymus	Nothing particular
Pleural cavities	Unpleasant chemical smell is noted.
Trachea & Bronchi	Congested and froth stained
Oesophagus	Mucosa congested
Lungs	Rt. 560 gm, Lt. 520 gm Congested, voluminous, red coloured froth on cut section, unpleasant chemical smell is noted. Petechial haemorrhages noted.
Diaphragm	Nothing particular
Pericardial Sac	Nothing particular
Heart:	310 gm, nothing particular
Aorta	Nothing particular
Large Blood vessels	Nothing particular

(D) ABDOMEN

Abdominal wall	Nothing particular
Peritoneal Cavity	Unpleasant chemical smell is noted.
Stomach and contents:	stomach contains 150gm of semi digested food particles with unpleasant chemical smell is noted. Mucosa is congested.
Small Intestine	As in stomach proximal parts
Large intestine	Nothing particular.
Vermiform appendix and mesentery	Nothing particular.
Liver and Gall bladder	1290 gm, congested
Pancreas	Nothing particular.
Spleen	Congested
Kidneys	Rt. 120, Lt. 110 gm, congested
Urinary bladder	Empty
Pelvis	Nothing particular.
Genital Organs - Testes	Nothing particular
Long Bones	Nothing particular.

(E) SPINE

Spinal column and spinal cord (To be opened where indicated)	Nothing particular
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(F) Additional Observations:
 SARS CoV-2 - Trunat Test : Negative
 Done in C&DST Lab, KGH, Visakhapatnam on 01-07-2020.
 Lab ID: TNT/VSM/IRL/18766

(G) TISSUES PRESERVED FOR FURTHER EXAMINATION: Right lung tissue, half of each kidney, a bit of Liver, A bit of brain tissue are preserved in 10% formalin for Histopathology and sent to Pathology department, Andhra Medical College, Visakhapatnam.

- (H) SPECIMENS REMOVED FOR CHEMICAL ANALYSIS:** yes
1. Stomach and small intestine with its contents
 2. Liver (500grams), brain and half of each kidney
 3. Blood 30ml.
 4. Preservative - Sat. NaCl solution for 1, 2 only
 5. Whole left lung in air tight for gas poison
 6. Blood sealed with liquid paraffin For gas poison.

Post Mortem examination concluded at 04:30 p.m. on 30th June, 2020.

OPINION AS TO CAUSE OF DEATH: pending Chemical Analysis Report of Viscera from RFSL, Visakhapatnam and Histopathology Report from Pathology Department, AMC, Visakhapatnam.

- a) Approximate time of death: **between 12-24 hours prior to the Post-mortem Examination.**
- b) The cause of death to the best of my knowledge and belief _____

Signature
 Name and Designation

[Handwritten Signature]
 01/07/2020

[Handwritten Stamp]
 DR. S. KISHAN RAJU
 01/07/2020

- 1 Original Post Mortem Report to The Hon'ble V Metropolitan Magistrate, Anakapalli
- 2 Copy to Asst. Director, RFSL, Visakhapatnam
- 3 Copy to Inspector of Police, Steel Plant P.S., Visakhapatnam City
- 4 Copy to File

As per the format Approved by Govt. Memo No. 4284 La 139-1, 2014/19 Dept. Govt. Of Andhra Pradesh Dt. 13.4.2018

REPORT OF POSTMORTEM EXAMINATION

ANDHRA MEDICAL COLLEGE/ K. G. H.

VISAKHAPATNAM-530002

FORENSIC MEDICINE & TOXICOLOGY DEPARTMENT



Page 1 of 2

POST-MORTEM No. 0660/20

DATE: 01 July 2020

Date and hour of receipt of body: On 30.06.2020 at 03:00am

P.M. Requisition received at 03:00p.m on 01 July 2020

From: Station House Officer, Parawada PS, Visakhapatnam City.

Crime No. 345/2020

Police Station: Parawada PS, Visakhapatnam City.

Body Identified by PC No: 1406

PS Parawada PS, Visakhapatnam City.

Date and time of commencement of PME / Autopsy: On 01 July 2020 at 03:10p. m

Autopsy/PME conducted at: Modern Mortuary AMC/KGH, Visakhapatnam

By Dr. V. Chandra Sekhar, Ex Major (ARMY), Associate Prof. FMT, AMC, VSP

A GENERAL

1. Deceased Name	RAVI NARENDRA s/o Naga Seshu		
2. Sex	Male	3. Apparent Age	33 years.
4. Height (measure length of body in cms)	160cms	5. Weight	—
6. Physique	Moderate	7. Nutritional state	Moderate
8. Identification marks	9. Death particulars as per the records / Form 80		
1. A black mole outer upper 1/3 (R) arm	Found died at: KGH, Visakhapatnam		
2. A black mole outer mid 1/3 (R) abdomen	Regd. No. OP-29846, COT		
	Brought dead at 02:07am on 30.06.2020		
- Complexion: Dark brown			

Brief History as per the Inquest: On 29-06-2020 about 11:30pm found unconscious along with other five persons at Sainor Life Science Pvt. Ltd. Company due to inhalation of poisonous gas leakage (H₂S) from SSR 107 reactor. Immediately he was shifted to Ram Key Hospital, after that RK Hospital Gajuwaka and finally KGH Visakhapatnam for treatment in unconscious stage and declared brought dead at 02:07am on 30 June 2020 in KGH due to inhalation of Gas Poison.

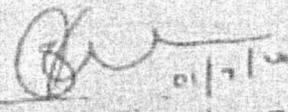
10. External appearance, Clothes and ornaments: Body is covered with a white bedsheet, on removal it found lying on supine position, dressed in a white cut banyan, pale grey full pant and brown drawer. Face is livid. Two rows black thread around waist. Dried white froth at nostrils.

Eyes are closed, conjunctivae congested. Mouth closed, tongue inside mouth, Fingers nails cyanosis present. External genitalia nothing particular.

11. Post-mortem changes

- Temperature: Sub-normal, Body kept in cold storage.
- P.M. Lividity: Back parts of body present.
- Rigor mortis: All over body present
- Putrefactive signs: Nil.

12. INJURIES ANTE MORTEM IN NATURE: NIL


 01/07/20
Dr. V. Chandra Sekhar
 Ex Major (Army) M.D. (F.M)
 Associate Professor
 Forensic Medicine & Toxicology
 Andhra Medical College / K.G.H
 Visakhapatnam - 530002. A.P.

P.T.O

(B) HEAD & NECK

Scalp	Nothing particular	
Skull	Nothing particular	
Brain	1400grams Congested, soften	
Orbital, Nasal, Aural, Oral Cavities	Nothing particular	
Mouth, Tongue and Pharynx	Nothing particular	
Condition of neck tissues	Nothing particular	
Thyroid and other cartilage condition	Nothing particular	
Trachea	Froth noted	

(C) CHEST

Ribs & Chest wall	Nothing particular	
Pleural cavities	Mild unpleasant chemical smell noted	
Trachea & Bronchi	Froth noted	
Esophagus	Nothing particular	
Lungs	Petechiae on surface, Congested, edematous, froth on cut sections, mild unpleasant chemical smell.	
Right	502 Grams	
Left	435 Grams	
Diaphragm	Nothing particular	
Pericardial Sac	Nothing particular	
Heart	300 Grams	Myocardium pale, Left ventricle empty.
Coronary vessels	Patent, empty.	
Aorta	Mild atherosclerosis plaques, patent.	
Large Blood vessels	As in aorta.	

(D) ABDOMEN

Abdominal wall	Nothing particular	
Peritoneal Cavity	Nothing particular	
Stomach	About 300grams semi-digest rice foods no specific smell, Mucosa congested	
Small Intestine	As in stomach proximal parts	
Large Intestine	Nothing particular	
Liver	2200 grams, Congested	
Spleen	250 Grams: Congested	
Kidneys	Congested both	
Right	160 Grams	
Left	170 Grams	
Urinary bladder	Residual urine present	
Pelvis	Nothing particular	
Internal Genital Organs	Nothing particular	
TESTES	Nothing particular	
Long Bones	Nothing particular	

(E) SPINE

Spinal column and spinal cord (To be opened where indicated)	Intact, not open.
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(F) Additional Observations: Blood dark red colour, fluid in nature

(G) TISSUES PRESERVED FOR FURTHER EXAMINATION: Tissue bits Lung-2, kidney 1/2 each, liver-1, spleen-1, Brain (L) frontal lobe with basal ganglia-1 are preserved in formalin, sent to HPE, Pathology, AMC.

(H) SPECIMENS REMOVED FOR CHEMICAL ANALYSIS: YES

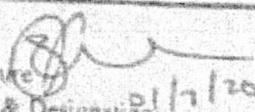
1. Stomach & Intestine with contents
2. Liver (500grams), Kidney (half of each)
3. Blood 30ml
4. Sample Solution (Preservative-Sat. NaCl) for 1 & 2.
5. Whole right lung airtight for gas poison
6. Blood sealed with liquid paraffin for gas poison

Post-Mortem examination concluded at 04:00 pm. On 01 July 2020.

OPINION AS TO CAUSE OF DEATH: Pending for RFSL & HPE Reports.

a). Approximate time of death: About 36-42hrs prior to PME

Typed by me

Signature 
 Name & Designation 01/7/20
Dr. V. Chandra Sekhar
 Ex Major (Army) M.D. (FM)
 Associate Professor
 Forensic Medicine & Toxicology
 Andhra Medical College / K.G.H
 Visakhapatnam - 530002, A.P.

1. Post-Mortem Report Original To Honourable Court of the 3rd MM, Anakapalli
2. Copy to RFSL, Visakhapatnam
3. Copy to SHO, Paravada PS
4. Copy to File