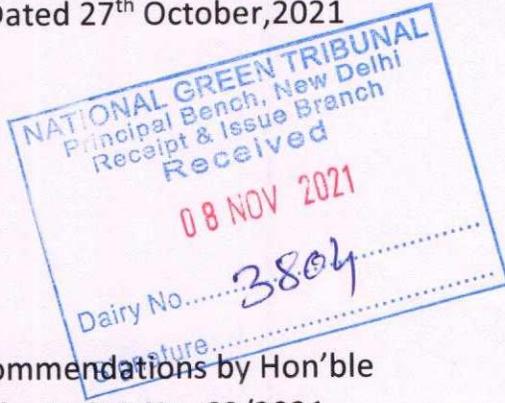


No: FAC/142021/6021/M3  
Labour and Employment Department,  
Block No.5, 6<sup>th</sup> Floor  
Sachivalaya, Gandhinagar.  
Dated 27<sup>th</sup> October, 2021

To,  
The Registrar,  
National Green Tribunal,  
Faridkot House, Copernicus Marg,  
New Delhi-110001



**Sub:** - Action Taken Report on recommendations by Hon'ble  
National Green Tribunal Order in O.A No. 60/2021.

Sir,

With Reference to the subject cited above Hon'ble National Green Tribunal had asked Chief Secretary, Gujarat to submit Action Taken Report on directions given by Hon'ble National Green Tribunal in Order dated 11<sup>th</sup> June, 2021 in O.A No.60/2021.

Considering the directions of Hon'ble National Green Tribunal, Chief Secretary, Gujarat had called upon a meeting to take stock of the situation occurred in GIDC, Jhagadia, Dist. Bharuch and for implementation of directions and statutory provisions to ensure safety and issued necessary directions to the concerned authorities for which Director, Industrial Safety and Health, Gujarat has compiled an Action Taken Report.

I am directed to submit an Action Taken Report submitted by Director, Industrial Safety and Health, Gujarat regarding above cited matter and to request Hon'ble National Green Tribunal to consider the same.

Thanking you,

*Dathan*

(D. M. Pathan)

Deputy Secretary to  
Government of Gujarat

Encl: As Above

Copy to:

1. Joint Secretary to Chief Secretary, block No.1, Sachivalaya, Gandhinagar.
2. Chairman, Gujarat Pollution Control Board, Paryavaran Bhavan, Sector-10A, Gandhinagar.
3. Vice Chairman & Managing Director, Gujarat Industrial Development Corporation, Block 3,4,5, Udhog Bhavan, Sector-11, Gandhinagar.
4. Collector and District Megistrate, Bharuch.
5. Director, Industrial Safety and Health, Shram Bhavan, Ahmedabad.

18/Jul  
10-11-21

Ld. R.G.  
08-11-21

Ld. D.R.  
9/11/21

Consultant (J)

1563/R6/DAK

08/11/2021

1453/DR

09/11/2021

**Action Taken Report on  
Hon'ble NGT matter  
O.A. No. 60/2021**

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

(By Video Conferencing)

Original Application No. 60/2021

(With report dated 17.04.2021)

In re: News item published in The Hindu dated 23.02.2021 titled  
**"Two dead, 5 missing in fire at UPL Plant"**

Date of hearing: 11.06.2021

**CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON  
HON'BLE MR. JUSTICE SUDHIR AGARWAL, JUDICIAL MEMBER  
HON'BLE MR. JUSTICE M. SATHYANARAYANAN, JUDICIAL MEMBER  
HON'BLE MR. JUSTICE BRIJESH SETHI, JUDICIAL MEMBER  
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER**

Respondent: Mr. Raj Kumar, Advocate for CPCB  
Mr. Ankit Virmani, Advocate and Ms. Manasi Kumar, Advocate for  
UPL Ltd.  
Mr. R.R. Vyas, RO, GPCB

**ORDER**

**Introduction and procedural history**

1. Proceedings have been initiated in the present matter on the basis of the media reports dated 23.02.2021 published in 'The Hindu' under the heading "Two dead, 5 missing in fire at UPL plant".<sup>1</sup> It is reported that fire broke out at 1.35 am on February 23 at UPL Ltd (United Phosphorus Ltd) after a blast and major fire at the company's Jhagadia plant which claimed two lives and injured 26. Five labourers are still missing. The unit was shut since February 5 for a planned annual boiler inspection. The Labour and Employment Department of Gujarat Government issued closure notice to the unit. The unit was directed by

<sup>1</sup> <https://www.thehindubusinessline.com/news/national/fire-breaks-out-at-upls-jhagadia-plant-in-gujarat/article33910072.ece>

the Gujarat Government to pay ex-gratia compensation to the next of the kin of the deceased workers. The report also gives version of the company that there was no chemical reaction as the plant was shut. Fire may have been caused due to fire/explosion in the solvent which could have been caused due to electric short circuit.

2. The matter was earlier considered on 25.02.2021 and it was found necessary to require status of compliance of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 ("the 1989 Rules") and Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 (The 1996 Rules) with a view to determine steps required to be taken for compensating the victims and restoration of the environment and preventing such occurrences in future. While issuing Notice to the UPL Ltd., Jhagadia, District Bharuch, Gujarat, Director, Industrial Safety and Health (DISH), Gujarat State PCB, CPCB, District Magistrate, Bharuch and the MoEF & CC, the Tribunal constituted a four Member Joint Committee comprising of the CPCB, State PCB, DISH and the District Magistrate, Bharuch. The Tribunal also noticed that in the recent past, 12 other incidents had taken place and it has been found that in most of the cases the safety norms have been breached in operating the industrial activities.

3. The observations in the said order are quoted below:-

*"2. Above information gives rise to a substantial question of environment relating to compliance of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 ("the 1989 Rules") and Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 (The 1996 Rules), which have been framed under the Environment (Protection) Act, 1986 (EP Act), falling in schedule to the NGT Act, 2010. It is thus necessary to determine the above question and if necessary, award relief under Section 15 of the NGT Act to the victims and for restoration of the environment after determining the liability of the persons engaged in such activity as well as role of the statutory regulators in failing to prevent the*

same. Further question is preventive measures to avoid recurrence of such incidents in future in such activities.

3. Since the report shows that the unit is engaged in manufacture of chemicals attracting Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 ("the 1989 Rules") requiring preparation of onsite and offsite plan and conducting of mock drills and as per law laid down in *M.C Mehta v. UoI & Ors.*<sup>2</sup>, principle of 'Absolute Liability' is attracted in such cases to compensate the victims of such accidents as well as to compensate the environment, **it is necessary to ascertain the cause of the incident, the extent of damage caused, the extent of compensation required to be paid for damage to the environment as well as for loss of lives, for the injuries and steps required to be taken for preventing any such occurrence in future on the same pattern as the Tribunal has dealt with such accidents in the recent past**<sup>3</sup>.

<sup>2</sup> (1987) 1 SCC 395

- i. Order dated 01.06.2020, relating to incident of gas leak dated 07.05.2020 in **LG Polymers India Pvt. Limited** at Vishakhapatnam, resulting in death of 11 persons and injuries to more than 100, apart from other damage (OA No. 73/2020, In re: Gas Leak at LG Polymers Chemical Plant in RR Venkatapuram Village Visakhapatnam in Andhra Pradesh);
- ii. Order dated 03.02.2021, relating to incident dated 03.06.2020 in a chemical factory, **Yashyashvi Rasayan Pvt. Ltd.**, at Dahej, District Bharuch, Gujarat resulting in deaths and injuries and other damage (OA No. 85/2020) (Earlier OA 22/2020) (WZ), Aryavart Foundation through its President vs. Yashyashvi Rasayan Pvt. Ltd. & Anr.);
- iii. Order dated 06.08.2020, in relation to incident of **oil well blow out on 27.05.2020 at Baghjan in the Tinsukia District of Assam** resulting in deaths, injuries and damage to the environment (OA No. 43/2020(EZ), Bonani Kakkar vs. Oil India Limited & Ors.).
- iv. Orders dated 06.07.2020 and 22.12.2020, relating to incident dated 30.06.2020 on account of gas leakage at **Sainor Life Sciences** factory at Parawada in industrial area on the outskirts of Vishakhapatnam (OA No. 106/2020, 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...");
- v. Orders dated 08.07.2020 and 22.12.2020, dealing with the incident dated 01.07.2020 resulting in death of 6 person and injury to 17 due to blast of boiler in **M/s Neyveli Thermal Power Station** (NLCIL), Cuddalore (OA No. 108/2020, News item published in the "Indian Express" dated 01.07.2020 titled "Tamil Nadu Neyveli boiler blast: 6 dead, 17 injured") and;
- vi. Orders dated 23.07.2020 and 22.12.2020, in relation to incident of **fire engulfed the chemical plant of Visakha Solvents Ltd**, Vizag on 13.07.2020 at Ramky CETP Solvents building in Pharma City resulting in injuries (OA No. 134/2020, News item published on 13.07.2020 in the local daily named "India Today" titled "Massive fire engulf Vizag chemical plant, explosions heard, injuries reported").
- vii. Order dated 18.12.2020, in relation to incident of **explosion in a plastic recycling factory at Sujapur in Malda on 1.12.2020** resulting in death of six persons, including two minors and serious injuries to four persons (OA No. 272/2020, News item published in the "Times of India" dated 20.11.2020 entitled "Six killed as blast tears through Malda Plastic recycling factory").
- viii. Order dated 18.12.2020, in relation to incident of **methane gas leak in a sugar factory** called Lokenete Bapurao Patil Agro Industries Ltd. in Mohol Taluka of Solapur District, Maharashtra on 21.11.2020 resulting in deaths and injuries and other damage (OA No. 274/2020, News item published in the "Indian Express" dated 23.11.2020 entitled "Maharashtra: Two Killed, eight injured in methane gas leak in sugar factory").
- ix. Order dated 08.01.2021, in relation to **Gas Leak in Agro Company** (O.A 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")
- x. Order dated 18.01.2021, in relation to News item published in Navbharat Times dated 24.12.2020 titled "**Gas leaks in IFFCO Plant, 2 Officers dead**" (O.A No. 04/2020, In re :

4. While directing issuance of notice to the UPL Ltd., Jhagadia, District Bharuch, Gujarat, Director, Industrial Safety and Health (DISH), Gujarat, State PCB, CPCB, District Magistrate, Bharuch and the MoEF & CC by e-mail, we constitute a four-member joint committee comprising of the CPCB, State PCB, DISH and the District Magistrate, Bharuch to give a report to this Tribunal. The nodal agency for coordination and compliance will be the CPCB and the State PCB. The committee may visit the site preferably within next one week and give its report with reference to issues mentioned in para 3 within one month by email at [judicial-ngt@gov.in](mailto:judicial-ngt@gov.in) preferably in the form of searchable PDF/OCR Support PDF and not in the form of Image PDF. Simultaneously, the report may also be uploaded on the website of the State PCB to enable the concerned stakeholders to access the same and file their response, if any.

5. Except for visit to the site at least once, the Committee will be free to conduct its proceedings online. It will be free to take the assistance from any other expert/organization. The Committee may suitably interact with the stakeholders and, apart from considering the present incident, also consider remedial measures for preventing such incidents in the area or by other establishments even beyond the said area. The Committee may compile information about existence and working of onsite and offsite plans in terms of 1989 Rules and conducting of mock drills and safety SOPs., number of such units in the area and the carrying capacity of the area to sustain the same. Since in the recent past, the Tribunal has dealt with similar issues of industrial accidents resulting in deaths and injuries and Expert Committees in some of such accidents have given reports to this Tribunal, such reports may also be taken into account by the Committee to the extent relevant.

#### **Report of the fact-finding Committee and consideration**

4. Accordingly, the Committee has filed its report on 17.04.2021. The report shows that the Committee visited the site, interacted with the personnel of the unit, calculated compensation and assessed the safety preparations of the unit. Based on site visit and deliberations, the Committee has given its findings on factual aspects of cause of the accident and remedial measures by the unit and the regulatory

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News item published in Navbharat Times dated 24.12.2020 titled "Gas leaks in IFFCO Plant, 2 Officers dead")

- xi. Order dated 11.02.2021, in relation to accident of toxic gas leak in Rourkela Steel Plant in Orissa" (O.A. No. 09/2021, In re: News item published in The Indian Express dated 07.01.2021 titled "Four workers dead due to toxic gas leak in Rourkela Steel Plant")
- xii. Order dated 16.02.2021, in relation to accident of Virudhunagar firecracker factory blast (O.A. No. 44/2021, In re: News item published in The News Indian Express dated 12.02.2021 titled "At least 19 dead in Virudhunagar firecracker factory blast, more than 30 injured")

authorities. The Committee has also made recommendations for safeguards which need to be adopted to prevent such incidents in future.

5. The salient observations, conclusions and recommendations in the report of the Committee are as follows:-

#### **“5.1 Action taken by DISH**

*The officials of DISH received information over telephone at around 02:15 Hrs dated 23/02/2021 regarding the accident at unit-5 of M/s. UPL Ltd, Jhagadia. The officials of DISH reach the site around 03:00 Hrs. DISH arranged additional fire tenders & ambulances from nearby industries located in Jhagadia GIDC & Disaster Prevention and Management Centre (hereinafter referred to as ‘DPMC’) located at Ankleshwar and Dahej.*

*SDM & DISH has immediately served head-count notice on 23/02/2021 (Copy of the same is in **Annexure - 4**). The reply submitted by the unit is in **Annexure - 5**. As per the reply, total 2 persons reported dead and 5 persons were missing.*

*DISH has also issued a letter on 23/02/2021, directing the unit to close down the manufacturing activities in all plants within the premises. (copy of the same is in **Annexure - 6**)*

*DISH has given breach of law remarks under schedule 19 part (2), Rule 102, para no. 5 of The Gujarat Factory Rules- 1963 dated 05/03/2021 to M/s. UPL Ltd (Unit-5). Based on the submissions by unit, DISH has filed a criminal case against the occupier in the Additional Chief Judicial Magistrate court at Jhagadia (Breach of law remarks by DISH is as **Annexure - 7** and reply by unit in this regard is attached in **Annexure - 8**).*

#### **5.2 Action Taken by Local Police**

*Jhagadia police station has registered the accidental death No. 6/2021 under section 174 of Criminal Procedure Code and prepared detailed ‘Panchnama’ of accidental location in vernacular language Gujarati dated 23/02/2021 at accident site during 16:30 to 18:30 Hrs. As per ‘Panchnama’, death of three persons & missing of four persons is reported. The investigation is still under progress.*

#### **5.3 Action Taken by GPCB**

*After the accident, a team of officials from GPCB, Ankleshwar reached the place on 23/02/2021 at around 04:15 hrs. The officials of other departments present at the site were; 1) Sub Divisional Magistrate, Jhagadia, 2) Police officials, 3) Officers of DISH, 4) Officials of GIDC, 5) Mamlatdar, Jhagadia.*

- On reaching the site, visual inspection of the area surrounding the unit was carried out considering the smoke emitted with plume direction and firefighting activity. Considering the prevailing wind direction during the accident from N-NE to S-SW, the GPCB monitored Ambient Air Quality for Volatile Organic Compound (VOC) and Hydrocarbons by a Handy VOC meter in the downwind direction of the location of the accident, which included the village habitation (details included in **Annexure-9**). During the monitoring VOC emission in prevailing wind direction was measured having maximum level @ 12.6 ppm. VOC of @ 23.8 ppm was measured outside the premises at the location, North of the CM-257 plant. General hydrocarbon at two locations i.e. near the main gate of the unit and at the back side of the unit i.e. in the downward wind direction it is observed @ up to 5 ppm. Based on these monitoring results, the local authorities i.e. SDM, Jhagadia & DISH decided that evacuation from nearby villages would not be required. The GPCB also monitored Ambient Air Quality with Respirable Dust Sampler (RDS) kept on the terrace of the Police station, located near the premises of the unit during 09:00 Hrs to 17:00 Hrs. on 23/02/2021, which did not show about any alarming situation.
- There was generation of contaminated wastewater during the firefighting operations. The contaminated wastewater accumulated in the storm water drains (hereinafter referred to as 'SWD') within the premises of the unit and subsequently, was observed flowing in dry GIDC storm water drain. The contaminated wastewater in the GIDC SWD is observed entering into a kutchra natural drain/trench starting near M/s Lanxess India Pvt. Ltd. and the same was observed to have reached till the portion of the natural drain/trench passing near village Gumanpura. Samples of contaminated wastewater generated during firefighting were collected from various locations within & outside the premises. It was observed that contaminated wastewater did not reach Boridra nalla, where this natural drain/trench leads to. The Boridra nalla is also observed dry. The unit was directed to collect the contaminated wastewater generated during the firefighting, that was accumulated within the premises and also that had flown outside the premises. Based on the instruction, the unit has started lifting wastewater from drains inside the premises and from the natural drain/trench by making a temporary bund in the natural drain/trench passing near Gumanpura Village. The wastewater was lifted, carried through tankers and stored in the guard pond sump near the ETP within the unit's premises. The unit also carried out scraping soil from natural drain at location i.e. near Gumanpura village road Bridge and sent the dredged soil to TSDF site at BEIL Ankleshwar, manifest copy of the same is attached in **Annexure - 10**. The unit has submitted photographic evidence for lifting of wastewater and dredging of soil.
- GPCB carried out post-monitoring of the accident on 02/03/2021 to verify action taken by the unit. During this visit GPCB visited the affected areas outside the premises (along with representatives from M/s. UPL Ltd (unit-5), Jhagadia) which

include the route of earlier flowing contaminated wastewater, GIDC SWD leading to the natural drain and Boridra nalla. During the visit the stretch of GIDC SWD and the natural drain was found dry. One soil sample is also collected from above mentioned location (area of dredging) near Gumanpura village road Bridge location for analysis purpose. The detailed post monitoring inspection report along with analysis of sample collected are attached as **Annexure - 9**.

- Based on the inspection report dt: 23/02/2021, the GPCB issued Closure Direction U/s 31 (A) of Air Act on 24/02/2021 (**Annexure - 11**) to M/s UPL Ltd (Unit-5) with reference to the accident occurred in CM-257 plant on 23/02/2021 at early morning hours in the unit. The direction also includes interim EDC of Rs. 1 Crore to be paid by UPL LTD (unit-5), which was subsequently paid by the unit on 25/02/2021

#### **5.4 Cause of accident as reported by the unit**

The in-house investigation report submitted by the unit is attached as Annexure-12, wherein based on the list of damaged equipment probable cause of the accident was assessed by the unit. **It was reported that leakage of brine (Methanol Water Mixture) took place in the reactor R-25001 which might have resulted in the triggering of exothermic reaction and blast in the reactor.** The unit has also submitted a list of equipment, materials which were lost due to the accident.

#### **5.5 Interaction of committee with officials present at the time of accident in the plant/unit.**

During the first visit of the joint committee on 04/03/2021, the committee interacted with Shri Vamshi Krishna, night duty officer to get his narration about the accident. He informed that at the time of the blast he was in his controlled room located near the main gate of the unit. In an immediate response, he informed senior officials of the plant about the blast and rushed to the location. According to him, the fire fighters reached the location of the accident within 2 to 3 minutes and started firefighting & rescue activities.

The committee also interacted during the visit on 09/03/2021, with Shri Tejas Borse the shift in-charge of CM-257 plant present for night duty (22/02/2021 – 23/02/2021) on the day of accident. Shri Tejas informed that the plant was on shut down since 05/02/2021 and during the night shift only basic housekeeping was carried out. All the process parameters were under control and at around 01:45 Hrs when he was at the shift in-charge cabin located in the ground floor of the plant, there was a blast however, he could escape from the plant with minor injury. As per his statement, neither knocking nor any indications nor any alert was noticed there prior to the blast.

*During the interaction with the firefighting team, present on the day of accident, it was informed by the team that the firefighting team started using fire tender within 4 to 5 minutes however, one of the main fire hydrant line near CM-257 plant was damaged due to blast and hence, the portion was isolated before starting the fire hydrant system. The portion of fire hydrant line located between the plant and tank farm was also not approachable to operate, which had resulted in delayed start of fire hydrant operation.*

*In addition to above, additional 18 fire tenders from nearby industries & DPMC Ankleshwar and Dahej were used. Moreover, in addition to water about 317 KL of foam was also used for controlling the fire. The fire was controlled at around 6:30 hrs. however, the water hydrant system was kept operational after fire control to cool down the structure till 8:30 hrs on 23/02/2021.*

#### **5.6 Probable cause of accident as per the Joint Committee**

*Based on the above submission of the unit about the accident, various study carried out by the unit for plant CM-257, HAZOP, safety audit report, accident report from DISH, discussion with the representatives of the unit and field visits, the joint committee draws following observations and conclusions regarding cause of accident:*

- The manufacturing process of clethodim was developed in-house by the unit at laboratory level. Studies regarding safety and risk at various stages before converting the lab scale study into kilo-level and pilot-level were not conducted. The reaction conditions maintained in a lab-scale glass reactor cannot be so easily maintained in a plant-scale reactor. The unit has submitted lab scale trial tech-pack documents wherein for an example, the cooling medium used in the laboratory to maintain reaction temp at 5 degree C was chilled water, while the one used in the plant was methanol. An impact / safety aspect of such a change in cooling medium (chilled water to methanol) was not studied during the R&D trials in the laboratory.*
- It was informed that the basic engineering and detailed engineering of the plant for CM-257 was carried out in-house and was erected and commissioned in October 2020. The reactor has pressure variation from atmospheric reducing to 50 Torr(Vacuum) and temperature variation of 10 to 50 deg centigrade. As per the P&ID submitted by the unit for stage-I, "the P&ID was issued for approval/Engineering on 02/03/2019". Considering the above it is understood that the P&ID and detailed engineering was carried out by the unit for manufacturing of CM-257 in 2019. Later on, it was also explained by the unit that construction of the plant for the production of Clomazone and Mesotrion and was initiated during May 2019, then subsequently by Jan 2020 there was no demand for the said products hence, the plant was converted for the production of clethodim/ glufosinate/ glyphosate by Change-in-product mix permission which contradicts the submission of the unit regarding the commissioning of plant.*

- *The product developed at R&D stage is further studied and reviewed at various stage like pilot stage and further scale up at design and execution stage for assuring safety during commercial production. During these stages, various data and information are being collected, which require to set design parameters and safety aspects, for engineering design and its execution. Moreover, these data are very essential to design safety instrumentation for the process and are also required for HAZOP study, HAZAN, Qualitative & Quantitative Risk assessment studies and for thermal stability study in case of exothermic reaction. Reports regarding thermal stability, reactivity and other process hazards which may be envisaged at various stages of process is not available with the unit.*
- *HAZOP study has not covered the design data and operation data of this process such as process hazards pertaining to the exothermic reaction, run away reaction, thermal stability of the product at various stages, impact of utility services leakages, reaction between the reactants and the heating/cooling fluid, imbalance of stoichiometric quantities of various reactants in the reactor, deviation from defined storage conditions for various intermediate stages, mal-function of any instruments, chemical stability of the product at various stages like intermediate and finished stage, etc. These may have resulted in oversight of various process hazards which may occur as a dangerous occurrence like explosion, fire etc.*
- *As a part of safety and process requirements, the plant was having a DCS control system with multiple temperature, pressure, and level sensors for different reactors. During discussion **it is gathered that there were no distress signals before the blast in the DCS system. It is strange that none of the sensors provided for the R-25001 reaction vessel gave any prior distress signals about increase in levels of temperature or pressure due to leakage of methanol and its reaction with ETB mass which might have resulted in increase in temperature as claimed by the unit.***
- *The unit submitted photographs showing complete damage of the DCS system of CM-257 plant and hence no sensor data could be recovered. Moreover, **it was informed that the unit does not have a central DCS centre. Thus, it appears that the systems provided on R-25001 were not adequate in terms of type of sensors, its range, its MOC, DCS data transmission facility to central DCS control etc. Central DCS system, if provided by the unit, would have given very valuable information about changes in the process parameters (temperature, pressure, leakages etc.) which might have occurred resulting in the accident.***
- *The unit informed that the plant was under planned shutdown (due to boiler shutdown) and the reason for keeping the material (about 8.50 MT of ETB) in intermediate stage in the reactor no. R25001 of CM-257 plant was not justified by the unit. The unit has submitted various work permits of the plant as evidence of*

shut down. In general, during planned shutdowns for any chemical industry, it is a general practice that the reactors with products at intermediate stages are safely emptied and stored in safe conditions, depending upon the reactivity study/ instability study etc. and defined Standard Operating Procedures are in place for such shutdown and safe startup activities. However, such a study report or defined **standard operating procedure (SOP) for safe start-ups and safe shutdown (emergency and planned) are not prepared by the unit.**

- The unit has carried out a safety audit from a third party namely M/s Naik & Associates, Surat. The safety audit report though mentions about the audit carried out for CM-257 plant in page no.08, however, the process detail, manufacturing detail about CM-257 plant is not mentioned in the "Chapter 6 Process and Hazard Information" of the report. Also, detailed about the name of vessel and its location is not mentioned in the report in the section 6.3 - Operational and process hazards with control. As per details of chemical stored in the unit, the actual total stored quantity of toluene, n-Hexane and Methanol exceeds 143 kl (storage permission from PESO to the unit). However, **the safety audit report does not mention any observation regarding exceedance in stored quantity beyond permission limits of PESO. Thus, the safety audit carried out by the unit shows gaps and needs to be carried out again by a competent agency, accredited by an Accreditation Board as per Rule 68 j para 9 of the Gujarat Factory Rules, 1963.**
- The unit has informed that many of the chemicals are recovered and the same will be disposed at Common Facility for incineration. One of such recovered chemicals was ETB stored in Tank T-25002 at ground level vertically below R-25001. It was informed that entire quantity (about 9000 kg) of ETB was recovered after the accident and emptied and stored in 9 tanks (each of capacity about 1 T). Thus, the blast in the reactor due to trigger of temperature in the reactor where ETB was kept at intermediate stage cannot be justified as ETB stored in T-25002 could survive an explosion and significantly high ambient temperatures without catching fire or explosion.
- The committee has also collected design details of R25001 from the unit and using the information provided, an attempt is made to calculate the internal pressure built-up/developed responsible for the blast in such a reactor.

**Calculation of internal pressure required for explosion of the reactor:**

Information provided by the unit:

Reactor No. R25001 (Stage I reactor, wherein the blast took place)

Reactor diameter = 2250 mm,

MOC: SS 316L, and

Wall thickness: 12 mm,

Considering the yield strength of SS 316L = 475 MPa (normally 450-500 MPa) and

Causes of pressurization of such reactor and its failure can be due to:

(1) Circumferential stress =  $pD/2t$ ,

(2) Longitudinal stress =  $pD/4t$ , and

(3) Shear stress =  $pD/4t$  or  $pD/8t$ .

Here,  $D$ =diameter of cylinder,  $p$  = internal pressure, and  $t$ =thickness of wall.

Substituting details of reactor in above equations, the minimum internal pressure found for circumferential stress is 5.07 Mpa (51.7 kg/cm<sup>2</sup>). If such minimum internal pressure is considered to be developed in the reactor and resulted in the blast, development of such a high pressure cannot be instantaneous and without any warning signal unless, either the DCS system was bypassed or non-working or the sensors provided were not adequate in terms of range, specification, safe to give the warning signal. Moreover, it was informed that the reactor is equipped with a vent after scrubber and thus it is not convincing that at a very high internal pressure in the reactor, no fumes/liquid/gas got vented through this vent, releasing the internal pressure and preventing the explosion.

**Based on above mentioned observations it can be concluded that the probable reason for the accident i.e. leakage of methanol in the intermediate stage and reaction of methanol with ETB as considered by the unit may be logical in terms of reaction chemistry. However, sudden blast in the intermediate stage of reactor, when the reactor was not in operation and that too after about 18 days, without any sign of abnormality in terms of level, temperature or pressure indicators in DCS, indicates ineffectiveness of safety system provided or assessed by the unit for the plant CM-257. Thus, serious lapses in terms of safety study, reactivity study, compatibility test, development of standard operating procedure for planned and emergency shutdown, storing intermediate stage product during shutdown, gaps in HAZOP, safety audit, inadequacy of sensors provided for the reactor might have resulted in the accident.**

## 6. ENVIRONMENT DAMAGE ASSESSMENT

- The joint committee conducted visits to the unit and affected areas on 04/03/2021 and 09/03/2021. During the visits the committee also inspected the portion of natural drain from where, the unit had dredged soil and collected the samples of soil as detailed below:

**Table 5: Details of samples collected by joint committee on 04/03/2021**

Sampling point	
W-1	Small patch of Wastewater observed in natural drain leading to in Gumanpura village (Lat: 21.6741970, Long: 73.1139060)
W-2	Wastewater collected from outside and stored in ETP guard pond of UPL Ltd.
H-1	Soil sample collected near Gumanpura village road bridge (Lat:21.674989, Long:73.113248) at nallah
H-2	Soil sample collected near Gumanpura village road bridge (Lat:21.6741970, Long:73.1139060)
H-3	Soil sample collected near Gumanpura village (Lat:21.6790079, Long:73.1074349)
H-4	Soil sample collected near Gumanpura village road bridge (Lat:21.6723874, Long:73.1165128)
H-5	Reference soil sample near Gumanpura village bridge (21.672544, 73.116402)

Analysis reports of the above mentioned samples collected by the committee are attached as **Annexure- 9**.

- It was informed to the committee that the wastewater during firefighting reached a point up to location H3 (as shown in google image above) falling under revenue land of Gumanpura village area and had not reached to Boridra Nalla. The entire stretch of the natural trench/drain including Boridra nalla was dry before the accident.
- During the visit on 04/03/2021, it was observed that the unit had dredged the top layer of the soil in the natural trench/drain passing near Gumanpura village and as reported, 19 MT of contaminated soil was disposed to CHWTSDf, a scientific landfill site. It was also informed that the wastewater was lifted from the bridge on the natural drain near Gumanpura Village by constructing a temporary bund.
- The wastewater was transferred to a guard pond inside the premises of the unit. A sample of waste water from the guard pond was also collected during the visit. It was informed that about 3000 kl of wastewater from inside and outside was collected back.

The soil samples collected from the dredged drain/trench were analysed for various parameters. From the analysis reports of the soil samples, It is found that the TOC in the soil sample varies from 0.0357 to 0.168 gm/kg. The soil sample (H5) was collected as reference from the ramp used by the unit for movement of tankers near Gumanpura village bridge as the same was not yet dredged and disposed off by the unit. Higher concentrations of almost all measured parameters were found in the

sample collected from Location H5 as compared to other soil samples. The unit needs to collect and dispose of the soil from this location to CHWTSDF site.

The analysis result of the sample is provided in Annexure – 9.

The accident was assessed in terms of the damage caused to the environment. Based on the information submitted by the unit about the accident, meteorological data, list of chemicals with quantity lost during accident, analysis of samples and considering the steps taken thereafter, by the unit, the components considered by the committee for calculating damage to the environment are mentioned in the subsequent paragraphs.

The damage caused to the environment is evaluated based on air, water and soil components considering the probable impact, steps taken by the unit to restore the same.

#### **6.1 Meteorological data on 23/02/2021**

Actual meteorological data obtained from M/s. DCM Shriram Alkalies Ltd., Jahagdia situated adjacent to the accident site during the period of accident on 23/02/2021, indicates average wind speed is @ 2.77 km/h, predominant wind direction is from N-NE to S-SW, Avg. Temperature 23 °C., humidity 52.72 % etc.

Although the prevailing predominant wind direction during the two days period i.e. from the 22/02/2021, was from West to East, the actual predominant wind direction observed as per the tabular meteorological data for the period during which the fire accident continued i.e. 1:46 hrs to 6:30 Hrs on 23/02/2021 as from N-NE to S-SW direction. Meteorological data on 23/02/2021 is attached in **Annexure - 14**.

#### **6.2 Air Component**

The unit has submitted a list of chemicals with quantity lost due to accident on 23/02/2021 early morning hours. The committee has referred to the methodology adopted for calculation of total quantum of chemicals converted using stoichiometry to various components of all the chemicals which were reportedly lost except for Toluene at various stages and ethanol water mixture. Portion of Toluene is considered burnt and remaining emitted as VOCs from the surface of the flowing water. Accordingly, evaluating damage for air components, two factors were considered i.e. complete combustion of chemicals and emission of VOCs due to toluene.

##### **6.2.1 Estimation of amount of Toluene vaporized**

The volatile organic compound such as toluene having low water solubility will be volatilized in air. After the accident, severe smell of toluene was felt by the people at and around the site. The volatility of a volatile organic liquid from a surface depends on vapour pressure of

compound, wind speed, and the ambient temperature. Since the specific gravity of toluene is less than water, the undissolved toluene will float on the surface of water.

The volatility of a volatile organic liquid from a surface may be estimated by the following method.

$$\text{Organic compound volatilized (kg/h/m}^2\text{)} = 0.00116 \times \text{MW} \times P \times W^{0.625} \quad \text{Equation. 1}$$

(Source: Evaporation Rate of volatile liquids, USEPA, 1989)

Where,  $W$  = wind speed in ft/min,  $P$  = vapor pressure of compound in inch Hg,  $MW$  = molecular weight of compound in gram.

Considering a wind speed of 0.5 km/h (27.9 ft/min) near ground surface corresponding to the wind speed of 2.5 km/h at 10 m at the time of accident, vapor pressure of toluene as 28 mm Hg (1.12 inch Hg) at 25 deg C, and molecular weight of toluene = 92 g/mole, equation (1) predicts the rate of toluene volatilization as 0.95 kg/h/m<sup>2</sup>, respectively.

Estimation of the total surface area from where volatilization occurred can be obtained by calculating the surface area of drains as under:

1. Total length of GIDC drains carrying fire-fighting water around unit = 700 m, average width 1.0 m, hence surface area = 700 m<sup>2</sup>
2. Total length of katchcha drains wherein fire-fighting water flowed = 3900 m of average width 1 m, hence surface area = 3900 m<sup>2</sup>.

Thus, total surface area from where toluene can volatilize = 4600 m<sup>2</sup>.

Considering toluene volatilization rate of 0.95 kg toluene/h/m<sup>2</sup>,

The total mass of toluene volatilized would be 4370 kg/h.

The total time for volatilization is difficult to predict since all the drain surface area does not become occupied at once. The committee has considered 2 hours for estimation of calculating quantum of toluene, which gives amount of toluene volatilized = 8740 kg. Such vapours of hydrocarbon can produce radicals and secondary pollutants in the sunlight which could be potentially hazardous. Thus for combustion calculation remaining quantum of toluene 18260 kg is considered.

- Combustion of chemicals may have led to generation and release of various gaseous pollutants such as sulfur dioxide (SO<sub>2</sub>), hydrogen chloride (HCl), oxides of nitrogen (NO<sub>x</sub>), carbon di-oxide (CO<sub>2</sub>) etc from the chemicals lost during the blast and subsequent fire in the unit. The moles of chemical compounds were considered to calculate the mass of gaseous emissions as shown in Table below.

**Table 6: Calculation of Gaseous emissions due to combustion of chemicals during the accident**

Chemical formula	Quantity Lost	Quantity Considered for calculation, kg	kilo moles	C	N	O	S	Cl	CO <sub>2</sub> , kg	SO <sub>2</sub> , kg	NO <sub>2</sub> , kg	HCl, kg
C <sub>6</sub> H <sub>12</sub> O <sub>5</sub>	8500	8500	64.39	6	0	1	1	0	17000	4121	74	0
C <sub>6</sub> H <sub>15</sub> N	112	112	1.60	4	1	1	0	0	282	0	0	0
C <sub>2</sub> H <sub>5</sub> SH	1000	1000	16.13	2	0	0	1	0	1419	1032	605	0
C <sub>6</sub> H <sub>13</sub> N	1302	1302	13.15	6	1	0	0	0	3472	0	0	0
C <sub>7</sub> H <sub>8</sub>	27000	18260	198.48	7	0	0	0	0	61131.9	0	0	0
C <sub>16</sub> H <sub>24</sub> O <sub>5</sub> S	3666	3666	11.18	16	0	5	1	0	7868	715	0	0
C <sub>16</sub> H <sub>24</sub> O <sub>5</sub> S	712	712	2.17	16	0	5	1	0	1528	139	4472	0
C <sub>3</sub> H <sub>6</sub> ONCl.H	14000	14000	97.22	3	1	1	1	2	12833	6222	4472	7097
C <sub>3</sub> H <sub>6</sub> ONCl.H	14000	14000	97.22	3	1	1	1	2	12833	6222	0	7097
C <sub>2</sub> H <sub>5</sub> OH	1500	750	12.10	2	0	1	0	0	1065	0	0	0
<b>Total gaseous emissions in kg</b>									<b>119431.</b>	<b>18452</b>	<b>9623</b>	<b>14194</b>

**6.2.2 Estimation of Environmental Damage compensation due to release of gaseous emissions**

To estimate the damage compensation due to air pollution, the methodology employed by the Committee constituted in case of Yashashvi Rasayan Pvt. Ltd., Dahej (OA NO. 22 of 2020), was adopted. The damage values per ton of SO<sub>2</sub>, NO<sub>x</sub>, HCl, and CO<sub>2</sub> were taken as (Rs. in Lakh) 2.1989, 2.1729, 0.2189, and 0.0225 per MT of gas, respectively. No such damage value for the release of toluene is available to the best of Committee's knowledge. Therefore, **considering the risk of production of secondary pollutants in air due to toluene vapour, a damage value of Rs. 2.1989 lakh per MT of toluene vapor (maximum value among SO<sub>2</sub>, NO<sub>x</sub>, HCl, and CO<sub>2</sub>) is taken as damage value of toluene. Based on these Damage values, the total damage cost due to air pollution caused by fire and explosion is estimated as shown in below table.**

**Table 7: Estimation of Damage value due to Air pollution caused by fire**

Air pollutant, MT	SO <sub>2</sub>	NO <sub>x</sub>	HCl	CO <sub>2</sub>	Toluene vapor
	18.452	9.623	14.194	119.432	8.74

Damage value, Rs. In	2.1989	2.1729	0.2189	0.0225	2.1989
Damage value, Rs. In Lakh	40.57	20.91	3.11	2.69	19.22
<b>Total Damage value, Rs. in Lakh : 86.51</b>					

**Thus total amount of Rs. 86.51 lacs is calculated for environmental damages for air component.**

### **6.3 Water and Soil Component**

The explosion at UPL caused damage to all the compartments of environment emission/discharge of pollutants. Explosion followed by fire led to combustion of other chemicals and intermediates stored in the plant. The water used for fire-fighting contained foam used for fire fighting and the unburnt chemicals which flowed through GIDC drain from the premises to a point near M/s Lanxess followed by the katchcha drain/trench (after M/s Lanxess) and eventually accumulated on open land as the wastewater reportedly did not reach any natural water bodies (Boridra Nallah).

The committee calculated the firefighting water required and subsequent steps taken by the unit to calculate the damage to the environment for the water component.

#### **6.3.1 Damage to Water Environment**

##### **Estimation of the amount of water used for fire-fighting**

The unit informed that during fire fighting 18 numbers of 1" diameter and 3 numbers 3" diameter nozzle fire hydrants respectively with water pressure in the hydrant maintained at 6-7 kg/cm<sup>2</sup> were used. Considering co-efficient of discharge "Cd" of fire hydrant nozzles varies between 0.7-0.9 depending on the type of nozzle.

The discharge per nozzle can be given as,

$$Q = Cd \times (\pi/4) \times D^2 \times \sqrt{2gH}$$

Where, Q = flow in m<sup>3</sup>/sec, D = diameter of nozzle in m, H = water head in m.

Taking value of Cd = 0.8, and water head of 60 m, the flow of water by one 1" (25 mm) and one 3" (75 mm) water hydrant nozzles will be 0.0134 m<sup>3</sup>/s (48.24 m<sup>3</sup>/h) and 0.121 m<sup>3</sup>/s (435.6 m<sup>3</sup>/h), respectively. Thus, calculatedly the total water discharged from all the fire hydrants (18 nos. of 1" and 3 nos. of 3" diameter) will be approximately 2175 m<sup>3</sup>/h

Considering 6 hours of operation of fire hydrants total amount of water used for fire fighting will be: ~13000 KL (As per the information provided by the unit, the fire hydrants were operated for 6 hours)

GIDC drainage network are blocked for all seasons except monsoon and to monitor the same CCTV camera focused at the drain near M/s Lanxess India Pvt. Ltd. was provided. GIDC has concrete drainage network from the unit till the exit point of the GIDC drain after crossing M/s Lanxess India Pvt. Ltd. The GIDC drain is subsequently meeting an open kachcha drain/trench leading to Gumanpura village area. The committee has obtained CCTV Footage from the M/s Lanxess India Pvt. Ltd. and the time duration when the dry drainage network of GIDC Jhagadia near M/s Lanxess India Pvt. Ltd. has recorded flow, was considered by the committee.

- It may be seen that the flow started in the GIDC storm water drain at 6 AM (~4 hours after the accident) and continued until 3 PM. The GPCB officers at the time of visit observed that the average flow velocity in the drain was 0.75 – 1.5 m/s and depth of flow 0.2 – 0.4 m. Taking the average width of cross section of water flow as 1 m, and considering average values of water depth and flow velocity, the total quantity of water flowing in the storm water drain would be approx. 10000 KL. As per report prepared by GPCB on 23/02/2021, wherein it is mentioned that the contaminated wastewater from the unit was found flowing downstream to a location in the Gumanpura village but did not reach to Natural Drain Boridra nalla.
- Based on instructions of GPCB, the unit later on, blocked the drain and started lifting fire-fighting water from the drain near Gumampura village on 23/02/2021. The unit reported that about 3000 KL water was lifted from UPL drains and GIDC drain and stored in the Guard pond within the unit. The water lifting work was reportedly completed on 24/02/2021. Thereafter the unit has started dredging of soil and lifting of soil from the area. The work of soil dredging and lifting was reportedly completed on 25/02/2021. Considering the lifting of 3000 KL runoff water by the unit about 10000 KL of fire-fighting runoff water out of total estimated quantity of 13000 KL, went to the natural drain/trench, further going all the way to Gumanpura village, about 5.7 km away from the unit (as per the Google earth image).

The unit provided a list of chemicals lost during the accident as shown in Table 1. These chemicals are highly flammable and it was assumed that most of these chemicals would have been burnt during the fire. However, runoff of firefighting water sample collected by GPCB on 23/02/2021 and the sample of wastewater from guard pond collected by the joint committee on 04.03.2021 reveals that the wastewater has concentration of organics in terms of COD (1272-1932 mg/L) in addition to various other monitored parameters.

When fire-fighting water containing such chemicals is released in to natural environment, there are following possible fates of such chemicals

- 1) The chemical dissolved in fire-fighting water can percolate in the soil causing land pollution and may contaminate groundwater
- 2) A part of volatile chemicals (such as toluene which is less soluble) volatilized in air and cause air pollution, and

Considering lifting of firefighting water from natural trench and subsequently dredging of wet soil from the drain/trench and disposal of contaminated soil to CHWTSDF site (about 19 MT wet soil) by the unit, monitoring results of soil samples collected from the drain/trench on 04/03/2021, the committee is in view that the unit has taken possible steps however environmental damage due to spillage of contaminated runoff water cannot be ruled out.

The damage caused and the level of impact due to organic pollutant released is evaluated in monetary terms by the committee by considering two factors

- the waste of natural resources i.e. fresh water used for fighting and cost of treatment of the wastewater generated as per the prevailing treatment cost as charged by the common effluent treatment plants (CETPs) and
- Liability towards the environmental damage due to spillage of contaminated runoff water.

The total compensation towards environmental damage due to the discharge of fire-fighting water contaminated with hazardous chemicals (approx. quantity 10000 kL, COD 1272-1932 mg/L) is calculated in below table.

**Table 8: Calculation of Environmental Damage**

Valuation of environmental damages due to release of organic load in the wastewater	=	Rate of freshwater in the Jhagadia GIDC	+	Treatment cost of the contaminated wastewater generated from fire fighting	+	Liability and Remediation Cost in case of a Fire accident leading to spillage of hazardous waste/contaminated runoff water*
		Rs. 40 per kl x 13000 kl = Rs.5.2 lac (Rs. 40 per kl GIDC water supply charge)	+	Rs.80 per kl x 10,000 kl = Rs.8 lac (Rs. 80 per kl CETP treatment charge for COD concentration of 2000 mg/l)	+	Rs. 120 lakh

\*According to the CPCB "Guidelines on Implementing Liabilities for Environmental Damages due to Handling & Disposal of Hazardous Waste and Penalty".

- Thus, Total amount of Rs. 133.2 lacs calculated for environmental damages of water and soil component.

The total cost of Environmental damage compensation due the accident at UPL sums up to Rs. 133.20 lakh (due to the discharge of contaminated fire-fighting water and soil) + Rs. 86.51 lakh (due to the air pollutant) = Rs. 219.71 lakh.

## 7. COMPENSATION TO DECEASED PERSONNEL

The compensation amount for the personnel who lost their lives due to the unfortunate fire accident on the intervening night of 22<sup>nd</sup> February and 23<sup>rd</sup> February 2021, three court cases i.e. "Sarla Verma & Ors. Vs. Delhi Transport Corporation & Anr.", "Sunita Tokas Vs. New India Insurance Co. Ltd." and "Amrit Bhanu Shali & Ors. Vs. National Insurance Co. Ltd. & Ors." to base the calculation for the payment of compensation considering the following components-

1. Monthly salary of the deceased i.e. gross salary of deceased personnel as per the list provided by the unit.
2. Addition to income for future prospect: The committee has considered following criteria referring to the judgement order of Sarla Verma & Ors Vs. Delhi Transport Corporation & Anr., para 11, "In view of imponderables and uncertainties, we are in favour of adopting as a rule of thumb, an addition of 50% of actual salary to the actual salary income of the deceased towards future prospects, where the deceased had a permanent job and was below 40 years. [Where the annual income is in the taxable range, the words 'actual salary' should be read as 'actual salary less tax']. The addition should be only 30% if the age of the deceased was 40 to 50 years. There should be no addition, where the age of deceased is more than 50 years".
3. Deduction for personal and living expense: The committee has considered following criteria referring the judgement order of Sarla Verma & Ors Vs. Delhi Transport Corporation & Anr., Para 14, "Having considered several subsequent decisions of this court, we are of the view that where the deceased was married, the deduction towards personal and living expenses of the deceased, should be one-third (1/3rd) where the number of dependent family members is 2 to 3, one-fourth (1/4 th) where the number of dependant family members is 4 to 6, and one-fifth (1/5 th) where the number of dependant family members exceed six" and "Where the deceased was a bachelor and the claimants are the parents, the deduction follows a different principle. In regard to bachelors, normally, 50% is deducted as personal and living expenses, because it is assumed that a bachelor would tend to spend more on himself",
4. Multiplier: The committee has considered following criteria referring the judgement order of Sarla Verma & Ors Vs. Delhi Transport Corporation & Anr., para 21, " We therefore hold that the multiplier to be used should be as mentioned in column (4) of the Table above (prepared by applying Susamma Thomas, Trilok Chandra and Charlie), which starts with an operative multiplier of 18 (for the age groups of 15 to 20 and 21 to 25 years), reduced by one unit for every five years, that is M-17 for 26 to 30 years, M-16 for 31 to 35 years, M-15 for 36 to 40 years, M-14 for 41 to 45 years, and M-13 for 46 to 50 years, then reduced by two units for every five years, that is, M-11 for 51 to 55 years, M-9 for 56 to 60 years, M-7 for 61 to 65 years and M-5 for 66 to 70 years"
5. Expense towards love & affection

The committee has referred three cases i.e. "Sarla Verma & Ors. Vs Delhi Transport Corporation & Anr", "Sunita Tokas Vs. New India Insurance Co. Ltd" and "Amrit Bhanu Shali & Ors Vs. National Insurance Co. Ltd. &Ors."

In which the court has taken different view on different cases depending upon the subjective merit of the case for expense towards love & affection.

**Table 9: The amount of expense towards love and affection in the above-mentioned cases**

Case	Expense towards love & affection
Sarla Verma & Ors. Vs Delhi Transport Corporation & Anr	Rs. 10,000/- (as loss of consortium)
Sunita Tokas Vs. New India Insurance Co. Ltd	Rs. 2,00,000/-
Amrit Bhanu Shali & Ors Vs. National Insurance Co. Ltd. &Ors	Rs. 1,00,000/- (Rs. 50,000/- to each dependent)

**The committee is of the opinion to consider the expenses towards love and affection is 200000/-per case.**

6. Expense towards last rites- The committee has referred following three cases as tabulated below and considered Rs. 50,000/- as amount of expense towards last rites.

Case	Expense towards last rites
Sarla Verma & Ors. Vs Delhi Transport Corporation & Anr	Rs. 5,000/-
Sunita Tokas Vs. New India Insurance Co. Ltd	Rs. 50,000/- (Loss of estate & funeral expense)
Amrit Bhanu Shali & Ors Vs. National Insurance Co. Ltd. &Ors	Rs. 10,000/-

Considering the above methodology the committee calculated the amount for deceased personnel and provided as **Annexure - 15**. The unit has submitted details about the compensation paid to the diseased personnel to the SDM Office.

**Table 10:A comparative table of total compensation assessed by the committee and amount already paid by the unit is shown in table below:**

S. N.	Name	Compensation estimated by the committee	TOTAL COMPENSATION ALREADY PAID BY THE UNIT				
			EX-Gratia	GPA	Term Insurance	Workmen Compensation	Total Amount
1	Late Ketankumar Gevariya	61,48,342.90	3549000	1500000	1000000	0	60,49,000.00
2	Late Vanrajsinh Dodiya	47,31,523.00	3000000	1500000	1000000	0	55,00,000.00
3	Late Krunal Patel	36,34,360.00	3000000	900000	1000000	0	49,00,000.00
4	Lt Nehal Mehta	38,32,630.00	3000000	1300000	1000000	0	53,00,000.00
5	Late Kuvarlal Kasdekar	16,16,794.00	1500000	0	0	954101	24,54,101.00
6	Late Kamal Panse	16,16,794.00	1500000	0	0	932986	24,32,986.00
7	Late Maniram Dhikar :	16,16,794.00	1500000	0	0	938634	24,38,634.00

The unit paid total Rs. 2,90,74,721.00/- and has informed that in addition to the above Gratuity, EDLI and PF are also paid as per rules. Therefore, the committee is of the opinion that **the unit has already paid compensation under various heads which is more than the compensation calculated by the committee referring the methodology as per orders of various matters of Hon'ble Supreme court of India and Hon'ble NGT except for Late Ketan Kumar Garviya. Therefore, the difference of the amount of Rs. 99342.00/- may be considered by Hon'ble Tribunal as additional compensation to be paid by the unit to the dependent of Late Ketan Kumar Gurviya**

Detailed Information regarding compensation paid by unit to Injured persons are enclosed in **Annexure- 15**.

#### **8. CARRYING CAPACITY OF JHAGADIA GIDC**

The committee has collected information about existence of various infrastructure facilities in GIDC Jhagadia with respect to number and types of industries, environment management facility, status of onsite and offsite plans in terms of 1989 Rules and mock drills, fire fighting facility, health care facility in the GIDC, details about the list of hazardous chemical storage permission to MAH units in the estate etc. to assess the present capacity in terms of safety of the area.

### 8.1 About Jhagadia Industrial Estate

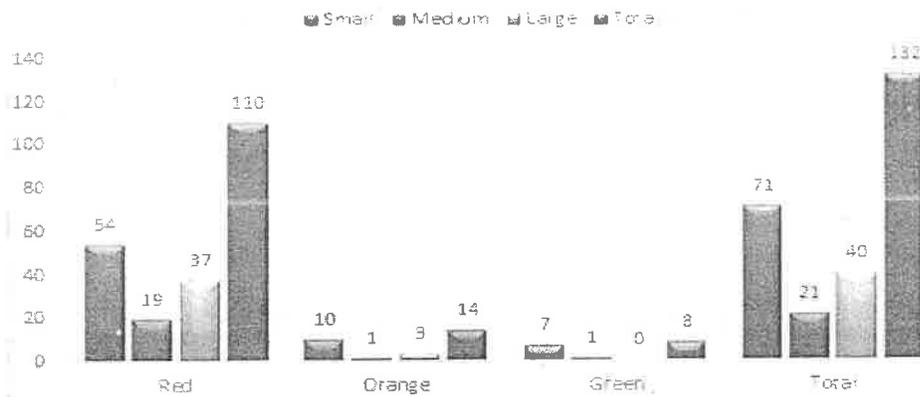
Jhagadia Industrial Estate is situated in the golden corridor of south Gujarat is developed by Gujarat Industrial Development Corporation (GIDC) in 1993 at Jhagadia, Taluka Jhagadia, Dist. Bharuch. It is one of the largest agglomerations of industrial units and classified as Mega Industrial Estate is spread over an area of 1700 hectares of land divided into 285 plots. As per records of GIDC, out of total spread area about 1300 hectares are allotted. There are a total 285 plots in GIDC, out of which 275 plots are allotted and 10 plots are not allotted. Out of 275 allotted plots, status of 36 plots is under construction, 100 are open plots. The estate is located @ 16 km in north-east direction from Ankleshwar Industrial Area.

As per GPCB record, statistics of operational industries-category and scale wise and operational units are given below Table & graphs

**Table 11: Statistics of total operational industries-category and scale wise**

Scale → Category	Small	Medium	Large	Total
Red	54	19	37	110
Orange	10	1	3	14
Green	7	1	0	8
<b>Total</b>	<b>71</b>	<b>21</b>	<b>40</b>	<b>132</b>

**Total Operational Industries as per gpcb xgn records**



Graphs showing Operational industrial statistics in Jhagadia Industrial Estate (Source: GPCB xgn).

## **8.2 Details of Present Infrastructure:**

### **8.2.1 Environmental Infrastructure**

#### **Wastewater management**

Individual industries located at Jhagadia Industrial estates discharges treated wastewater into GIDC drainage network from where it is collected in collection sump at Jhagadia from where it is transferred to Booster Pumping Station at Kantiajal. Booster Pumping Station at Kantiajal also receives wastewater from Final Effluent Treatment Plant (FETP) at Ankleshwar which receives industrial effluent from Ankleshwar and Panoli Industrial estates. Further, mixed effluent (Jhagadia, Ankleshwar & Panoli) from collection Sump at Kantiajal, discharge to deep sea through marine outfall.

#### **Air quality monitoring system (NAMP station, CAAQMS)**

- One NAMP station is operated by GPCB for collection of ambient air sampling as per the CPCB guidelines. The station is located at the terrace of Jhagadia Industrial Association (JIA) office in GIDC Jhagadia.
- CAAQMS facility is presently not available.

### **8.3 Carrying Capacity**

Carrying capacity in terms of safety provisions is assessed by the committee by collecting information about the availability and working of onsite and offsite emergency plan, mock drill, safety SOPs, availability of firefighting facility, health care facility in the GIDC, status of Major Accident Hazard (MAH) units in the GIDC Jhagadia etc.

Considering the definition of Major Accident and Major accidents Hazards installation, 11 installation in the GIDC Jhagadia are classified as MAH Installation. Definition of Major accident and Major Accident Hazardous Installation is given below.

“Major Accident” means an accident involving loss of life inside or outside the site or ten or more injuries inside and/or one or more injuries outside or release of toxic chemical or explosion or fire of spillage of hazardous chemical resulting in ‘on-site’ or ‘off-site’ emergencies or damage to equipments leading to stoppage of process or adverse effects to the environment.

Definition of Major Accident Hazard (MAH) installation

“Major Accident Hazard (MAH) installation” means isolated storage and industrial activity at a site handling (including transport through carrier or pipeline) of hazardous chemicals equal to, or in excess of the

threshold quantities specified in COLUMN 3 OF SCHEDULE 2 and SCHEDULE 3 respectively.

List of MAH Installation in the GIDC Jhagadia is given in table below:

**Table 12 : List of MAH Installation in the GIDC Jhagadia**

<b>SN</b>	<b>FACTORY NAME</b>	<b>ADDRESS</b>
1	Air Liquid India Holding Pvt Ltd.	Plotno.38/1,GIDC, Jhagadia Dist-Bharuch.
2	Cheme Organic Chemicals.	Plot No. 758,GIDC Estate, Jhagadia,Bharuch.
3	Galaxy Surfactants Ltd.	892,GIDC Jhagadia, Dist-Bharuch.
4	J M Hubar India Pvt Ltd	754 Jhagadia Indl. Estate,GIDC Bharuch 393 110.
5	Klg Organic Ltd.	Plot No.759, GIDC, Jhagadia, Dist. Bharuch.
6	Lanxess India Pvt Ltd	743/2/A,748/3,748/4/A & B GIDC Jhagadia, Dist-Bharuch
7	Panoli Intermediate (India) Pvt. Ltd.	Plot No. 778/1, GIDC, Jhagadia,Bharuch-393 110
8	Saint Gobain Glass India Ltd	36, GIDC Jhagadia , Dist-Bharuch
9	Shriram Alkali & Chemicals (A unit of Dcm Shriram Consolidated) Ltd.	749 GIDC Indl. Estate, Jhagadia, Bharuch-393 110
10	Upl Ltd (Unit-5).	750 GIDC Indl. Estate, Jhagadia, Bharuch-393 110
11	Vardhman Acrylics Ltd.	755 GIDC Mega Estate, Jhagadia, Dist. Bharuch

Detailed information about the list of hazardous chemicals with maximum storage quantity and availability of fire tenders with MAH unit wise is provided in **Annexure – 16**.

*Working of Offsite, Onsite emergency plan and Mock drill*

As informed by DISH,

- District offsite plan is prepared for Bharuch District wherein GIDC Jhagadia is part of the plan. Offsite mock drill is one of the mandatory requirements to ascertain the working of the offsite plan as per MSIHC Rule under the chairmanship of Dist. Collector. Offsite mock drill was carried out at Jhagadia GIDC on 10/07/2020 at M/s DCM Jhagadia. The Mock drill was planned and carried out for fire in a hydrogen bank truck. Major aim of mock drills is to record the response time and steps to be taken to minimise the same.

- As per the District Off-Site plan, Jhagadia GIDC has Local Crisis Group comprising 14 members (representative from MAH units and other units).
- DISH informed that all MAH units have onsite emergency plans and a third party safety audit is also carried out and submitted to DISH by all MAH units in the GIDC. As per the statutory requirement, MAH units has to carry out in house mock drills twice in a year and mock drill reports are to be submitted to DISH. All MAH units regularly submitted mock drill reports to DISH.

#### **8.4 Present Capacity of GIDC in terms of safety infrastructure**

Jhagadia GIDC Estate is growing with lots of new vulnerability of Risk, having more than one hundred thirty active industries spread in almost 1720 hectares of the land. The GIDC is surrounded by villages having almost 50,000 populations in the vicinity of about 10 kms radius. There are total 11 MAH units in the Jhagadia GIDC.

It can be seen that 09 MAH units located in close vicinity and accident in one unit likely to have adverse impact on surroundings and neighbouring units. The MAH units are mutually support each other during any accident in the area. There are only Five MAH units having Fire Tender vehicles with trained fire crew. At present, the available firefighting and allied facilities of the GIDC estate is not adequate even the local fire station of Jhagadia GIDC is also not well equipped and has only one fire tender. The scenario of accident of UPL indicates that the present infrastructure is not enough to handle such types of accident involving fire and explosion. As during the firefighting operation of almost 18 fire tenders from nearby industries of Jhagadia GIDC, from DPMC, Ankleshwar, DPMC-Dahej, GNFC-Bharuch were mobilised in addition to the in-house firefighting capability of the unit.

During the accident at UPL, the injured personnel were given first aid at the health centre of the unit and ambulances were mobilised for taking injured personnel to hospitals Smt. Jayaben Modi Hospital, Ankleshwar, as the area do not have any such facility. The available facilities are in Bharuch and Ankleshwar areas which are almost 25-30 kms away from Jhagadia GIDC estate.

Looking at the above facts, the committee is in the opinion that a review of fire load of individual industries and firefighting facility provided may need to be carried out by concerned authority considering IS13039:2014 and such standards provisions and also to establish a Disaster Prevention and Mitigation Centre (DPMC) type of infrastructure with well-equipped control room with all necessary fire & safety equipment and having trained firefighting staff, rescue workers and first-aiders personnel, deployed round the clock in Jhagadia GIDC, equipped with at least Four Water-cum-foam fire tenders and two HAZMAT vehicles to combat Chlorine and other toxic gas release. In addition to the above, a common water reservoir of adequate capacity with an advanced

*pumping system in the area may also be planned. Health care facility is also required to be planned as presently the area is not having any such facility to provide even the primary treatment in case of such accident.*

## **9. CONCLUSION**

*Hon'ble National Green Tribunal (NGT), Principal bench, New Delhi took up the matter on suo-moto basis in the application no. 60/2021 on 25/02/2021, and constituted a joint committee vide orders dated 25/02/2021 to submit a report on the accident that took place in M/s UPL Ltd. (Unit 5), GIDC Jhagadia on 23.02.2021. The accident took place in the manufacturing plant of the final product namely, Clethodim which is herbicide, in CM-257 plant at M/s UPL Ltd. (Unit 5), GIDC Jhagadia. The blast followed by massive fire in the premises of the unit took place on 23/02/2021 in the reactor (stage I, CM-257 Plant). During the accident, the plant process was under shutdown since 04/02/2021 owing to boiler maintenance and inspection. However, materials at intermediate reaction stages were stored in the different reactors of the plant. The reactor in which the blast took place was having about 8.0 MT of Ethyl Thio Butanol (ETB) which is the first stage intermediate product in the process of manufacturing Clethodim. **The blast was so massive that it felt like anearthquake in the entire area resulting into death of 07 personnel working in the plant, injury to 53 personnel within the premises, damage of other reactors/tank form containing various chemicals, other infrastructure including the DCS building, sheds of other plants, glass of windows inside the premises of the unit etc.***

*The joint committee visited the unit on 04/03/2021 and again on 09/03/2021. During visit, the committee interacted with some of the concerned officials present on duty on the day of accident in the unit, representatives of the unit, collected various available reports and records from the unit. Referring to the reports prepared by DISH, GPCB and other authorities, action taken by different authorities, information collected & observations in connection with accident following conclusions were drawn by the committee:*

- The plant CM-257 was commissioned by the unit based on its in-house R&D Study, basic and detailed engineering. During such in-house development of products, more focus need to be given in conducting proper safety and stability test at various stages. However, in the plant stage serious lapses in HAZOP study, safety audit, non-availability of SOP for safe shutdown etc. were observed. The unit has not yet been able to identify the root cause of the accident. One of the probable reasons reported by the unit is leakage of methanol in the reactor containing ETB which might have triggered due to exothermic reaction and resulted in the blast. The reaction of methanol with ETB may be logical in terms of reaction chemistry. However, serious lapses in terms of safety study, reactivity study, compatibility test, development of*

standard operating procedure for planned and emergency shutdown, storing intermediate stage product during shutdown, gaps in HAZOP, safety audit, in adequacy of sensors provided for the reactor etc. might have resulted in the accident.

- Considering the accident as reported in the social media, during manufacturing of similar product in China in 2019 and in the present case, the committee is in of the opinion that **detailed various studies w.r.t. the safety aspects as mentioned in the para above, needs to be carried out before reconsidering manufacturing of Clethodim, as there is a lack of information about thermal stability, reactivity at intermediate stages, and safety provisions as observed in the present case.**
- The unit has submitted safety audit report, as per which, details of chemical stored in the unit, the actual total stored quantity of toluene, n-Hexane and Methanol exceeds 143 kl (storage permission from PESO to the unit). However, the safety audit report does not mention any observation regarding exceedance in stored quantity beyond permission limits of PESO. Moreover, the audit report has various gaps which includes lack of detailed process hazards from CM-257 Plant. **Thus, the safety audit carried out by the unit shows gaps and needs to be carried out again by a competent agency, accredited by an Accreditation Board as per Rule 68 j para 9 of the Gujarat Factory Rules, 1963 and restrict the storage of chemicals as per permission from PESO.**
- The committee is also of the opinion that the unit needs to review entire safety aspects in terms of SOP, HAZOP study, Qualitative and Quantitative Risk assessment, fire load, etc. as gaps were identified during visits. **The unit needs to take required measures to fulfil the gaps identified in the report.**
- The committee has calculated Environmental Damage cost considering the air, water and soil component. The chemical lost during the accident were converted in terms of pollutants like sulphur-di-oxide, carbon-di-oxide, HCl etc. except a part of toluene considered to be emitted as VOC along with firefighting water. The quantity of firefighting water used is estimated and based on the concentration of COD, the water component is calculated in lieu of loss of natural resources and treatment cost. In addition, **the liability towards damage in the area is also considered due to spread of contaminated water on soil. Considering above, the total cost of Environmental damage compensation due the accident sums up to Rs. 219.71 lakh which may be considered by Hon'ble Tribunal to be paid by the unit towards Environmental Damage compensation.**
- The committee calculated compensation for the deceased personnel refereeing various orders of Hon'ble Supreme Court of India and various reports of Hon'ble NGT. **The committee is of the opinion that the unit has already paid about 290.74**

***lakh towards compensation under various heads which is more than the compensation calculated by the committee except for in case of Late Shri Ketan Kumar Garviya. Therefore, the difference of the amount of Rs. 99,342.00/- may be considered by Hon'ble Tribunal as additional compensation to be paid by the unit to the dependent of Late Shri Ketan Kumar Gurviya.***

- ***The committee has also identified inadequacies in present infrastructure to combat the major accident scenario in the Jhagadia GIDC. Though it was informed that onsite emergency plan and mock drill is carried out by all 11 Major Accident Hazardous (MAH) units in the estate as statutory requirement and local crises group is also there in the GIDC as per offsite plan of Bharuch District, the committee is of the opinion that a safety review in terms of fire load of individual industries and firefighting facility provided by them needs to be carried out by concerned authority in compliance to the IS 13039:2014 and other similar standard provisions.***
- ***There is an urgent need of infrastructure like Disaster Prevention and Mitigation Centre (DPMC) with well-equipped control room, all necessary fire & safety equipment, trained firefighting staff, rescue workers and first-aiders personnel deployed round the clock in Jhagadia GIDC. The proposed DPMC should be equipped with at least Four Water-cum-foam fire tenders and two HAZMAT vehicles to combat Chlorine and other toxic gas release may be provided in the GIDC. In addition to the above, a common water reservoir of adequate capacity with an advanced pumping system in the area may also be planned. Health care facility is also required to be planned in vicinity of the Jhagadia estate, as presently the area is not having any such facility to provide even the primary health treatment."***

#### **Discussion and directions**

6. We have heard learned Counsel for the CPCB, the Project Proponent and the representative of Gujarat State PCB. No one has entered appearance on behalf of the State. Questions for consideration are the cause of the incident and remedial measures, including compensation to the victims and restoration of environment.

#### **Cause of the incident and remedial measures**

7. We find that several accidents have recently taken place in the course of industrial activities on account of gas leak, blast, fire etc.. The details of some of such cases have been already mentioned in the earlier

order quoted above including an incident in same District - District Bharuch in a chemical factory Yashyashvi Rasayan Pvt. Ltd. In respect of the earlier incident dated 03.06.2020 in Yashyashvi Rasayan Pvt. Ltd, the Tribunal has dealt with the matter vide order dated 03.02.2021 in O.A. No. 85 of 2020, Aryavart Foundation through its President v. Yashyashvi Rasayan Pvt. Ltd. & Anr. in the light of report of the Expert Committee headed by Justice B.C. Patel, former Chief Justice of Delhi High Court. The Tribunal accepted the report of the said Committee which *inter-alia* recommended as follows:-

"7. Recommendations to avoid future incidents and other questions are as per the report Mark Annexure 28.

#### **SECTION 8**

#### **STEPS REQUIRED TO AVOID SUCH INCIDENT (NATIONALDISASTER MANAGEMENT AUTHORITY)**

55. The question is how such accidents can be avoided. There is National Disaster Management Authority (NDMA) of the Government of India, which has issued guidelines for Chemical Disasters (Industrial).

56. The common causes for chemical accidents, deficiencies, safety management system and human errors are noted. The chemical accidents fire, explosion and/or toxic release were resulting irreversible pain, suffering and death. To minimise such accident and to improve emergency preparedness at all levels, substantial efforts are still required to predict the occurrence of disaster. (Page xvii)

57. It is also stated that it has been realised that effective Chemical Disaster Management (CDM) is possible by the adoption of preventive and mitigation strategies as most chemical disasters are preventable in comparison to natural disasters that are difficult to predict and prevent. Statutory inspection, safety audit and testing of emergency plan, onsite emergency plan, offsite emergency plans, medical emergency plans, information on chemical, technical information have been given importance.

xxx.....xxx.....xxx

**5. Shortage and training of manpower:**

viii. *It is necessary to appoint adequate number of Scientists and other officers as well as other staff considering the number of industries so as to effectively monitor the manufacturing units. Shortage of staff is also referred in the report of the Comptroller and Auditor General of India on Environmental Clearances and Post Clearance Monitoring 2016 that there are shortfalls in monitoring of environmental parameters. One of the reasons mentioned in the report is the shortfall/inadequate staff. Considering the numbers of Environmental clearance by MoEF & CC, New Delhi as well as SEIAA Gujarat (No. of ECs issued by MoEF & CC, New Delhi-Approx. 1500 & by SEIAA Approx. 8300 for the state of Gujarat only), the scientific staff in Ministry's regional offices should be strengthened for post EC monitoring at regular intervals. Thus, for having an eye over all the units, the Committee feels that the government should take appropriate steps for appointing adequate staff. The PESO also pointed out the same concerned the Gujarat being most industrialized state having about 40,000 licensed premises covered under various Acts and Rules including 1800 Major Accident Hazards premises, this is one of the pressing problems.*

ix. *The manpower of the DISH in the industrial area must be related to the numbers of units in the area. Considering the incident and the quality of the inquiry made by DISH, it is desirable that proper training should be imparted to the officers of the DISH. This will improve the efficiency of DISH.*

6...xxx.....xxx.....xxx

**7. Management & study:**

- xiii. *HAZOP study direction / instruction must be carried out strictly and regularly by the unit.*
- xiv. *Management to educate the staff on Materials Safety Data Sheet (MSDS) and engineers & operators in the plant must study the same.*

**7. DCG, Hospitals:**

- xv. *All Industrial Zone/SEZ should have their own Local Crisis Group. The District Crisis Group should give surprise visit to the factories regularly at least once in a quarter and check the operation of factories. At the end of the visit, they should generate a report and submit to the State Crisis Group.*
- xvi. *As per the Chemical Accidents (Emergency, Planning, Preparedness, Response) Rules, 1996, brought out under the Environment Protection Act 1986, it is mandatory to have*

State Crisis Group (SCG) and District Crisis Group (DCG) to help the State Disaster Management Authority (SDMA) and District Disaster Management Authority (DDMA) under the Disaster Management Act, 2005 in advisory roles to deal with Chemical Disaster Management (CDM). There is no emergency response centre / disaster management centre within the SEZ. Therefore, the authorities must provide urgently such centers. As the Industry in the instant case failed to report in this behalf there must be a provision for not reporting immediately to the DCG and DDMA or at emergency control room for chemical disasters in the state (as in the instant case it is at Vadodara). The Rule making authority though having prescribed 48 hrs. time limit within which the competent authority is required to be informed but there is no provision for the breach with regard to non-informing immediately or within 48 hrs. (In the instant case it is admitted the report was submitted on 9th June, 2020 against the incident on 3rd June, 2020).

- xvii. **The requirement of a Hospital in an industrial zone or SEZ and particularly industries are engaged in hazardous chemicals is a must. Even Hospitals at distance of 50 kms are general hospitals and not specialised in chemical burns and injuries arising out of accident on account of hazardous materials.**
- xviii. District crisis group must undertake mock drill under off site emergency plan and crisis management in every industrial cluster or SEZ on failure action should be taken against DCG. (In the instant case they were satisfied with mock drill in one place in a district. In the instant case in one district there are more cluster of industries. Therefore, in each cluster an exercise aforesaid is a must – DISH has admitted that such exercise is not carried out in all clusters).
- xix. As at other places in the state of Gujarat in the industrial clusters, the GPCB has provided tower for air quality monitoring and same is being monitored by the GPCB. Dahej – I & II or the SEZ being an industrial town and factories are particularly engaged in hazardous chemicals, the committee is of the opinion that there should be Continuous Ambient Air Quality Monitoring Systems (CAAQMS) at all strategic locations. So that everyone in that area is aware about the air pollution.

#### **8. Safety audit:**

- xx. **For the purpose of auditing the safety, the government must make a panel of safety auditors to inspect the factory independently twice in a year and they should submit their report directly to the DISH. The safety auditor should be made answerable to the government.**
- xxi. The committee is of the opinion that sub-rule (9) of Rule 68(J) of the Gujarat Factories Rules 1963, refers to safety report and safety audit reports, under that Rule sub rule 2 gives a choice to industry to select the auditor for the purpose of the safety audit. The committee of the opinion that the state government be requested to consider the case and particularly

safety report from independent auditor and to amend the Rule as below:

2). After the commencement of these Rules, the occupiers of both the new and existing industrial activities and isolated storage must be checked by the government through the safety auditor which is accredited by an accreditation board to be constituted by the Ministry of labour, Government of India.

3). The auditor within 30 days of audit shall send the report to the chief inspector with respect to the audit recommendations and which shall be examined by the government within a period of 1 month and the industry shall be directed to carry out within the period specified the recommendation that may be made by the Government in this behalf.”

8. In the present case also we find similar recommendations. After consideration of the matter in the above earlier case, the Tribunal issued following directions in the said matter:-

“28. We do not find any tangible objections to the report of the Committee which stand accepted. The recommendations of the Committee need to be duly implemented which needs to be overseen by the statutory regulators. We note that in the recent past the Tribunal has come across the number of incidents of leakage of gases and handling of hazardous chemicals. On investigation, this Tribunal has found that most of the accidents are result of non-compliance of laid down safety norms under the 1989 Rules and the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 [1996 Rules]. There is, thus, need for the establishments handling hazardous chemicals to strictly follow the laid down norms, which need to be overseen by the statutory regulators.

29 to 31xxx.....xxx.....xxx

32. In view of frequent accidents resulting in deaths and injuries, the Chief Secretaries of all the States/UTs may evolve a mechanism to ensure that the companies dealing with hazardous substance must forthwith pay compensation for deaths and injuries to the victims at least as per Workmen Compensation Act, 1923 wherever applicable or the principle of restitution laid down in Sarla Verma (supra), National Insurance Company Ltd. v. Pranay Sethi, (2017) 16 SCC 680 to the victims either directly or through the District Magistrate.

33. Conduct of safety audits of all establishments having potential for such accidents may be ensured. All States/UTs

*may also ensure availability of healthcare facilities in the vicinity of such establishments. PCB and DM must assess cost of restoration of environment which should be recovered from company and spent on such restoration. The States and UTs in accordance with 1989 and 1996 Rules need to step up vigilance, surveillance and monitoring to avert such accidents. Preparedness to meet such eventualities be ensured. Regular mock drills may be ensured in respect of onsite and offsite emergency plans. We may also refer to the directions issued by this Tribunal to the MoEF&CC and all the States/UTs on the subject of strengthening regulatory and oversight measures, vide order dated 01.02.2021 in OA 837/2018, Sandeep Mittal vs. Ministry of Environment, Forests & Climate Change & Ors.”*

9. It is thus clear that there are violations in following requisite safety protocols and monitoring and absence of adequate health facilities in the vicinity. Learned Counsel for the Project Proponent fairly stated that the unit in question will follow all the recommendations of the Committee including payment of compensation for the damage to the environment, remedying the inadequacies in the infrastructure and all safety precautions for future. Entire safety aspects will be reviewed in terms of SOP, HAZOP, Qualitative and Quantitative Risk Assessment and other gaps identified by the Committee.

**Compensation to the victims and restoration of environment**

10. While accepting the report, we note that substantially the compensation assessed has been already paid to the victims. Remaining amount, if any be paid. We further approve the compensation for damage to the environment and the same may be credited to a separate account by the industrial unit for being spent on restoration of the environment by preparing an action plan, to be approved by the State PCB and the CPCB. The plan may focus on developing relevant infrastructure to prevent such accidents and provide relief in case such untoward incident happens. The said step will be apart from other measures suggested by the Committee.

### **Compliance of recommendations for remedial action**

11. We find that it is necessary to require an action taken report to be filed by the Chief Secretary, Gujarat who may hold a joint meeting with District Magistrate, Bharuch, the Director Industrial, Safety, the Member Secretary, State PCB and the GIDC within one month. The Chief Secretary may ensure that all the remedial measures have been adopted in terms of the report and file an action taken report within three months with the Tribunal by e-mail at [judicial-ngt@gov.in](mailto:judicial-ngt@gov.in) preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF. The Chief Secretary, Gujarat may also issue instructions for requisite safety measures for all other industrial units in the State having potential for such accidents. The action taken report may include status of risk-policies taken by the industries to cover health and safety risks of persons engaged or likely to be affected and compliance of 1989 and 1996 Rules. The action taken report may also mention the remedial measures taken in respect of 11 other units mentioned in the report viz:-

1. Air Liquid India Holding Pvt Ltd.
2. Cheme Organic Chemicals
3. Galaxy Surfactants Ltd.
4. J M Hubar India Pvt Ltd.
5. Klg Organic Ltd.
6. Lanxess India Pvt Ltd.
7. Panoli Intermediate (India) Pvt. Ltd.
8. Saint Gobain Glass India Ltd.
9. Shriram Alkali & Chemicals (A unit of Dcm Shriram Consolidated) Ltd.
10. Upl Ltd. (Unit-5)
11. Vardhman Acrylics Ltd.

12. We also direct CPCB and MoEF&CC in coordination with other concerned authorities to consider issuing appropriate guidelines for conducting safety audits and taking other remedial measures throughout India in the light of present report as well as other recent reports in

respect of industrial accidents so as to prevent such incidents and to save human lives and health.

13. We place on record our appreciation for the task executed by the Committee. CPCB may convey this observation to the members of the Committee. The report of the Committee may be placed on websites of the State PCB and the CPCB for purpose of reference for six months.

The application is disposed of except for considering the action taken report which may be filed in pursuance of the above order.

The same may be put up for consideration on 09.11.2021.

A copy of this order be forwarded to the Chief Secretary, Gujarat, the District Magistrate, Bharuch, the Director Industrial, Safety, the Member Secretary, State PCB, the GIDC, MoEF&CC and the CPCB by e-mail for compliance.

Adarsh Kumar Goel, CP

Sudhir Agarwal, JM

M. Sathyanarayanan, JM

Brijesh Sethi, JM

Dr. Nagin Nanda, EM

June 11, 2021  
Original Application No. 60/2021  
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**Minutes of the Meeting held on 30<sup>th</sup> June 2021 at 15:45 under the Chairmanship of Shri Anil Mukim IAS, Chief Secretary, Government of Gujarat.**

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**Agenda:** To take stock of the situation with respect to implementation of directions and statutory provisions to ensure safety and to issue directions to the concerned authorities as may be found necessary.

**Reference:** Hon'ble NGT order dated 11.06.2021 in the matter of O.A. No. 60/2021.

**Date & Time:** 30<sup>th</sup> June, 2021 at 15.45 Hrs.

**Venue:** Committee Room, Office of the Chief Secretary, 5th Floor, Block No. 1, Sachivalaya, Gandhinagar.

**Key Attendees:** 1) Shri Sanjeev Kumar, IAS, Chairman, Gujarat Pollution Control Board  
2) Shri M. Thennarasan, IAS, Vice Chairman and Managing Director, GIDC  
3) Dr.M.D.Modiya, IAS, Collector and District Magistrate, Bharuch  
(through video conference)  
4) Shri A. V. Shah, Member Secretary, GPCB Gandhinagar.  
5) Shri P. M. Shah, Director, Industrial Safety & Health, Ahmedabad.

At the outset, Shri A. V. Shah, Member Secretary, Gujarat Pollution Control Board (GPCB), Gandhinagar welcomed all officers present in the meeting and briefed about accident (blast followed by fire) that occurred in CM-257 Plant of M/s UPL (Unit-5), GIDC, Jhagadia, on 23/2/2021 and Suo-motu cognizance taken by Hon'ble NGT.

He made a presentation describing: (1) Order of Hon'ble NGT wherein four member committee comprising of CPCB, GPCB, DISH & DM-Bharuch has been constituted. This committee has to submit its report within one month from date of order in pursuance of this order dated 25/02/2021. Committee has visited site twice and submitted its report on 17/04/2021. (2) Hon'ble NGT has disposed the matter on 11/06/2021. As directed by Hon'ble NGT Chief Secretary to hold a joint meeting with DM-Bharuch, the Director Industrial Safety, the MS-GPCB and the GIDC within one month and to ensure all the remedial measures be adopted as per report. Action Taken Report (ATR) required to be filed within 03 months. Next date of hearing is 09/11/2021 for consideration of ATR only.

The details of the presentations and discussion that took place in the meeting are as follows:

**1) Director, Industrial Safety and Health (DISH) :**

- To make a panel of Safety Auditors to inspect the factory twice in a year and submit their report to DISH. Safety Auditors be made answerable to Govt.
- To approach concerned for amendment in the Rules - New and existing industries and isolated storage must be checked through accredited safety auditor and its report and recommendation to be implemented in specified time period.
- Implementation of guidelines for Chemical disasters issued by National Disaster Management Authority (NDMA) of the GOI, adoption of preventive and mitigation strategies.
- Improve emergency preparedness, efforts to predict occurrence of disaster.

- Appointment of adequate manpower and training of DISH officers.

While discussing regarding “amendment in the Rules for the purpose of auditing the safety for new and existing industries”, Shri P.M. Shah, Director-DISH informed that change of rules falls under the jurisdiction of Ministry of Labor and Employment, New Delhi. Hence, Chief Secretary asked the Director- DISH to write a letter to the Ministry of Labor and Employment, New Delhi seeking required changes in the Rule.

## **2) District Magistrate(DM)-Bharuch**

- Implementation of Local Crisis Group and District Crisis Group. Mock drill to be conducted in every industrial clusters.
- Surprise visit of factories by District Crisis Group – once in 3 month
- Submit report to State Crisis Group.
- Provision of Emergency Response Center/Disaster Management Center / Hospital (chemical burns & injuries).
- Provision should be made in Rules for the breach with regard to non-informing immediately or within 48 hrs.

The Chief Secretary asked Dr. M.D.Modiya, District Collector Bharuch about status of Local Crisis Group and District Crisis Group, mock drill, Emergency Response Center. District Collector, Bharuch informed that these facilities are ongoing. Hence, Chief Secretary asked District Collector to send a report showing compliance status of the directions of Hon’ble NGT with the DISH.

## **3). Gujarat Industrial Development Corporation (GIDC):**

- To establish Health care facility and Disaster Prevention and Mitigation Centre (DPMC) well equipped with :
  - Control room, fire & safety equipment, trained staff deployed round the clock in Jhagadia GIDC, well equipped with at least Four Water-cum-foam fire tenders and two HAZMAT vehicles to combat Chlorine and other toxic gas release.
  - A common water reservoir of adequate capacity with an advanced pumping system.
- Review of fire fighting system.

The Chief Secretary asked VC and MD of GIDC to facilitate advance firefighting facilities at GIDC, Jhagadia and to establish Disaster Prevention and Mitigation Centre (DPMC) with modern infrastructure. He further informed to take action in this regard along with providing a common reservoir with advance pumping system for firefighting and designate it for this special purpose.

It was further decided that GIDC shall enter upon MOU with the Seva Rural Trust Hospital for facilitating primary treatment and Jayaben Modi Hospital-Ankleshwar for treatment of severe cases. GIDC shall make payment to the hospitals and will recover from the concerned industrial units.

#### 4). Gujarat Pollution Control Board (GPCB):

- Installation of CAAQMS at Jhagadia.
- Assess cost of restoration of environment to be recovered from company.
  - Total EDC due to accident at UPL (U-5) is calculated as Rs. 219.71 lakh as per Hon'ble NGT order.
  - GPCB levied EDC of 1 Crs.
  - UPL (U-5) has to credit the amount in separate account.
  - This amount to be spent on restoration of environment by preparing an action plan to be approved by the GPCB and the CPCB.

Regarding Environmental damage and its compensation due to any adversities/accidents in the industrial unit, Chief Secretary asked MS, GPCB to implement the direction accordingly.

#### After deliberation on issues following decisions were taken:

1. Director- DISH will write a letter to the Ministry of Labour and Employment, New Delhi seeking required change in the Rules for inclusion of provisions that new and existing industries and isolated storage must be checked through accredited safety auditor and its report and recommendation to be implemented in specified time period.
2. District Collector shall send a report showing compliance status of the direction of Hon'ble NGT to the DISH.
3. GIDC shall upgrade inadequate fire-fighting facilities at GIDC, Jhagadia and to establish Disaster Prevention and Mitigation Centre (DPMC) with modern infrastructure, to take action in this regard along with facilitating a common reservoir with advance pumping system for fire-fighting and designated it for this special purpose.
4. GIDC shall enter upon MOU with the Seva Rural Trust Hospital for facilitating primary treatment and Jayaben Modi Hospital- Ankleshwar for treatment of severe cases. GIDC shall make payment to the hospitals and will recover from the concerned industrial units.
5. As per the directions GPCB shall ask industry for payment of Environment Damage Compensation.
6. Nodal officer of compilation of an Action Taken report will be DISH and all the concerned departments shall submit compliance report of relevant directions narrated in order to DISH by 31/07/2021 and DISH shall prepare an ATR which will be submitted to Hon'ble Chief Secretary by 14/08/2021.

The meeting was concluded with vote of thanks to the Chair.

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**Action Taken Report of Director Industrial Safety and Health on  
NGT O.A. No. 60/2021**

Sr. No.	Action required to be taken	Action Taken
1	<p>Make a panel of safety auditors to inspect the factory independently twice in a year and they should submit their report directly to DISH. The safety auditor should be made answerable to the Govt. To amend the rule as below:</p> <ul style="list-style-type: none"> <li>➤ The occupiers of both the new and existing industrial activities and isolated storage must be checked by the Govt. through the safety auditor which is accredited by an accreditation board to be constituted by the Ministry of labor, Government of India.</li> <li>➤ The auditor within 30 days of audit shall send their report to the chief inspector with respect to the audit recommendations and which shall be examined by the government within a period of 1 Month and the industry shall be directed to carry out within the period specified the recommendation that may be made by the government in this behalf.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Letter has been written to Hon'ble Secretary, Ministry of Labour and Employment, GOI by Principal Secretary, Labour and Employment, GoG on dated 18<sup>th</sup> September 2021 vide letter No.FAC/142021/1956/M.3 (copy attached here with in Annexure- A )</li> <li>➤ Letter has been written to Director General Factory Advice Service and Labour Institute, Mumbai by Principal Secretary, Labour and Employment, GOG on dated 18<sup>th</sup> September 2021 vide letter No.FAC/142021/1957/M.3 (copy attached here with in Annexure- B )</li> <li>➤ Letter has been written to Director General Factory Advice Service and Labour Institute, Central Labour Institute, Government of India by DISH on dated 22<sup>nd</sup> July 2021 vide letter No. DISH/H-Safety /2021/253. (copy attached here with in Annexure- C)</li> </ul>
2	Implementation of guidelines for Chemical disasters issued by National Disaster Management Authority (NDMA) of the GOI.	Bharuch District Off Site Emergency Plan has been prepared as per the NDMA guideline, Off Site Emergency Plan updated date October, 2019.
3	Improve emergency preparedness at all levels, substantial efforts are still required to predict the occurrence of disaster.	Information given in Annexure – D attached here with.
4	Effective implementation of Chemical Disaster Management. (CDM) by adoption of preventive and mitigation strategies.	information given in Annexure – D attached here with.
5	Importance to be given to statutory inspection, safety audit and testing of emergency plan, onsite emergency plan, information on chemical, technical information.	Information given in Annexure – D attached here with.
6	Appointment of adequate manpower as well as other staff considering the number of industries in the area so as to effectively monitor the manufacturing units.	Recruitment process is under progress by Government of Gujarat.
7	Proper training should be imparted to the officers of DISH.	Training is being given to the Officers as and when require.

*Anju Sharma, IAS*  
Principal Secretary



FAC/142021/1956/M3  
Labour & Employment Department  
Government of Gujarat

Date: 18/09/2021

Subject: Regarding Point No.8 direction of Hon'ble NGT in the matter of O.A. No. 60/2021 dated 11/6/2021

Respected Sir,

With reference to above subject, Hon'ble NGT (Principal Bench), New Delhi had ordered various directions in the matter of United Phosphorus Ltd, Jagadia, Dist-Bharuch, Gujarat in the matter of O.A. No.60/2021 dated 11/6/2021. One of the direction is regarding safety audit point no.8 at page No. 31.

Hon'ble NGT has directed that "For the purpose of auditing the safety auditors to inspect factory independently twice in a year and they should submit their report directly to Director Industrial Safety and Health."

Hon'ble Tribunal directed that sub rule (9) of Rule 68(J) of the Gujarat Factories Rules, 1963, refers to safety report and safety audit reports, under that rule sub rule 2 gives a choice to industry to select the auditor for the purpose of the safety audit. Copy of the Rule 68(J) 9 is enclosed here with and marked as **Annexure - 1**.

The occupier, within thirty days of the completion of the audit, shall send a report to the Chief Inspector with respect to the implementation of the audit recommendations.

In the said order Hon'ble NGT recommended as per sub rule 9(2) industrial unit shall arrange to carry out safety audit by an empaneled agency. As per the rules such agency is required to be accredited by an Accreditation Board to be constituted by the Ministry of Labour, Government of India, in this behalf.

I would therefore request you to kindly direct the concerned to make available the list of safety auditors empaneled by the Government of India so that the honorable court's direction can be carried out.

Best regards

(Anju Sharma)

Encl: as above

To,

Shri. Apurava Chandra IAS  
The Secretary,  
Ministry of Labour and Employment  
Government of India  
Shram Shakti Bhawan,  
Rafi Marg, New Delhi

## Annexure -1

Rule 68-J (9) is reproduced as under:

(9) *Safety Reports and Safety Audit Reports.:-*

(1) *Subject to the following clause of this sub-rule, an occupier shall not undertake any industrial activity or isolated storage to which this sub-rule applies, unless he has prepared a safety reports on that industrial activity containing the information specified in Schedule 7 and has sent a copy of that report to the Chief Inspector at least ninety days before commencing that activity.*

(2) *After the commencement of these rules, the occupiers of both the new and the existing industrial activities or isolated storage shall arrange to carry out safety audit by a competent agency to be accredited by an Accreditation Board to be constituted by the Ministry of Labour, Government of India in this behalf.*

*Further, such auditing shall be carried as under:-*

*(a) internally once in a year by a team of suitable plant personnel;*

*(b) externally once in two years by a competent agency accredited in this behalf;*

*(c) in the year when an external audit is carried out, internal audit need not be carried out;*

(3) *The occupier, within thirty days of the completion of the audit, shall send a report to the Chief Inspector with respect to the implementation of the audit recommendations.*

*Anju Sharma, IAS*  
Principal Secretary



FAC/142021/1957/M 3  
Labour & Employment Department  
Government of Gujarat

Date: 18/09/2021

Subject: Regarding Point No.8 direction of Hon'ble NGT in the matter of O.A. No. 60/2021 dated 11/6/2021

*Dear Shri Elangovan*

In continuation with the letter dated 22/07/2021 written by Director Industrial Safety & Health (DISH) to you regarding the above subject, It is submitted that Hon'ble NGT (Principal Bench), New Delhi had ordered various directions in the matter of United Phosphorus Ltd., Jagadia, Dist-Bharuch, Gujarat in the matter of O.A. No.60/2021 dated 11/6/2021. One of the direction is regarding safety audit point no.8 at page No. 31.

Hon'ble NGT has directed that "For the purpose of auditing the safety auditors to inspect factory independently twice in a year and they should submit their report directly to Director Industrial Safety and Health."

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In the said order Hon'ble NGT recommended as per sub rule 9(2) industrial unit shall arrange to carry out safety audit by an empaneled agency. As per the rules such agency is required to be accredited by an Accreditation Board to be constituted by the Ministry of Labour, Government of India, in this behalf.

Kindly provide information / resolution/ notification regarding the list of accredited safety auditors to us so that necessary action can be taken at our end.

*Best regards*

*Anju Sharma*  
(Anju Sharma)

Encl: as above

To,

Dr Elangovan,  
Director General  
Directorate General Factory Advice Service & Labour Institutes,  
Vyavasayik Suraksha aur Swasthya Bhavan,  
N. S. Mankikar Marg, Sion,  
Mumbai- 400 022

### **Annexure -1**

*Rule 68-J (9) is reproduced as under:*

**(9) Safety Reports and Safety Audit Reports.:-**

**(1)** *Subject to the following clause of this sub-rule, an occupier shall not undertake any industrial activity or isolated storage to which this sub-rule applies, unless he has prepared a safety reports on that industrial activity containing the information specified in Schedule 7 and has sent a copy of that report to the Chief Inspector at least ninety days before commencing that activity.*

**(2)** *After the commencement of these rules, the occupiers of both the new and the existing industrial activities or isolated storage shall arrange to carry out safety audit by a competent agency to be accredited by an Accreditation Board to be constituted by the Ministry of Labour, Government of India in this behalf.*

*Further, such auditing shall be carried as under:-*

*(a) internally once in a year by a team of suitable plant personnel;*

*(b) externally once in two years by a competent agency accredited in this behalf;*

*(c) in the year when an external audit is carried out, internal audit need not be carried out;*

**(3)** *The occupier, within thirty days of the completion of the audit, shall send a report to the Chief Inspector with respect to the implementation of the audit recommendations.*



**Directorate Industrial Safety & Health, Gujarat State**

3<sup>rd</sup>, 5<sup>th</sup> Floor, Shram Bhavan, Near Gun House,  
Rustom Cama Marg, Khanpur, Ahmedabad-380001  
Phone : 079- 25502346, 25502349; Fax: 079- 25502357;  
E-mail: [dish-ahd@gujarat.gov.in](mailto:dish-ahd@gujarat.gov.in)

No.DISH/ H-Safety / 2021/253

Date: 22 /07 /2021

To  
Director General  
Directorate General Factory Advice Service & Labour Institutes,  
Vyavasayik Suraksha aur Swasthya Bhavan,  
N. S. Mankikar Marg, Sion,  
Mumbai- 400 022

**Subject: Regarding Point No.8 direction of Hon'ble NGT in the matter  
of O.A. No. 60/2021 dated 11/6/2021**

Respected Sir,

With reference to above subject, Hon'ble NGT (Principal Bench), New Delhi had ordered various directions in the matter of UPL, Jagadia, Dist-Bharuch, Gujarat in the matter of O.A. No.60/2021 dated 11/6/2021. One of the direction is regarding safety audit point no.8 at page No. 31.

Hon'ble NGT has directed that "For the purpose of auditing the safety auditors to inspect factory independently twice in a year and they should submit their report directly to Director Industrial Safety and Health."

Hon'ble Tribunal directed that sub rule (9) of Rule 68(J) of the GFR, 1963, refers to safety report and safety audit reports, under that rule sub rule 2 gives a choice to industry to select the auditor for the purpose of the safety audit.

Occupiers of industrial activities and isolated storage must be checked by the Government through the safety auditor which is accredited by an accreditation board to be constituted by the Ministry of Labour, Government of India.

*Rule 68-J (9) is reproduced as under:*

- (9) *Safety Reports and Safety Audit Reports.:-*
- (1) *Subject to the following clause of this sub-rule, an occupier shall not undertake any industrial activity or isolated storage to which this sub-rule applies, unless he has prepared a safety reports on that industrial activity containing the information specified in Schedule 7 and has sent a copy of that report to the Chief Inspector at least ninety days before commencing that activity.*
  - (2) *After the commencement of these rules, the occupiers of both the new and the existing industrial activities or isolated storage shall arrange to carry out safety audit by a competent agency to be accredited by an Accreditation Board to be*

*constituted by the Ministry of Labour, Government of India in this behalf.*

*Further, such auditing shall be carried as under:-*

- (a) internally once in a year by a team of suitable plant personnel;*
  - (b) externally once in two years by a competent agency accredited in this behalf;*
  - (c) in the year when an external audit is carried out, internal audit need not be carried out;*
- (3) *The occupier, within thirty days of the completion of the audit, shall send a report to the Chief Inspector with respect to the implementation of the audit recommendations.*

In the said order Hon'ble NGT recommended as per sub rule 9(2) industrial unit shall arrange to carry out safety audit by a paneled agency to be accredited by an Accreditation Board to be constituted by the Ministry of Labour, Government of India, in this behalf.

You are requested to kindly provide information / resolution/ notification regarding whether Accreditation Board is constituted by GOI, Ministry of Labour, New Delhi. Also provide list of accredited safety auditors.

**Sd/-**

(P.M. Shah)  
Director

Industrial Safety & Health  
Gujarat State, Ahmedabad

**Annexure - D**

**District** : **Bharuch**  
**Offsite emergency plan updated Date** : **October-2019**  
**Off site emergency Mock Drill Date** : **20/10/2020**  
**State Crisis Plan updated** : **2016**

No.	Name of Factory with Address	Hazardous Chemical	Date of On Site Emergency Plan	Date of last Mock drill Conducted	HAZOP Study Report / Risk Assessment	Third party safety Audit	Date of inspection by DISH
1.	Air Liquid India Holding Pvt. Ltd., Plot no. 38/1, G IDC, Jhagadiya, Di. Bharuch	Liquid Oxygen Liquid Nitrogen H2 Gas	31/07/21	03/07/21	March-2021	March-2021	27/01/21
2.	Cheme Organic Chemicals, plot no. 758, GIDC Estate, Jhagadiya, Dist- Bharuch	Chlorine Benzene	Apr-2020	09-05-2021	Nov-20	May-2021	29/06/21
3.	Galaxy Surfactans Ltd. 892, GIDC, Jhagadiya, Dist- Bharuch	Ethylene Oxide	25-11-2019	30/03/21	Dec-20	Aug-2020	20/04/21
4.	J M Hubar India Pvt. Ltd., 754, GIDC Estate, Jhagadiya, Dist- Bharuch	This factory has removed from MAH category from 2017					
5.	KLJ Organic Ltd., Plot no. 759, GIDC Estate, Jhagadiya, Dist- Bharuch	Chlorine	May-2020	22-12-2020	March-21	Sep-2020	06/08/20
6.	Lanxess India Pvt. Ltd., 748/2/A, 748/3, 748/4/A & B GIDC Estate, Jhagadiya, Dist- Bharuch	Acrylonitrile Oleum (So3)	24-2-2021	21-09-2020	07/07/21	16-06-2020	2/03/21
7.	Panoli Intermediates (India) Pvt. Ltd., Plot no. 778/1 GIDC Estate, Jhagadiya, Dist- Bharuch	Chlorine Aniline	April-2020	17-04/2021	Oct-15	Sep-2019	06/08/20
8.	Sant Gobain Glass India Ltd., 33, GIDC, Jhagadiya, Dist- Bharuch	LPG	30-04-2021	02/07/21	Dec-20	Oct-2020	30/04/21
	Shriram Alkali & Chemicas (A unit of CCM shriram Consolidated) Ltd. 749, GIDC Estate, Jhagadiya, Dist- Bharuch	Chlorine Hydrogen	15-06-2020	15-02-2021	05/08/21	Jan-2021	21/06/21
10.	UPL Ltd ( Unit-5) 750, GIDC Estate, Jhagadiya, Dist- Bharuch	Chlorine Carbon Disulphide Etylene Oxide Acrylonitrile	Nov-2020	28-06-2021	14/06/21	Nov-2020	05/03/21
11.	Vardhman Acrylics Ltd. 755, GIDC Estate, Jhagadiya, Dist- Bharuch	Acrylonitrile Sodium Chlorate Vinyle Acetate Monomer	01-09-2020	26-6-2021	Feb-2021	Nov-2020	29/06/21

**Action Taken Report (ATR) of District Magistrate-Bharuch as per the Hon. National Green Tribunal order dt: 11.06.2021 in the O.A. No. 60/2021**

This action taken report (ATR) has been prepared pursuant to the decision taken in the meeting held 30.06.2021 under the chairmanship of Hon. Chief Secretary, Gujarat, with regard to the case - order dt: 11.06.2021 in O.A. No. 60/2021, in the Hon. National Green Tribunal. Based on the discussion points of the above said meeting the concerned district-level authorities have submitted action taken report pertaining to their respective area of work. After a review of the details received from the concerned authorities, the final Action Taken Report has been prepared, which is depicted in the table below:

Sr. No.	Actions required to be taken	Actions taken/comments
1	Implementation of Local Crisis Group in all Industrial Zone/SEZ	As per provisions of the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996, There are four local crisis groups framed in Bharuch District. (1) Ankleshvar-Hansot local crisis group (2) Jhaghadia-Valia local crisis group (3) Bharuch-Vagra local crisis group (4) Jambusar-Amod local crisis group
2	Surprise visit by District Crisis Group to the factories at least once in a quarter and check the operation of factories.	District Crisis Group in Bharuch arranges mock drill in any of the MAH units of district every year as per provisions of the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996. During every drill District Crisis Group visits the factory in which drill is being conducted. After the drill comments are being obtained from members of District Crisis Group for further improvements. Now onwards the order (Annexure - 1) to visit factories at least once in a quarter is issued to members of District Crisis Group.
3	Visit report should be submitted to State Crisis Group.	On receipt of visit report mentioned in above stated order, it will be forwarded at every quarter.
4	Rule to have provision for the breach with regard to non-informing immediately or within 48 hrs.	The breach of Provisions under Rule-103 of Gujarat Factories Rules-1963 are filed with regard to non-informing immediately or within 48 hours by local DISH office in honourable court. (Total 3 no. of breaches is filed during year 2020 and 2021 till date)

Sr. No.	Actions required to be taken	Actions taken/comments
5	Undertake mock drill under off site emergency plan and crisis management in every industrial cluster or SEZ	Reports of last mock drills of each group (District Crisis Group and Local Crisis Groups of District) are attached herewith (Annexure - 2) for perusal please.
6	Review of fire load of individual industries and firefighting facility provided may need to be carried out by the concerned authority considering IS13039:2014.	<p>Firefighting facilities as per section-38 of the Factories Act-1948 and as per Rule-66 &amp; 66-A of Gujarat Factories Rules-1963 are being observed at the time of plan approval/ inspections / accident investigations under factories act. The breach of Provisions under above mentioned provisions are filed with regard to non-compliance by local DISH office in honourable court (Total 3 no. of breaches are filed during year 2019, 2020 and 2021 till date).</p> <p>More details relating to these could be given by concerned Fire Officers/ Chief Fire Officer.</p>
7	Installation of Continuous Ambient Air Quality Monitoring Station (CAAQMS) at Jhagadia.	The process for installation of CAAQMS has been initiated by GPCB-Gandhinagar following due procedure which includes (1) Technical Specifications (2) Financial Cost and (3) Comprehensive Maintenance Cost. Selection of location of the station shall be done in co-ordination with GPCB & GIDC
8	Assess cost of restoration of environment to be recovered from company.	<p>The total cost of Environmental Damage Compensation due to accident at UPL (Unit-5) is assessed and calculated as Rs. 219.71 lakh.</p> <p>As per Hon'ble NGT order dated 11/06/2021 "the compensation for damage to environment and the same may be credited to a separate account by the industrial unit for being spent on restoration of the environment by preparing an action plan, to be approved by the State PCB and the CPCB. The Plan may focused on developing relevant infrastructure to prevent such accidents and provide relief in case such untoward incident happens".</p> <p>i. UPL (Unit-5) has to been asked to credit the amount in separate account.</p> <p>ii. The action plan is being prepared by UPL (Unit-5)</p>

Sr. No.	Actions required to be taken	Actions taken/comments
		The unit has already been informed for the compliance of the directions of Hon'ble NGT on 26/07/2021, w.r.t. the points i & ii above.
9	Provision of hospital in an industrial zone or SEZ having facility for chemical burns and injuries arising out of accident on account of hazardous materials	<u>Health Care Facilities</u> MOU is signed with Smt. Jayaben Modi Hospital for the treatments of patients having burn and injuries due to industrial accidents. The MOU has been executed on 14/07/2021. (Copy is attached herewith as Annexure - 3).
10	Provision of Emergency Response Centre/ Disaster management centers	To get Assistance under Assistance for Industrial Infrastructure scheme of Industries Commissioner for Fire Fighting facilities, Notified Area Authority has prepared the proposal under All scheme and submitted the online application to the IC on dated 15/07/2021.



District Magistrate  
&  
Collector Bharuch

COLLECTOR OFFICE  
DISTRICT EMERGENCY OPERATION CENTRE  
B/H - TREASURY OFFICE-BHARUCH  
PH.NO 02642-242300 FAX NO 02642251900  
Dismgmt-bha@gujarat.gov.in

Annexure-1

ક્રમાંક : ડીઆસ્ટર/વશી/૨૭૨૦

તા. ૨૩/૦૮/૨૦૨૨

વંચાણે લીધો:

(૧) નામદાર નેશનલ ગ્રીન ટ્રિબ્યુનલના ઓરિજિનલ એપ્લિકેશન નં ૬૦/૨૦૨૧, તા. ૧૧-૦૬-૨૦૨૧

હુકમ :

ઝગડીયા જી.આઇ.ડી.સી ખાતે આવેલ યુ.પી.એલ કંપનીના પ્લાન્ટમાં તા. ૨૩/૦૨/૨૦૨૧ ના રોજ બ્લાસ્ટ થયેલ હતો. જે અંતર્ગત નામદાર નેશનલ ગ્રીન ટ્રિબ્યુનલના ઓરિજિનલ એપ્લિકેશન નં ૬૦/૨૦૨૧, તા. ૧૧-૦૬-૨૦૨૧ના હુકમ અનુસાર કલેક્ટરશ્રી અને જિલ્લા મેજિસ્ટ્રેટશ્રી એ લેવાના થતા એક્સન્સમાં ડીસ્ટ્રિક્ટ કાઇસિસ ગ્રુપ દ્વારા દર ત્રણ માસેઓછામાં ઓછુ એક વાર જિલ્લાની ફેક્ટરીની સરપ્રાઇઝ વિઝિટ કરાવી વિઝિટ રિપોર્ટ સ્ટેટ કાઇસિસ ગ્રુપને સબમિટ કરવાનો થાય છે.

આથી ડીસ્ટ્રિક્ટ કાઇસિસ ગ્રુપના નીચે જણાવેલ મેમ્બર્સને દર ત્રણ માસે ઓછામાં ઓછુ એક વાર જિલ્લાની ફેક્ટરીની સરપ્રાઇઝ વિઝિટ ગોઠવી વિઝિટ રિપોર્ટ ડીસ્ટ્રિક્ટ કાઇસિસ ગ્રુપના મેમ્બર સેક્રેટરી તરીકે નાયબ નિયામક, ઓદ્યોગિક સલામતી અને સ્વાસ્થ્ય, ભરુચ ખાતે રજુ કરવા હુકમ કરવામાં આવે છે.

**Formation / Constitution of District Crises Group Bharuch.**

Sr.No	Designation	Role in District Crisis Group
1	District Collector & Divisional Magistrate, Bharuch	Chairman
2	Deputy Director, Industrial Safety & Health, Bharuch.	Member Secretary
3	Deputy Superintendent of Police, Bharuch	Member
4	Regional Officer, G.P.C.B. Bharuch	Member
5	Regional Officer, G.P.C.B. Ankleshwar, Dist: Bharuch	Member
6	Deputy Chief Controller of Explosives, PESO	Member
7	Chief District Health Officer, Bharuch	Member
8	S.D.M, Vagra, Dist: Bharuch	Member
9	S.D.M, Hasot, Dist: Bharuch	Member
10	S.D.M, Ankleshwar, Dist: Bharuch.	Member
11	S.D.M, Jambusar, Dist: Bharuch	Member
12	S.D.M, Jhagadiya, Dist: Bharuch	Member
13	Chief Officer, Nagarpalika Bharuch	Member
14	District Information Officer, Bharuch	Member
15	District Agriculture Officer, Bharuch	Member
16	Sp. Engineers, DCVCL, Bharuch	Member

17	R.T. O., Bharuch.	Member
18	D.P.M.C. Fire Station, Ankleshwar, Dist: Bharuch.	Member
19	District Project Officer, Bharuch	Member
20	Safety health and Environment Association-Trade Union Representative	Member
21	E.H.S Head, Jubilant Life Science, Vilayat. ( Members )	Member
21	E.H.S Head ,D.C.M. Shiram, Jhagadiya. ( Members )	Member
22	E.H.S Head, P.I. Industry, Jambusar. ( Members )	Member
23	E.H.S Head ,Lupin Ltd., Ankleshwar. ( Members )	Member
24	E.H.S Head, Birla Copper, Dahej, Ta: Vagra. ( Members )	Member
25	E.H.S Head, Atul Ltd., Ankleshwar. ( Members )	Member
26	E.H.S Head ,Reliance Industry Ltd., Dahej, Ta: Vagra. ( Members )	Member
27	E.H.S Head - GNFC Bharuch(expert) E.H.S Head- GACL Dahej (expert)	Member

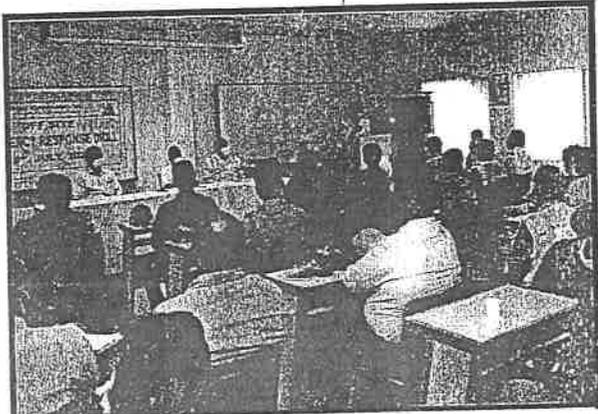
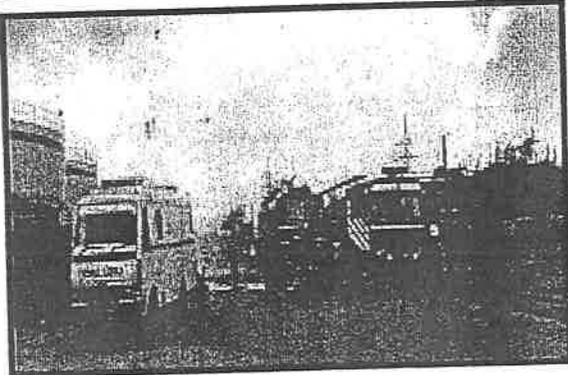
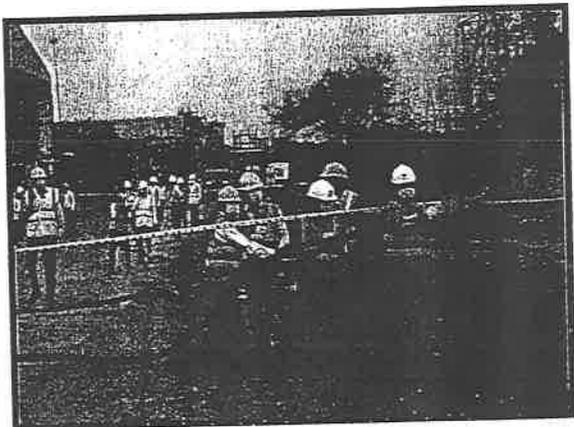
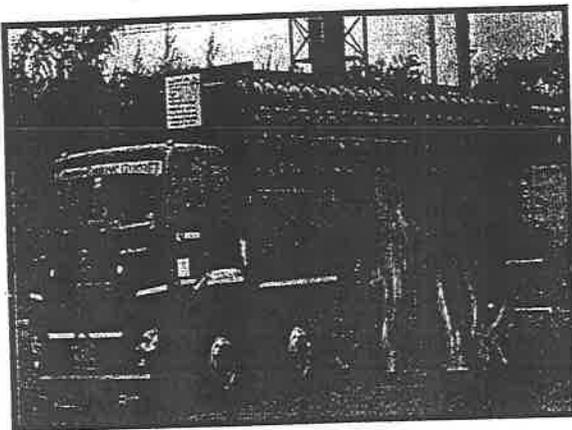
નાયબ નિયામક, ઓદ્યોગિક સલામતી અને સ્વાસ્થ્ય ,ભરુચે ડીસ્ટ્રિક્ટ કાઇસિસ ગ્રુપનો રિપોર્ટ સંકલિત કરી કલેક્ટર કચેરી ,ડિઝાસ્ટર શાખામાં રજુ કરવાનો રહેશે.



ડિસ્ટ્રિક્ટ કલેક્ટર અને જિલ્લા મેજિસ્ટ્રેટ  
તથા  
ચેરપર્સન ,ડીસ્ટ્રિક્ટ કાઇસિસ ગ્રુપ  
ભરુચ

Annexure-2

**Off Site Mock Exercise of Local Crisis  
Group (Jhagadia)**



AT:

DCM SHIRIRAM LIMITED (Unit: Shriram Alkali & Chemicals),  
Plot no: 749, GIDC Industrial estate, Jhagadia, Dist: Bharuch

On Date: 10.07.2020

## Off Site Mock Exercise of Hydrogen Fire (Industrial)

Situation of Offsite mock exercise: Fire in Hydrogen cylinder bank on truck in parking area near Material gate no.01

Sr.	Description	Details
1	Date & time	10.07.2020 & 11:00 am
2	Location	DCM Shriram Ltd.( Unit: Shriram Alkali & Chemicals) Plot no. 749, GIDC, Industrial Estate, Jhagadia, Dist: Bharuch
3	Scenario Considered	Fire in hydrogen cylinder bank truck
4	Incident details	Jet fire in Hydrogen cylinder bank truck Jet fire radiation intensity :37.5 kw/m <sup>2</sup> upto 11m ,4kw/m <sup>2</sup> upto 32m Wind Speed : 2 m/s Wind Direction : South West to North East Affected area : Material gate no. 01 nearby 100 M from plant boundary
5	Site Control Room	Emergency control centre near Main Entry gate DCM Shriram Ltd.( Unit: Shriram Alkali & Chemicals) Plot no. 749, GIDC, Industrial Estate, Jhagadia, Dist: Bharuch
6.	Local Control Room	Jhagadia industries association office Plot no. 763/1, GIDC industrial estate, Jhagadia, Dist: Bharuch Ph: 02645 -226000
7	Dist. Control Room	Disaster management centre ,Bharuch, near Dist. Collector office, Bharuch Tel. No. ; 1077 (02642) 242300, 240499, 240599,

## Line of actions

### **Industry**

- Tackle emergency with available resources (Fire tender, Fire fighting equipments with internal resources)
- Seek help of mutual aid group & local crisis group
- Inform emergency situation to DCG
- Medical treatment of affected person in plant premises
- Evacuation of plant persons
- Raising On-site , Off-site siren & all clear siren
- Work place and surrounding area monitoring inside plant premises

### **Mutual aid members**

- Tackle emergency in co-ordination with SMC
- Cordon downwind side area with water curtain
- Major fire emergency control with mutual aid fire fighting team – 4 fire tender reached at site for support( UPL-5, Lanxess, Vardhman, GIDC fire station)

### **Government Authority**

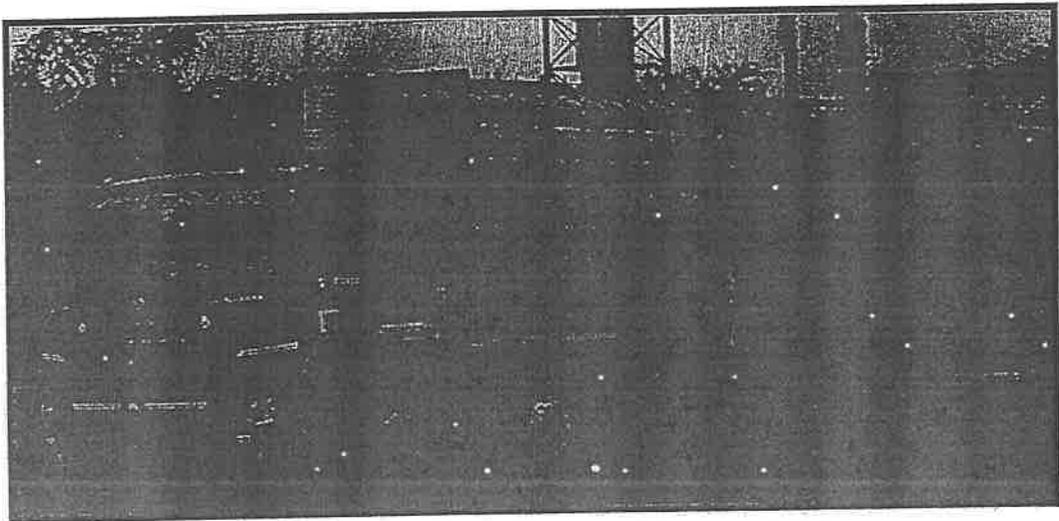
- Local Crisis Group (LCG – SDM, Jhagadia)-Mamaltadar, Jhagadia was representing SDM, Jhagadia during the exercise
- Declare Off-site emergency & co-ordinate with crisis group members
- Sub division PI and Local police – Traffic control
- Taluka Health Officer – Examine the affected persons for further treatment and advice
- GPCB, Ankleshwar, monitoring team - Monitor possible affected area
- SDM, Jhagadia & Ankleshwar -Evacuation of employees and from possible affected village/residential area, to safe area
- DISH – Update & discuss with LCG Chairman regarding the situation
- GIDC – Organise needful support from GIDC to mitigate fire

### OBSERVERS

<u>Location</u>	<u>Name of observers</u>
Offsite and Onsite ECC area	1. Mr. J C Trivedi & Mr. Archit Soni
Incident Site	2. Mr. Bhavesh Dashdiya
Incident Site	3. Mr. Nehal Raulji
OHC & Assembly point	4. Mr. Rajesh Jani
Traffic management	5. Mr. Bhavesh Panchal

### Observations:

<u>Time</u>	<u>Activity observed</u>
11:00	Security guard observed fire in hydrogen cylinder bank in truck at Material gate no. 01 area.



11:02	Security guard and team used fire extinguishers for control the fire
11:03	Security guard informed to Fire dept (Ext. 200) for further help and required fire tender
11:05	Shift In charge reached the site and information collected for fire incident.

He (**incident informer**) immediately announced the fire incident through PA system by using telephone.

11:06 Shift in charge informed to VP Works & HOU (**Site Main Controller**) and Mr. Sunit Gupta (**Incident Controller**) regarding the incident.

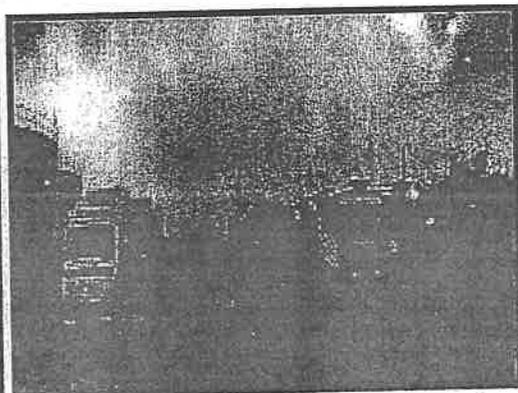
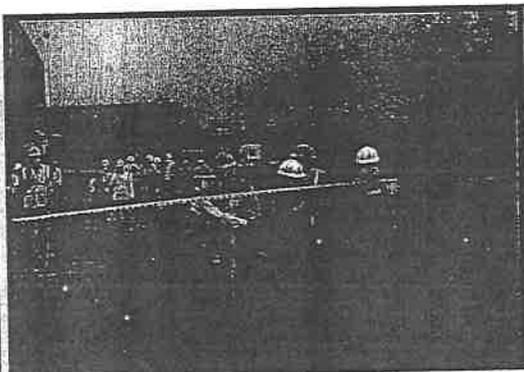
11:06 Shift in charge declared emergency and also informed main gate security officer regarding the incident.

11:07 Two sirens blown for 30 second each.

11:06 Fire & Security in-charge Capt. Rohit Mishra with Security officer immediately rushed to site with fire tender.

11:06 Mr. Sunit Gupta reached the incident site and he took over the position of incident controller.

11:07 Emergency Response team reached at site and started fire mitigation with help of fire tender.



11:08

Site main controller reached at main plant control room for further guidance. He asked shift engineer control room to see the water pressure of fire hydrant is min. 7 kg/cm<sup>2</sup>.

11:06

Fire water started from fire tender for extinguishing the Fire and cooling the cylinders.

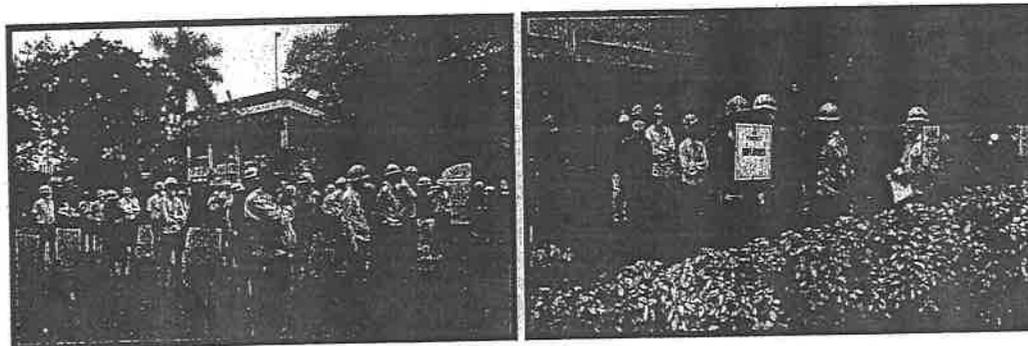
11:07

Mr. Sunit Gupta told shift eng. to stop all works and permits, also told to communicate the same through PA system.

ERT team reached for rescue operation at incident place , area barricading at incident place.

11:08

Shift In Charge in-turn announced about the incident & asked the employees (who are not assigned any responsibility as per on-site emergency plan) to proceed to assembly point no. 3 near power plant.



11:08

Trucks & tankers movement was stopped at the material gate & all the drivers and cleaners were asked to move to assembly point no. 4

Site situation periodically updated to site main controller by incident controller

HOD- Mechanical reached along with his team for support to incident controller .

HOD- Civil reached along with his team member for support to incident controller for storm water drain blocking and contaminated water recovery in system.

11:10

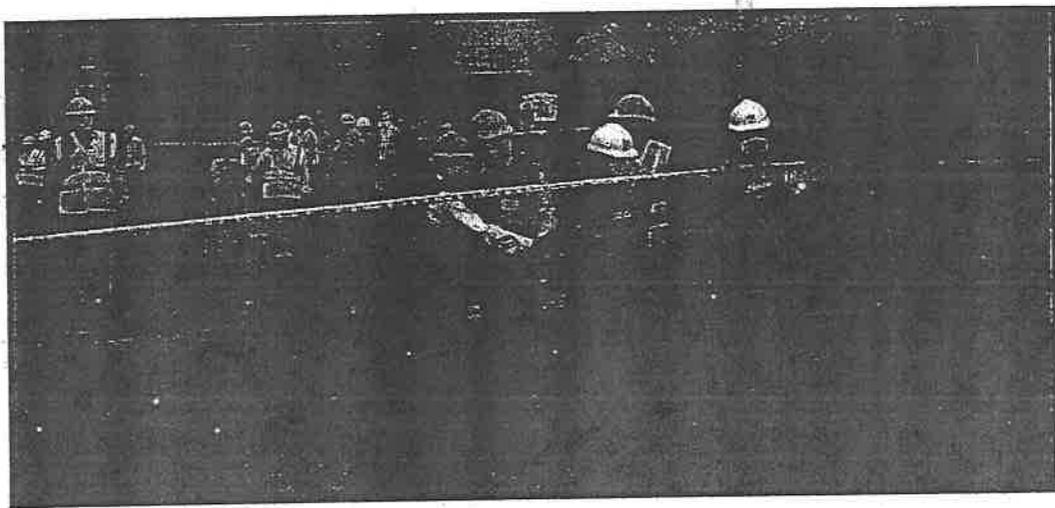
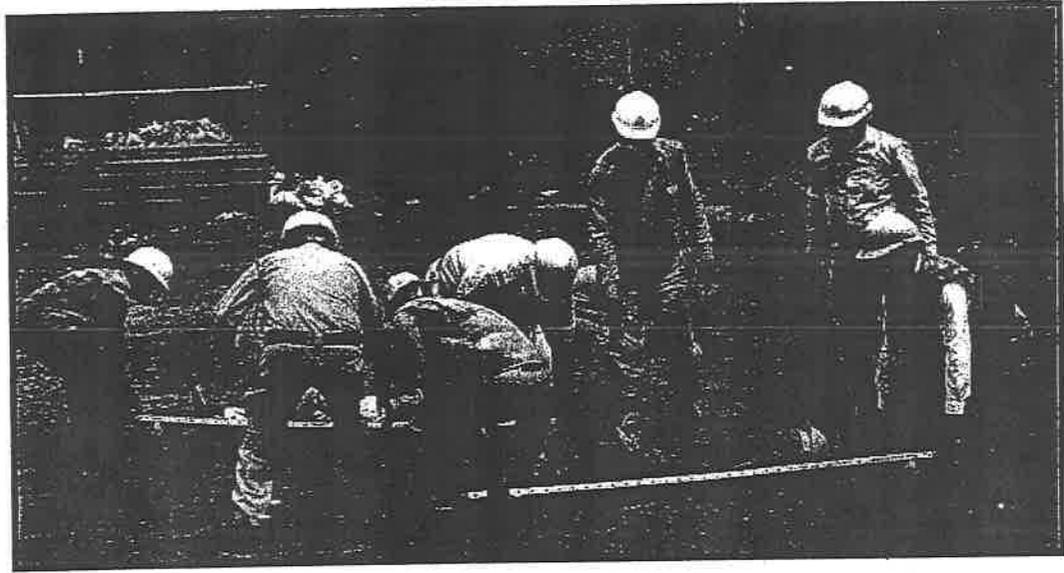
Fire propagated to nearby two tanker and it is out of control.

11:11

Incident controller Mr. Sunit Gupta informed to Site main controller for required further help of mutual aid due to fire not control with our fire fighting equipments.

11:12

Two persons reported for minor burn on his body, referred through ambulance at OHC for primary treatment.



11:13

Site main controller informed to LCG Chairman Incharge (Shri J.A. Rajbanshi, Mamlatadar, Jhagadia) through telephone and incident brief and required support for emergency control.

11:13

HOD- EHS informed to Mutual aid member for emergency support for fire tender.

11:13

HOD- EHS update to Site main controller for new development of unsafe condition

HOD- EHS summarized the work place area monitoring data and updated to site main controller



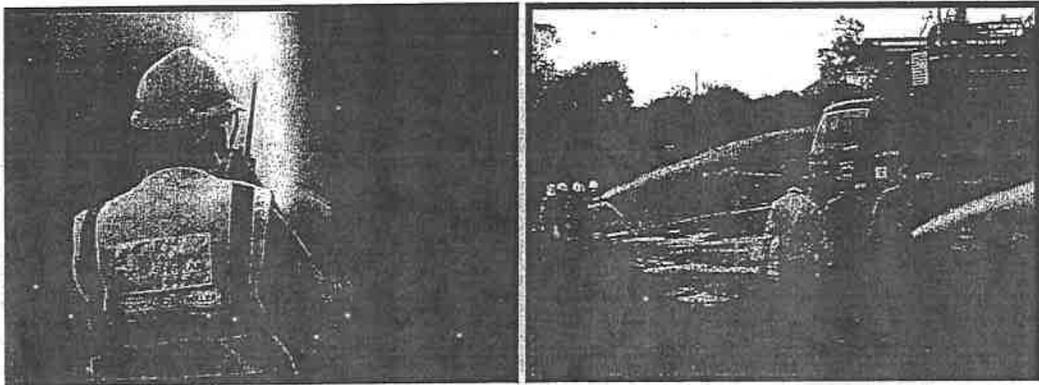
11:15

HOD- (Security & Admn.) – control traffic movement for inside and also help to police dept for outside.

HOD- (Security & Admn.) – Head counting at assembly point and report to incident controller.

Security guard guided emergency service vehicle to reach at incident place.

Ensured the fire hydrant pump are working condition and water level of reservoir



11:15

HOD- QAD – Water analysis of storm drain surrounding area

11:12

HOD- Electrical - Ensure power supply for the fire hydrant pump

11:12

HOD- IR - All external communication in consultation with SMC like: Corporate office, issue or public statement, media statement

Receive and meet important visitors and government officers

11:15

LCG team with SDM and other government authority reached at site and seat at LCG Control room -Jhagadia industrial association office,

LCG Chairman (SDM) took charge for Site main controller for offsite emergency  
SDM informed to LCG various committee member for support during off site emergency in major fire. He informed to various resources nearby industries regarding medical treatment, emergency service.

Police Inspector came at site and controlled the traffic at surrounding area and rescued non essential persons by shifting through Bus to near shelter area.

DISH office representative came at site and collected information regarding incident.

11:20

GPCB RO representative started work place area monitoring and reported to SDM.



11:30

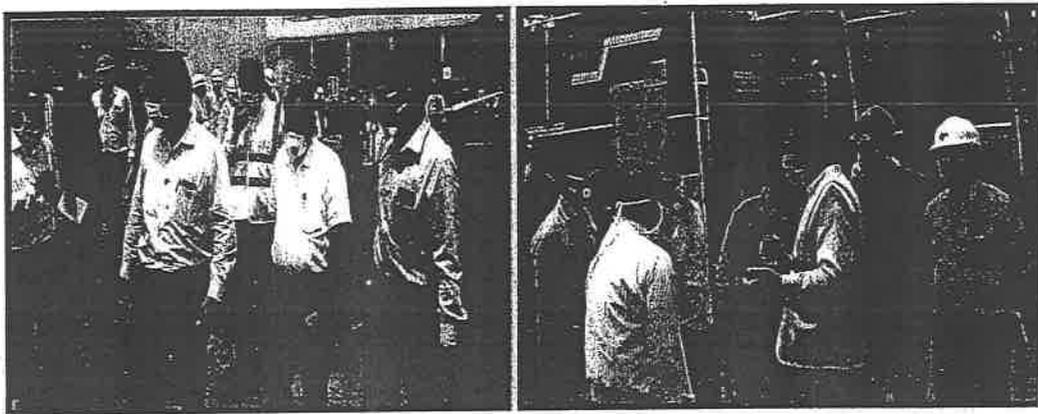
Mutual aid industries fire service reached at site and help for fire fighting at incident place

11:35

UPL-5, Lanxess , Vardhman, GIDC, Fire service reached at site and help for fire fighting.

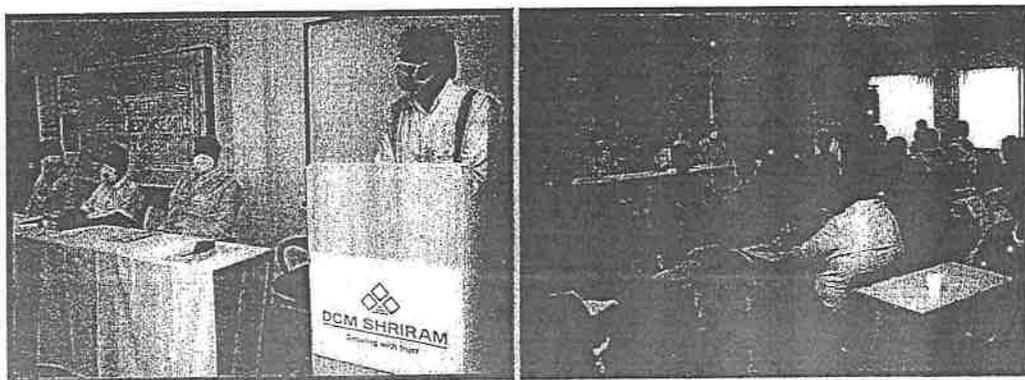
11:36 Incident controller Mr. Sunit Gupta informed to SMC for Fire control with help of fire services.

11:37 Site main controller & SDM Team went to the incident site to review the situation. Situation was normal.



11:38 Site main controller asked main plant control room shift engineer to call-off the emergency.

11:40 Emergency was called-off by blowing siren for 3 minutes continuously. All employees returned to their respective work places and the observers briefed about the exercise to LCG and Plant authorities.



**Following points have been evaluated after discussions in meeting**

**[A] Good Points:-**

1. Good communication between Site main controller and incident controller
2. Regular updated information share with SMC

3. Siren blow timely with proper communication and declare on site and off site as per level of emergency code
4. Regular updated information announcement through PA System for non essential persons
5. Use fire fighting equipments properly at incident place
6. Mutual aid Industries fire tenders( 4 nos.) and ambulance (1 nos.) proper communication with actual location with entry route
7. FMO and Para medical staff proper treatment given to Injured persons and refer to mutual aid hospital
8. Head counting of assembly point persons by HRD teams and informed to SMC & Incident controller
9. Proper evacuation of plant area and persons reached at assembly points
10. Cooling of other storage tank nearby area
11. Support service dept are timely reached at incident place and support to incident controller.
12. Storm drains monitoring by QAD dept and blocked by civil dept.
13. Non sparking tool with mechanical team provided by Mech. Dept.
14. Continue temperature monitoring of nearby product tank by instrument dept.
15. Surrounding and work place area monitoring by EHS dept. and informed to incident controller.
16. Unsafe situation and new development at incident place regarding communications by EHS team to Incident controller.
17. Cordons of the area by ERT team
18. Power supply check and monitoring of fire hydrant pump by electrical dept and support to incident controller.
19. Coordinates and communication with corporate office by HR dept.
20. Refreshment facility provided by HR dept at incident place.
21. Material gate open condition during emergency by security dept.
22. Security guard proper guide to emergency services for reaching at incident place.

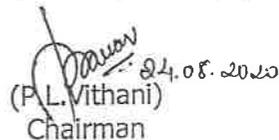
**[B] Points need to be Improve**

1. Different ring tone for emergency telephone no.( Ext: 200)
2. Fire hydrant network required near parking and tank farm area
3. Outside (Boundary area) near material gate no. 01 tea stall person to be removed during emergency
4. Outside traffic to be removed during emergency with help of police dept.
5. Burn injured persons need not be moved to OHC, Treatment can be given by FMO in Ambulance.
6. Siren and PA system not audible at ECC and OHC area



(R.G. Chaudhari)  
Member Secretary  
Local Crisis Group (Jhagadia)  
And

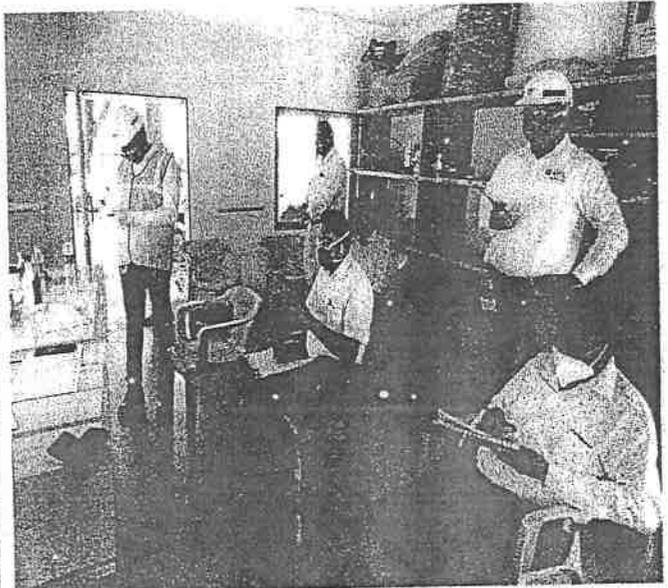
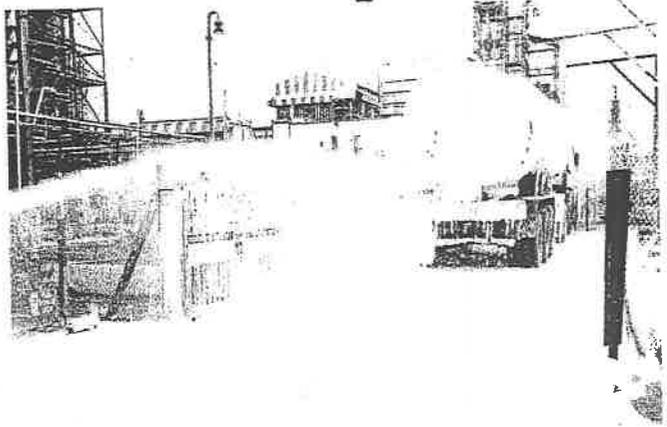
Industrial Safety and Health Officer, Bharuch

 24.08.2020  
(P.L. Vithani)  
Chairman

Local Crisis Group (Jhagadia)  
And

Sub-Divisional Magistrate, Jhagadia

# **A Report On Off Site Mock Drill by Local Crisis Group (Ankleshwar)**



At:  
UPL Limited (Unit-1),  
Plot No 117/118, GIDC, Ankleshwar, Dist.:-Bharuch.  
On Date: 14.07.2020

## Bird View on Industrial Area of Ankleshwar

- Total Nos. of MAH Units in Ankleshwar Industrial Pocket – 47 (Out of total 98 in Bharuch)

- Industrial Areas in Ankleshwar Industrial Pocket

### **Ankleshwar GIDC Area**

**Panoli** (Distance from Ankleshwar – 5 kms.)

**Hansot Taluka** (Distance from Ankleshwar – 20 to 30 kms.)

♦♦

## Details of Ankleshwar Industrial Estate, Gujarat

- Ankleshwar Industrial Estate came into existence in 1976-77.
- Industrial Estate spread over an area of 1574 Hectares.
- More than 1200 industries consisting of:

Chemicals	450 ( Appx.)
Pharmaceutical & Bulk Drugs	100 ( Appx.)
Textile, Plastic & Engineering	550 ( Appx.)
Packaging, Rubber & Service units	100 ( Appx.)
Employment	1,00,000 (Appx.)

## Introduction

In Gujarat State, The chemical industry occupies of preeminent position in the Industrial Sector, contributing to more than 40% of the industrial output. The entire range of the chemical process exists in Gujarat, which includes hydrocarbon processing, refining Products, petrochemical- polymers, manmade fibres, Fertilizers, Healthcare Products, Plant Protection Chemicals, Dyes, and Fine Chemicals Etc. The stretch of Chemical Industry in Gujarat makes it vulnerable to major manmade hazards, which exist over and above natural hazards posing threat to the society.

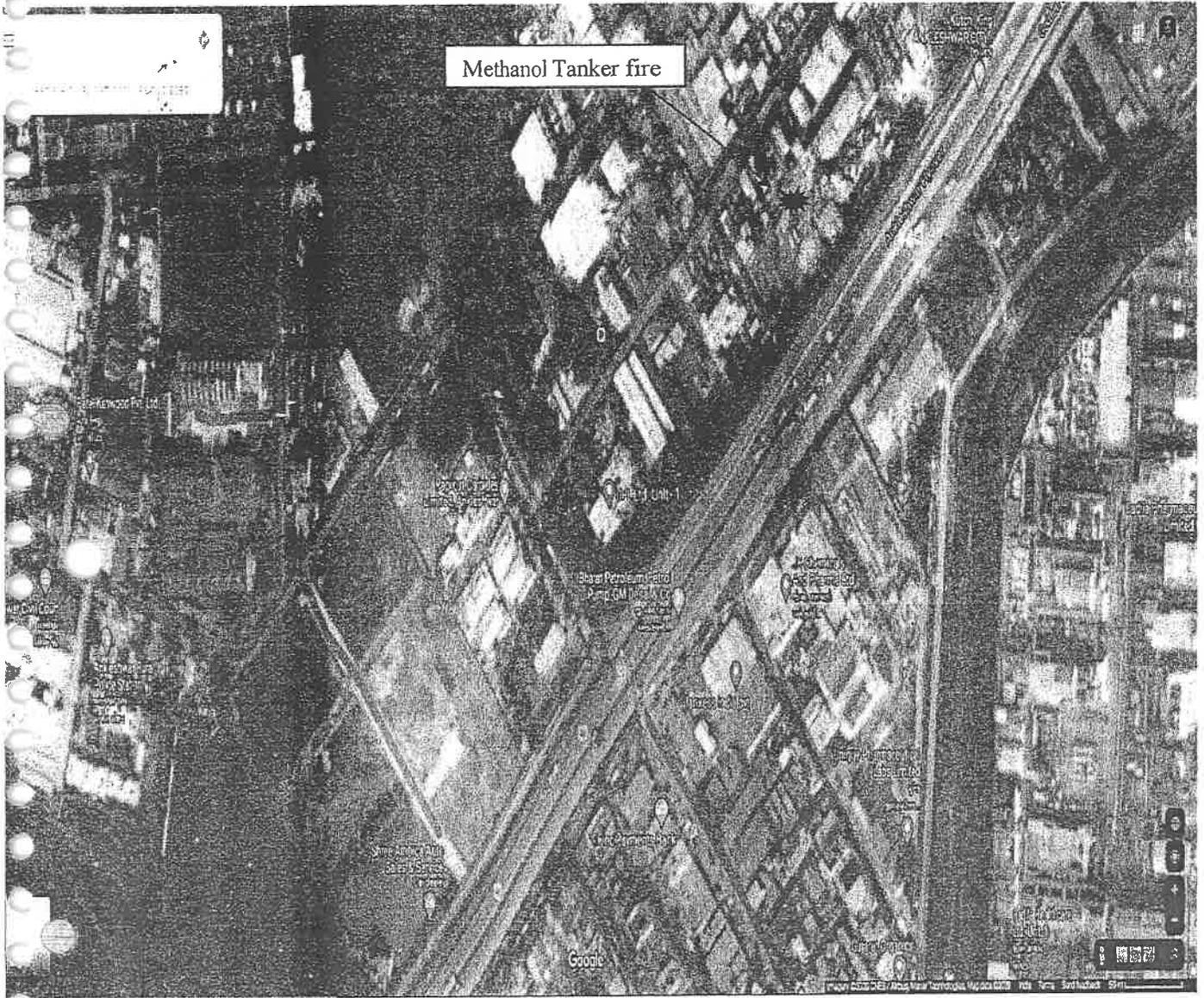
In view of above, the LCG of Ankleshwar Industrial pocket conducted a mock drill in Industrial belt of Ankleshwar to check the preparedness of the various agencies/ stakeholders. As Ankleshwar Industrial pocket is having high no. of Chemical industries and max. MAH Units, the planning for conducting on-off - site Mock exercise with the help of LCG.

## Scenario - Mock Exercise

Sr. No.	Description	Details
1.	Date & Time	14 <sup>th</sup> July 2020, Time – 10:45 a.m.
2.	Off-site Declaration	11.00 a.m.
3.	Location	UPL Limited (Unit-1), Plot No 117/118, GIDC, Ankleshwar – 393002
4.	Scenario Considered	Methanol tanker fire
5.	Incident details	While attending methanol leakage from unloading line flange, spark generated and filled methanol tanker caught fire.
	Site Control Room	UPL Limited, Plot No-117/118, GIDC, Ankleshwar Tel. No. (02646) 250 578,250 336, Cell No. - 9909994205/9925224785
7.	Local Control Room	Disaster Prevention & Management Centre Fire Station, Plot No. – G / S-3, GIDC, Ankleshwar. Ph. No. (02646) – 220229 Fire Control Room – 226101, 224100 , 101 (225166)
8	All clear	11:30 am
9	Dist. Control Room	Tel. No. 1077 (02642) 242300, 240499, 240599, Cell No. - 94280 57174

## Event

Time	Event	Time	Event	Time	Event	Time	Event
0:30	Methanol Tanker unloading activity started in Methanol tankfarm area.						
0:35	Leakage of Methanol from unloading flange observed.						
0:35	Fitter and operator started to attend leak.						
0:45	Spark generated while attending methanol leakage and fire initiated as Methanol is highly flammable.						
0:45	Alarm raised by manual hooter kept out side of MeOH yard by operator.			10:45	Information to SSH for 2-casualty shifting		
10:46	Shift incharge (Site Incident Controller -SIC) reached at location with identification Jacket and Walkie talkie - On-site emergency raised.	10:46	Near by ERT members reached at site and reported to SIC with PPEs	10:46	Casualty shifted to OHC by ambulance.Treatment started by FMO	10:45	SSH inform to DPMC for tender
10:49	Information passed to Unit Head (SMC) and Site Safety Head ( Asstistant - SMC) about fire incident.	10:49	Started fire fighting by using foam monitors considering wind direction.				
		10:50	Contacted to mutual aid companies/ DPMC for further help.			10:50	Sprinkler for ST1/2 started by TMP shift incharge for cooling purpose
10:55	DPMC tender arrived and started fire fighting			10:55	Other ambulance from UPL Unit-02,reported to site		
11:00	DPMC asked for further help as fire was not getting controlled.						
11:00	Information passed to DPMC/SDM/FI and got permission to declare Off-Site emergency.	11:00	Help received from UPL-5, DPMC, Nagar Palika, Panoli GIDC, Police.				
11:00	Off-Site Emergency declared.						
11:20	Fire controlled and informed to SDM/DISH						
11:30	SDM visited to incident location.	11:30	All Clear declared by UH after instruction by SDM.				



### Line of Actions

#### • Industry

- Tackle emergency with available resources (Fire Hydrant system, Fire Extinguishers, SCBA,)
- Seek help of mutual aid group & local crisis group
- Inform emergency to DCG
- Medical treatment of affected person-02 persons
- Evacuation of persons-287 persons
- Raising On-site, Off-site siren & all clear siren
- Toxicity monitoring inside and out site plant premises.

#### • Mutual aid members

- Tackle emergency in co-ordination with SMC
- Provide SCBA, Toxicity monitoring instrument to Gov. authority
- Ambulance, ERT members and experts from mutual aid members.

#### • Government Authority:

- Declare Off-site emergency & co-ordinate with crisis group members
- Police authority to control vehicle and people movement
- DPMC – Fire Tenders
- Nagar Palika- Fire tenders
- LCG Teams responded quickly and set up their base camp with respect to incident site.
- GPCB, Ankleshwar Toxicity monitoring team - Monitor possible affected area
- SDM, Ankleshwar – Assessment of affected site
- DISH – Update & discuss with DCG Chairman regarding the situation

Following points have been evaluated after discussions in meeting followed by Mock Exercise

**Name of Chief Observer :** Mr. Vijay Asar, Chief Co-ordinator, DPMC, Ankleshwar.

Good Points :

1. Communication was good and clear.
2. Emergency vehicles like fire tenders, ambulances and teams responded timely.
3. Coordination at site between Incident Controller, Fire Fighting Team and Control Room was very good.
4. PPE's were effectively used at incident place.
5. Public Address System at Assembly Point was very effective with clear message to employees assembled.
6. Head counting of emergency crew members was done at incident site after control of emergency.
7. Good clarity about roles & responsibility. (Dedicated manpower & well defined roles & responsibility). All members performed their Role properly.
8. All the events were orderly & properly displayed in Notice Board at Site Control Room.
9. Good Participation by all members.
10. Overall performance was very good.

Area for Improvement

1. Company's ERT team could have helped to start more hydrant points.
2. Due care shall be taken Road should not be blocked, while Positioning of Ambulance near First Aid Centre / Road.
3. Unwanted people to be kept away from danger zone.

For concern:

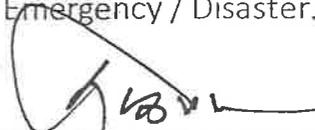
1. Provision of Emergency Access Point on NH-48 is required near UPL-1 to mobilize the resources from GIDC and vice versa in case of Major Emergency / Disaster.



Assistant Director

Industrial Safety and Health, Bharuch  
and

Member secretary of Local Crisis Group

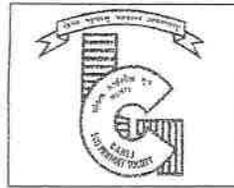


Sub Divisional Magistrate

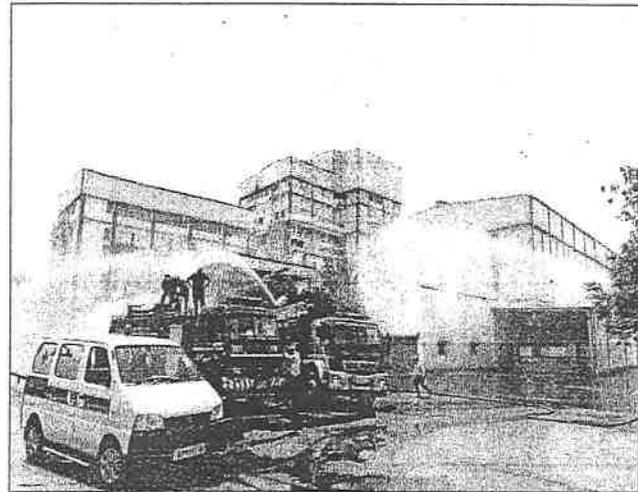
Ankleshwar

and

Chairman of Local Crisis Group



**Report On Off-site Level Mock Drill  
By Local Crisis Group(Bharuch-Vagra)**



**At:-  
Indofil Industries Limited-Unit-1,  
Plot No-Z-8,SEZ-1,GIDC,Dahej,  
Tal-Vagra, Dist-Bharuch, Gujarat-392017**

## Off site Level Mock Drill Report CS2 transfer line leakage from flange Joint

Date of Mock Drill	: 04 <sup>th</sup> July 2020
Time of Mock Drill	: 10:45 am
Venue of Mock Drill	: INDOFIL INDUSTRIES LIMITED Unit-1.-DAHEJ
Scenario of Mock Drill	: Carbon Disulphide (CS2) leakage from flange joint at INDOFIL tank farm area during transferring from INDOBAIJIN pipe line cloud occurred and caught fire and gas release.
<b>Incident Details:-</b>	
Rate of transferring	: 22 KL/Hour
Leakage from flange	: near tank before valve
Release Rate	: 4.0 kg/s
Wind Speed	: 2 m/s
Wind direction	: North – East (Average direction)
Affected area	: 100M from material gate boundary
Minimum Ignition energy(MIE)	: 0.01mJ
Site Control Room	: Emergency Control Room(ECC) near main gate Indofil Industries Ltd Unit-1 Plot No-Z-8,SEZ-1, GIDC-Dahej.
Local Control Room	: Dahej Industrial Association Office-Dahej
Dist Control Room	: Disaster management centre, Bharuch , Near Dist Collector office, Bharuch. Tel No.-1077(02642)242300, 240499, 240599

**Line of actions: -**

**By Company: -**

- Tackle emergency with available in house resources As-Sprinkler system, fire hydrant & monitor system, company fire tender, mayura curtain nozzles, auto operated triple purpose monitor, CPA set, Gas detectors, fire entry suit.
- Seek help from mutual aid & Local crisis group.
- Inform emergency situation to DCG.
- Medical treatment of affected persons.
- Evacuation of plant person.
- Raising of siren for on-site, off site & all clear.
- Work place and surrounding area monitoring inside plant premises.

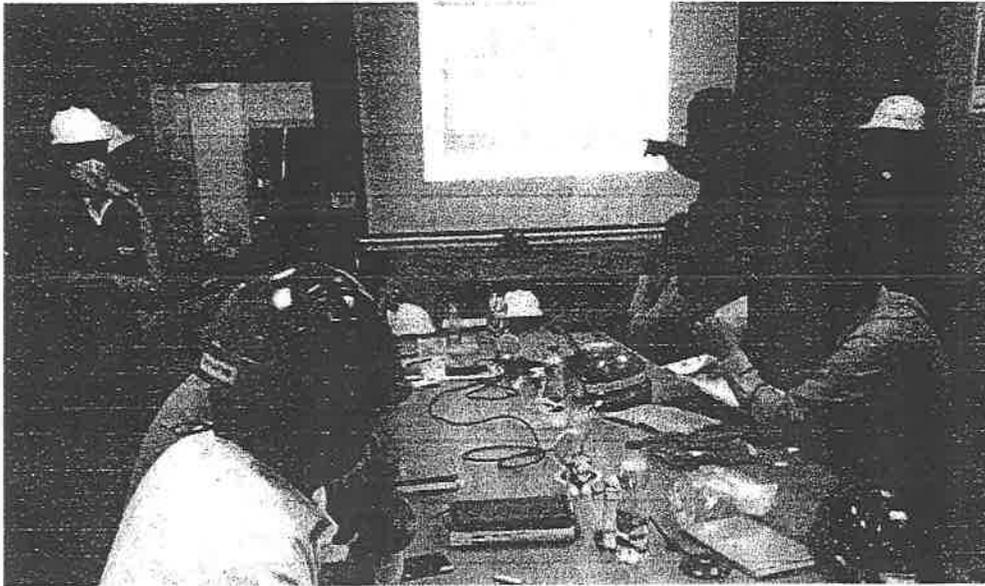
**By Mutual Aid Members: -**

- Tackle emergency in coordination with SMC.
- Major fire emergency and casualties controlled by mutual aid team-3 fire tenders and ambulance from Unit-2, Indobaijin, SEZ fire station and DMC).

**Government Authority: -**

- Local crisis Group(LCG), Member secretary and Mamlatdar- Vagra was representing LCG.
- Declare Off-site emergency and coordinate with LCG members.
- Police Team along with PI for Traffic control.
- DISH-Update & discuss with LCG chairman regarding the situation.
- G-3-to monitor possible affected area.
- Dahe Industrial association president and team- to get available needful resources.
- GIDC- Organize needful support to mitigate fire.
- SEZ Team-to clear access and control movement in SEZ.

10. Pre Mock Drill meeting / Table top exercise : Table top exercise conducted on at  
10:30hrs



11. Participants detail

1. Number of officials involved in Mock Drill : 08 Nos

2. Number of Mutual aid involved in

Mock Drill

: Indofil unit-2 & 3, Meghmani,  
Indobaijin, GACL, GFL, SRF.

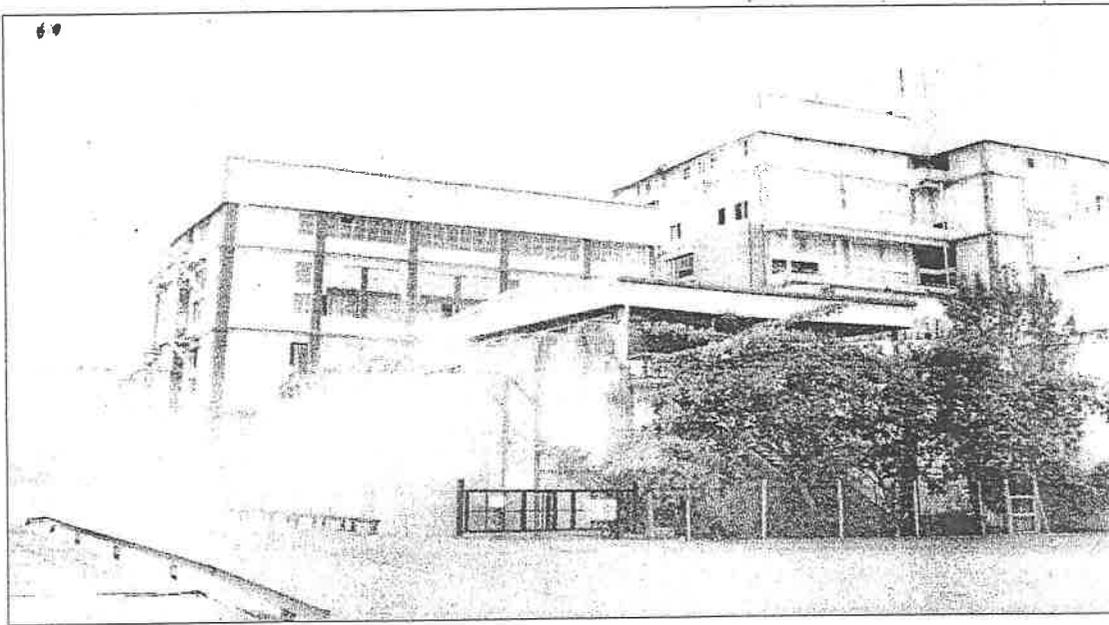
3. Number of other staff involved in Mock Drill: All employees

4. Details of observers:

- Mr. Vikas Yadav (M/s.SRF) to observe actions of Incident site
- Mr. M.B. Patel (M/s GACL) to observe SMC activities, OHC & Main gate
- Mr. Salendra Singh (M/s. Hindalco) to observe evacuation
- Mr. Vikas Valand (M/s Grasim) to observe actions at Assembly point and Head count

## 12. Mock Drill as conducted

Time	Event Description
10:45	Announcement of Tank Farm Engineer from DCS room regarding possible CS <sub>2</sub> leakage on PA system.
10:45	Tank farm operator reaches to CS <sub>2</sub> tank farm area
10:45	Tank farm operator observed fire at CS <sub>2</sub> tank farm
10:46	DCS operator has informed to Shift Manager Mr. Bhavin Ramani and Production head Mr. Hitesh Akbari about the leakage & fire
10:46	Tank farm operator started fire water sprinkler system on CS <sub>2</sub> tank farm to contained CS <sub>2</sub> fumes.
10:47	Tank farm operator started sprinkler system at EDA tank farm.



10:48	Incident controller Mr. Hitesh Akbari and ERT members reached to the incident spot immediately after hearing the announcement and call from DCS operator.
10:49	Incident controller has informed to SMC – Mr. SN Pandey about the CS <sub>2</sub> leakage and to declare the On-site emergency.
10:49	IC Hitesh Akbari has instructed to DCS room to stop the CS <sub>2</sub> transferring from Indo baijin and flush the line with nitrogen

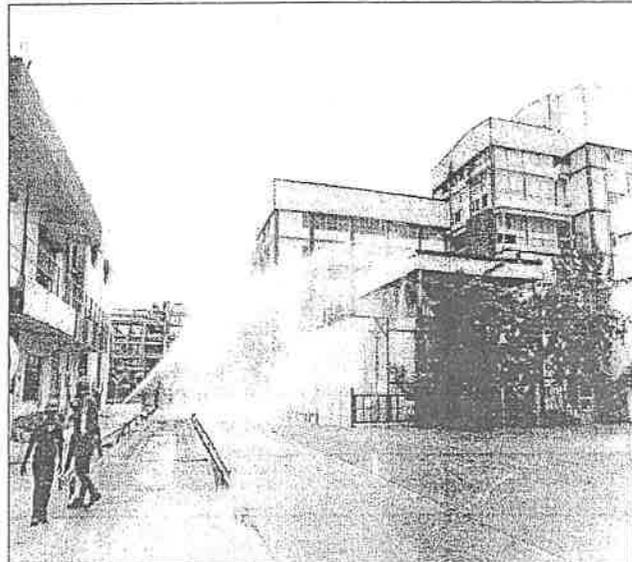
10:51 Unit head has taken charge of SMC at Emergency control center and call all the internal experts and resources.



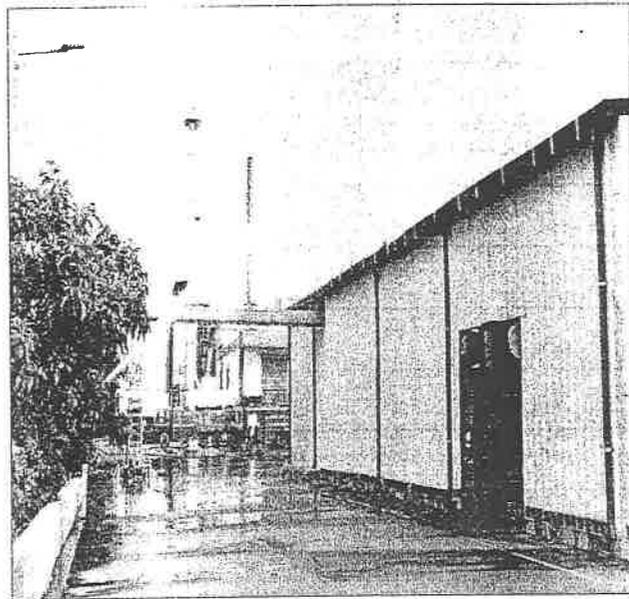
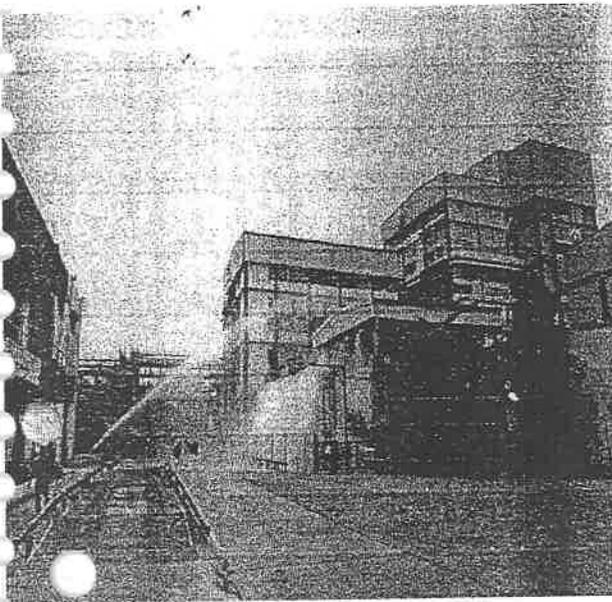
10:51 Casualty observed at weight bridge and IC informed to main gate for ambulance.

10:52 SMC has communicated to security to declare the on-site emergency by raising Emergency siren.

10:52 IC gathered all ERT members & First aider and distributed work and defined their roles.

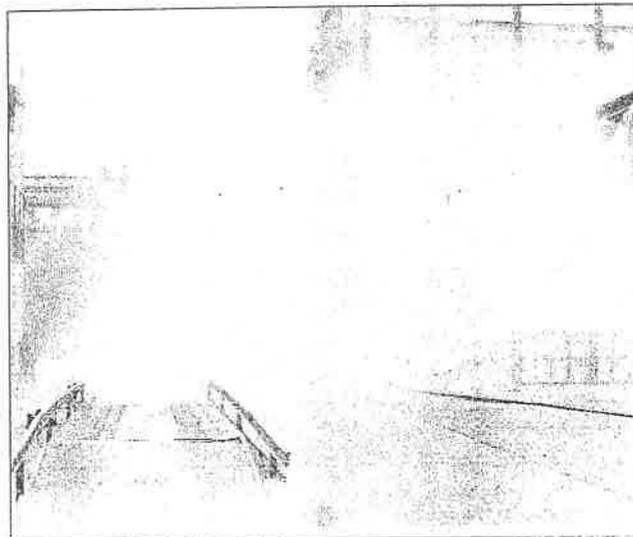
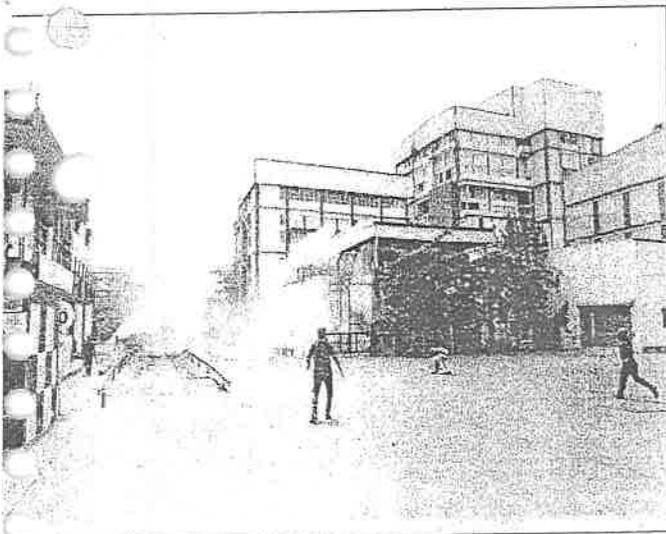


10:53 ERT members started fire fighting from two fix water monitors near wet plant and from back side of tank farm.



10:53 Plant evacuation was started towards assembly point point-1 from Plant and warehouse side and at assembly point no-2 from ETP, MEE & Utility side.

10:54 ERT members curtained surrounding area by 4 mayura curtain nozzles and automated triple purpose monitor.



10:55 Ambulance reached at incident site and first aider evacuated & shifted casualty in ambulance.

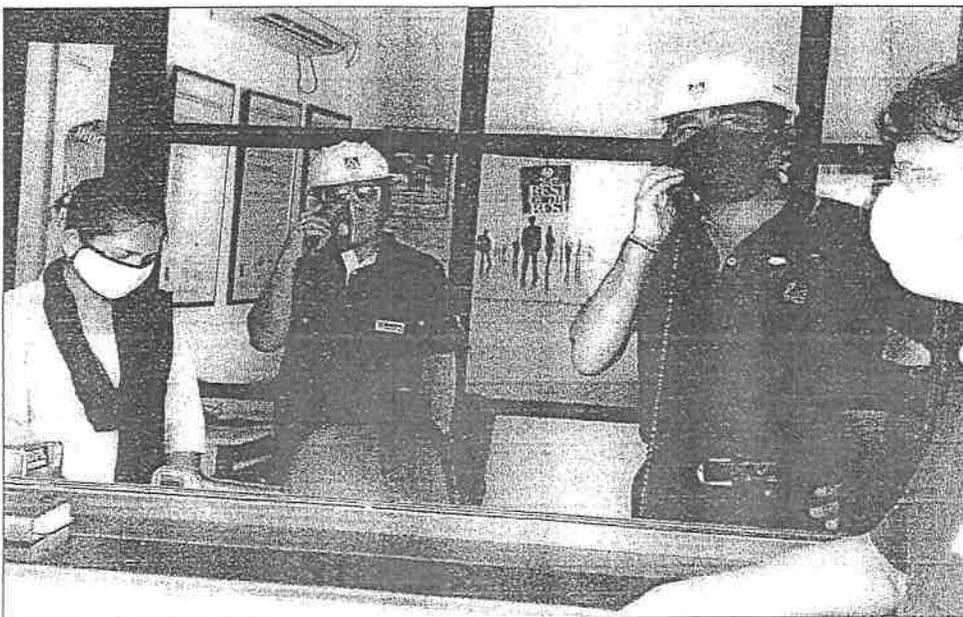


10:55 Parked tankers were turnout from material gate.

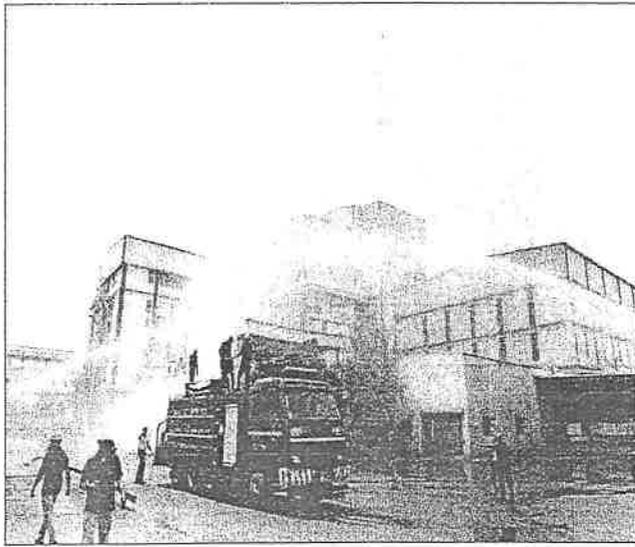
10:55 Incident controller has communicated to SMC that fire is big and need outside help to control the fire and may cause major emergency.

10:55 SMC has communicated to Mr. Y.M. Patel (Asst. Director DISH) about the fire and CS2 emergency and needs help.

10:56 SMC has informed to District disaster management centre on 1077 about the emergency.



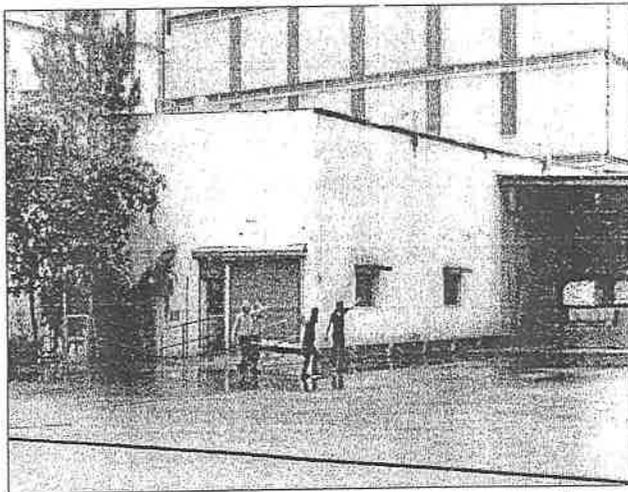
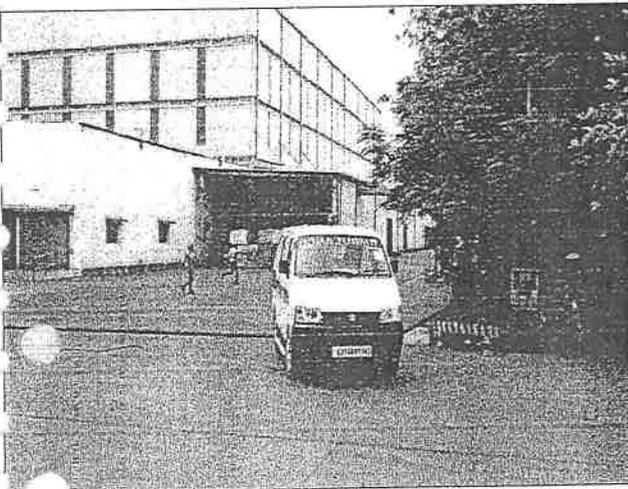
- 10:56 Environment team has reported the concentration of CS2 to incident controller 1500 ppm at near tank farm
- 10:56 Mr. Y.M. Patel has tried to communicate with SDM on landline but not connected, he took the charge of emergency
- 10:57 SMC has communicated with Fire officer SEZ to send the fire tender for help.
- 10:57 SMC has communicated with Mr. Hitesh (on duty officer of Disaster Management Centre - DMC, Dahej) to send the fire tender for help.
- 10:57 Mr. Y.M. Patel has communicated with GPCB office to monitor CS2 level and H2S level at offsite around the Indofil and in SEZ area.
- 10:58 Mr. Hitesh DMC Officer has released the order to turnout the fire tender from DMC and start the fire fighting at Indofil Industries Ltd unit-1.
- 10:58 Further contacted to SDM & informed him about incident and asked them to give permission for declaration of Offsite emergency. Permission given by SDM.
- 10:59 SMC has informed to security to declare the Off Site emergency and raise the siren for 3 minutes in wailing pattern
- 10:59 Mr. Ashutosh has informed to collector office to convey the message to Collector on the declaration of offsite emergency at Indofil Industries Ltd unit-1, SEZ-1.
- 11:00 Fire tenders from SEZ Fire station reported at incident location and take the positions to combat the fire. SEZ tender from materials gate tender from south side directed by Ankit Parihar-EHS.



11:00 GPCB person was informed to Mr.Y.M. Patel that CS2 ppm was 22 and H2S 12ppm at 100mtr. vicinity



11:00 Ambulance from unit-2 reaches at site for evacuation casualty number-2 as instructed by Mr. Ankit Parihar



11:01 Mr. Y.M. Patel has informed to Dahej Police station about incident and requested to help for traffic control @ SEZ area.

11:04 Fire tender from Unit-2 reported at incident location and take the positions to combat the fire as directed by Ankit Parihar-EHS.

11:04 Mr. Y.M. Patel has got the message that 02 nos. fire tenders combating fire at incident spot. He asked to Mr. SNP about any causality and condition. Also ask resources requirement of any.

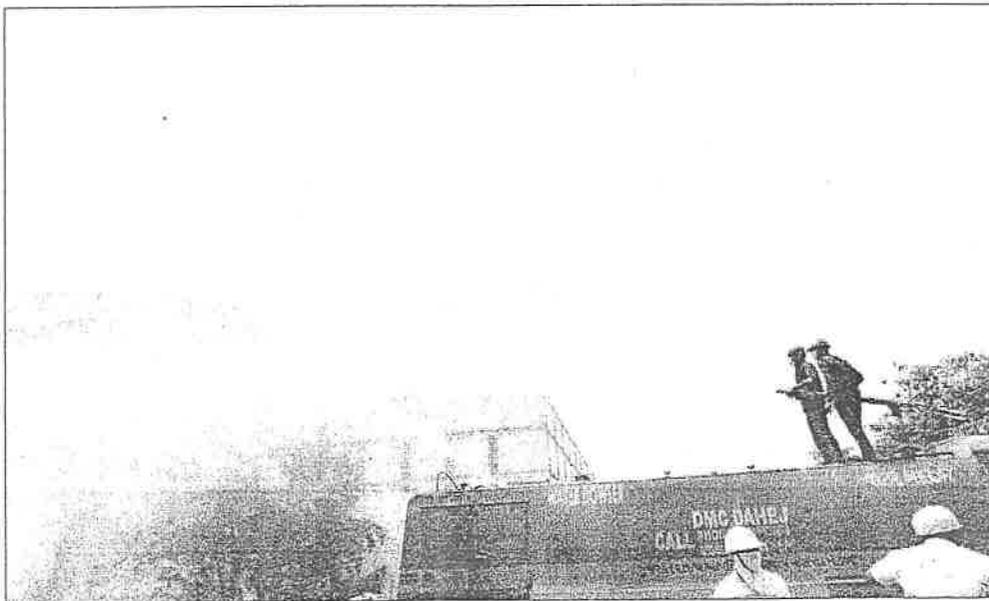
11:05 GPCB team has informed to Mr. Y.M. Patel that CS2 level is 10 ppm around 100 m vicinity and concluded concentration become decreased.



11:07 One more casualty found back side of security and IC informed to SMC for ambulance and Ambulance reaches at site and took the casualty to OHC

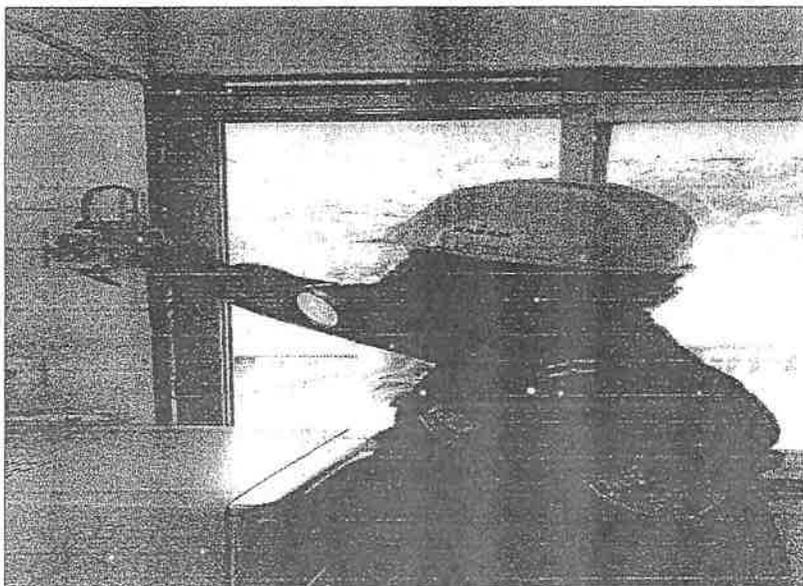
11:08 Mr. Y.M. Patel got the report from GPCB that concentration of CS2 came down to 4 ppm near vicinity of 20 meter and H2S is BDL.

11:10 Fire Tender from DMC reported to incident.

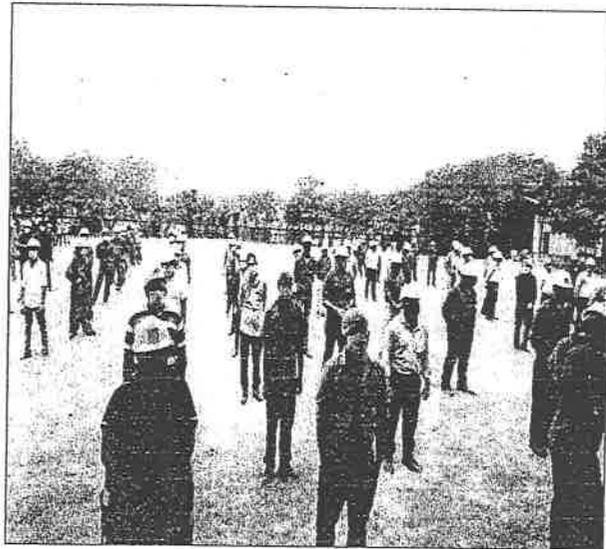


11:11 Mr. Y.M. Patel asked site main controller - are there requirement of more fire tenders, Mr.SNP has informed fire was controlled and situation is under controlled and now no need of further more fire tender.

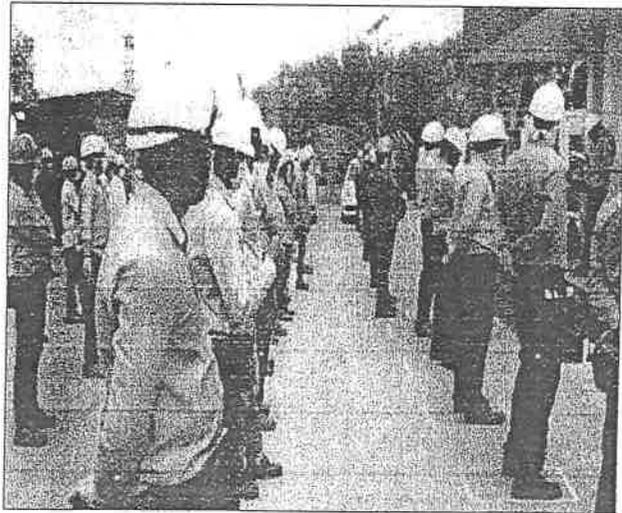
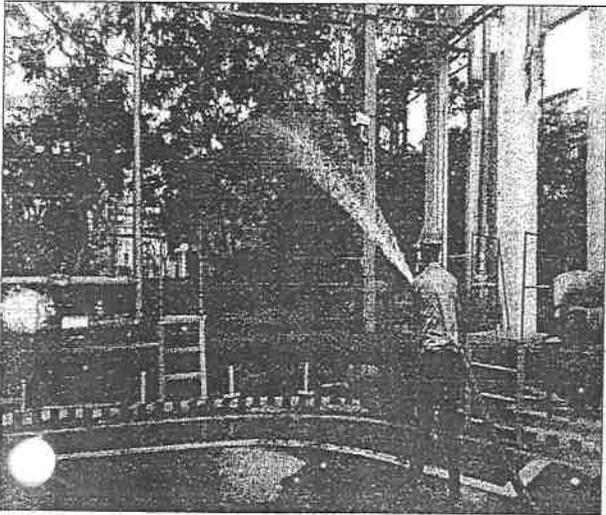
- 11:11 IC informed to SMC that fire is now controlled and instructed ERT member Mr. Kalpesh Vakariya & firemen to be at site for further 10min to ensure about emergency is controlled and rest member to be reported at assembly point-1.
- 11:11 IC instructed firemen to check CS2 and confirmed zero LEL.
- 11:12 Mr. SN Pandey has informed to Dr. Rao (Director of manufacturing) about the incident.
- 11:12 Mr. Y.M. Patel has informed to GACL to keep fire tenders in standby mode
- 11:13 Information received from site that concentration of CS2 measured as zero and asked DMC to clear off site emergency.
- 11:14 GPCB reported about zero CS2 & BDL H2S concentration.
- 11:18 SMC Information received from assembly point for head count is ok site that concentration of CS2 measured as zero and asked DMC to clear off site emergency.
- 11:18 Mr. Y.M. Patel spoke with Mr. N.R. Prajapati-SDM and updated the situation and also asked him to give permission to clear the offsite emergency. Mr. N.R. Prajapati-SDM has given the permission.
- 11:18 Mr. SN Pandey has been informed by Mr. Y.M. Patel to clear the offsite emergency.
- 11:19 Mr. S. N. Pandey has discussed with Incident controller and EHS head and ensured everything is Okay also ensured the CS2 level at tank farm area that it was 0 ppm checked by EHS Officer.
- 11:20 Mr. SN Pandey has conveyed the message to blow the siren for All clear.
- 11:20 All clear siren blown



### Debriefing done at Assembly Point



### Actions taken by nearby company M/S Indobaijin :-



**Debriefing Meeting:** All 04 observers have shared their positive and area for improvement comments to all employees and addressed to all, how emergency occurred and it been controlled.



mentioned the points discussed in de-briefing meeting are hereunder.

**1. Positive Observations**

Sl. No.	Observations	Competence demonstrated	Competence of Team/Individual
1	Overall seriousness was found good. People were doing it as if it is a real emergency.	Role Demonstration	Team Indofil
2	Fire Hydrant, Sprinkler, Mayura Curtain were working effectively for combating CS2 fire with in short period of time and to cover EDA tank farm	Velocity of teamwork demonstrated	Team Indofil Management
3	All emergency response team members were in required PPE's and were following instructions given by Incident Controller.	Knowledge & Awareness among team demonstrated	Team EHS
4	Functioning of SEZ, DMC fire tender was very effective.	Mutual aid - Coordination demonstrated	Team HR
5	Co-ordination between incident controller and emergency response team was appreciable.	Role demonstration	Team EHS
6	Employees evacuated the plant with keeping social distance in mind, department wise and contract wise	Role demonstration	Team Evacuation
	All employees including contractors moved to assembly point and good management at assembly point	Role demonstration	Team EHS
	Siren communication was good and audible to all	Role demonstration	Team EHS

Head count done in proper way and most important was contract workmen were found to be very discipline and standing in proper line	Role demonstration	Team EHS
Summon help from outside authorities by SMC as per emergency plan	Decision making authority demonstrated	IIL- Management
It was observed that a effective communication between incident controller and SMC regarding situations.	Role demonstration	Team EHS
SMC got updates from OHC person about victim condition and ask for further medical attention.	Human-welfare demonstrated	Indofil- Management
Immediately victim was transferred to Reliance Hospital, Dahej for further treatment.	Prosperity of Human-welfare demonstrated	Indofil- Management
Effluent collection tank having sufficient capacity to receive contaminated fire fighting water.	Planning and management demonstrated	Team EHS

#### 4. Area of Improvement

Observations	Corrective Action	Responsible person	Target Date	Status
First ERT team member came with gas cartridge mask instead of SCBA set and started fire fighting in downward wind direction	Training to be imparted	EHS	10/07/20	
There is only one fire proximity suit available at site	Fire proximity suit to be procure	Ankit Parihar	10/08/20	
Communication device such as walkie talkie to be checked for feasibility	To be explored and confirm	Hitesh Akbari	15/07/20	
There is only one CS2 potable meter	CS2 meter to be procured	Ankit Parihar	10/08/20	
Second assembly point location to be reviewed	Under review and plan to be relocated to material gate side boiler area	EHS	01/08/20	
Wind sock visibility at cricket ground was not visible	To be explored and installed at other locations also	Dinesh Vaswani	05/08/20	
One canteen vehicle was found maneuvering back and forth after offsite emergency was declared.	TBT/Training to canteen worker	Ashish Desai	10.07.20	
Access to assembly point was	Approach to assembly	Vineet	10.08.20	

	not good	point to be improved	Dobat		
9	One truck found outside the gate once emergency was declared	Training will be imparted	Ashish Desai	10/07/20	
5	Public rehabilitation to be considered.	Noted, we will consider in next mock drill	EHS	20/09/20	

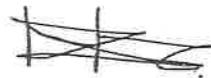
**Area for Improvement External/Authorities:**

	Considering very big industries in Dahej area, there should be one proper DPMC (Disaster Planning and management cell)	--	--	--
2	There should be multi speciality hospital in Dahej chemical zone.	--	--	--

**Briefing session was organized at Indofil Unit-II Plot No. Z-12 SEZ Dahej**

- 1) Mr. Dinesh Vaswani – Head EHS Indofil Dahej Plants has briefed about the scenario of Mock Drill
- 2) All Observers have brief about their observations
- 3) Mr.Y.M. Patel (Asst Director DISH, Bharuch), Mr. Vijay singh Parmar-Mamaldar-Vagra and Mr. A.C. Gohil-PI-Dahej has congratulated to Indofil Team and whole district management for successful completion of Mock Drill.
- 4) Mr. M.A. Hania (President –Dahej Industries Association) has congratulated to team members and government agencies for successfully completion of Mock Drill.
- 5) Mr. Mahesh Vashi (President Vilayat Industrial association) congratulate Indofil Team for good mock drill.
- 6) Mr. Ashish Desai Head-HR has give vote of thanks to all people who are involved in the event

**It was followed by Lunch at Indofil Industries Limited – Unit-I**

  
Assistant Director  
Industrial Safety and Health, Bharuch  
and  
Member secretary of Local Crisis Group  
(Bharuch-Vagra)

  
Sub Divisional Magistrate  
(Bharuch-Vagra)  
and  
Chairman of Local Crisis Group

*The District Crisis Group, Bharuch*  
*A Report on*

**"OFFSITE MOCK DRILL "**

*Conducted on*

*20/10/2020*

*At*



**GAIL (India) Limited**  
**GANDHAR**

## PREFACE

Gas Processing Unit (GPU), Gandhar being a part of Disaster Management Team of the Bharuch district & considering the handling of hazardous & flammable nature of materials at this unit has conducted 'Offsite Emergency Drill' involving the District Administration, mutual aid partners and nearby industries on 20<sup>th</sup> October 2020.

The main aim of the drill is to test the efficacy of Disaster Management Plan (DMP).

During the drill, two (2) numbers of nearby industries viz. ONGCL, IOCL, all concerned agencies participated assuming various roles.

A scenario of collision of an empty LPG Tanker with loaded LPG tanker was developed as a part of the 'Offsite emergency drill'. Subsequent to the collision of tankers, nearby shopkeepers (approximately 10 people) were evacuated and shifted to the nearest safe location at IOCL-Tanker parking area. As per drill scenario, two nos. of casualties were rescued from the site, given first aid there and shifted to Occupational Health Center by Ambulance where doctor treated them. The drill was carried out by GAIL-Gandhar unit under the guidance of Sh. ND Vaghela, Dy. Director (IS & H), Bharuch in association with District Administration and local police authorities.

Sh. S. K. Musalgaonkar, Chief General Manager & Officer-in-charge, GPU Gandhar along with Sh. JD. Patel, Resident Additional Collector of Bharuch District, closely oversaw & controlled the proceedings of the 'Offsite Emergency Drill'. The primary objective of 'the drill' was to evaluate & check the efficacy and adequacy of resources to be required during any disaster and promptness of responses from various response teams of GAIL, District Administration and Mutual Aid Partners in the area (viz. ONGC, IOCL) and for further improvement in emergency preparedness systems.

After the drill, Sh. JD. Patel, Resident Additional Collector chaired the meeting of all concerned and reviewed the drill and identified the improvement points of the District DMP. While commending the excellent coordination and efforts of all concerned persons during the drill, some observations were also made by external observers.

## CONTENTS

- ❖ INTRODUCTION
- ❖ LOCATION AND VENUE OF OFFSITE MOCK DRILL
- ❖ PRE MOCK DRILL MEETINGS AND TABLE TOP EXERCISE
- ❖ COMMUNICATION CHART
- ❖ OFF SITE MOCK DRILL CHRONOLOGY OF EVENETS
- ❖ OFF SITE DRILL DESCRIPTION
- ❖ REVIEW MEETING AND OBSERVATION

## INTRODUCTION

GPU, Gandhar: GAIL (India) Limited has established Gas Processing Unit near village Rozatankaria, in taluka Amod of district Bharuch in Gujarat state. It is a process unit of Hydrocarbon (Natural Gas) recovering LPG, Naphtha and Pentane, which involves the process operation, storage and transportation. Any leakage of Hydrocarbon can create a dangerous situation in and around the plant area; this situation may become catastrophic if not controlled at an incipient stage.

## BACKGROUND

The effects of a major accident in an industrial set up are not always restricted to the boundaries of the industrial installation. They may spill over to the community and the environment in vicinity. Therefore, the Government authorities and emergency agencies (hereinafter referred as the 'authorities and agencies') are required to prepare themselves and be in a state of readiness at all times to limit the consequences of any such emergency to protect the people and the environment. A systematic approach is required to plan, prepare and rehearse the industries, authorities and agencies to tackle an emergency due to hazardous chemicals.

The Factories Act, 1948, The Gujarat factory rules 1963, The Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and the Chemical Accidents (Emergency Planning, Preparedness and Response) [CA(EPPR)] Rules, 1996 provide a statutory structure for controlling major hazards posed by hazardous chemicals.

While working in hydrocarbon industry, Safety of employee and integrity of asset is prime concerns, employees are competent and trained to handle emergency. As per statutory requirement emergency drills are conducted in the plant on scheduled intervals with different scenarios to check preparedness, usage of resources and decision making of employees in abnormal conditions, at plant level. In India we have a history of industrial accident that turns in to Off-Disaster. Offsite Disaster can be managed by excellent leadership, proper coordination between various agencies, knowledge and experience.

Effective response to challenging situations and conditions is vital for ensuring personal safety and protecting lives, property, facilities, equipment, infrastructure and the environment. Personnel, communities, departments, incident commanders etc. must be able to take immediate actions necessary to safely mitigate the consequences of an unexpected or abnormal and potentially dangerous condition. The process presents a challenging management problem and becomes even more complex when all emergency management disciplines come together into one integrated system for managing emergencies. Drills and exercises focus on those actions which are necessary to respond to an emergency. Regular drills and exercises can help communities, governments, industrial bodies, corporate sectors and other sectoral agencies to test, evaluate and

continually improve their emergency management systems. Drills and exercises should ideally test all the phases of disaster management.

In view of above an Off-site Mock Drill was organized on 20<sup>th</sup> October 2020 under guidance of Dy. Director, ISH and District Crisis group, Bharuch

### AIM

The Mock Drill was aimed at

1. Proving our preparedness, Skill and experience in handling crisis scenario with safety and efficiency in planned manner.
2. Coordination between all agencies to mitigate the emergency in minimum time to save life and property.
3. Promoting culture of preparedness.

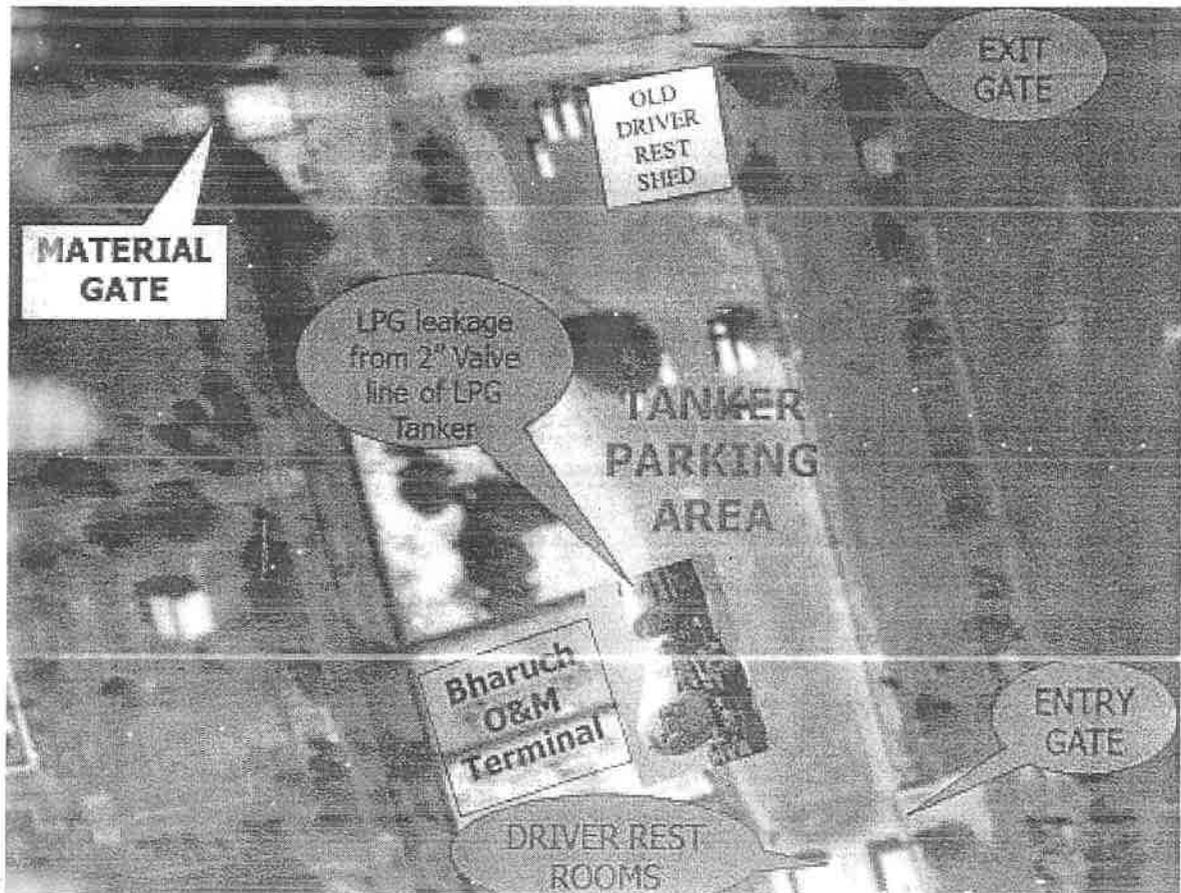
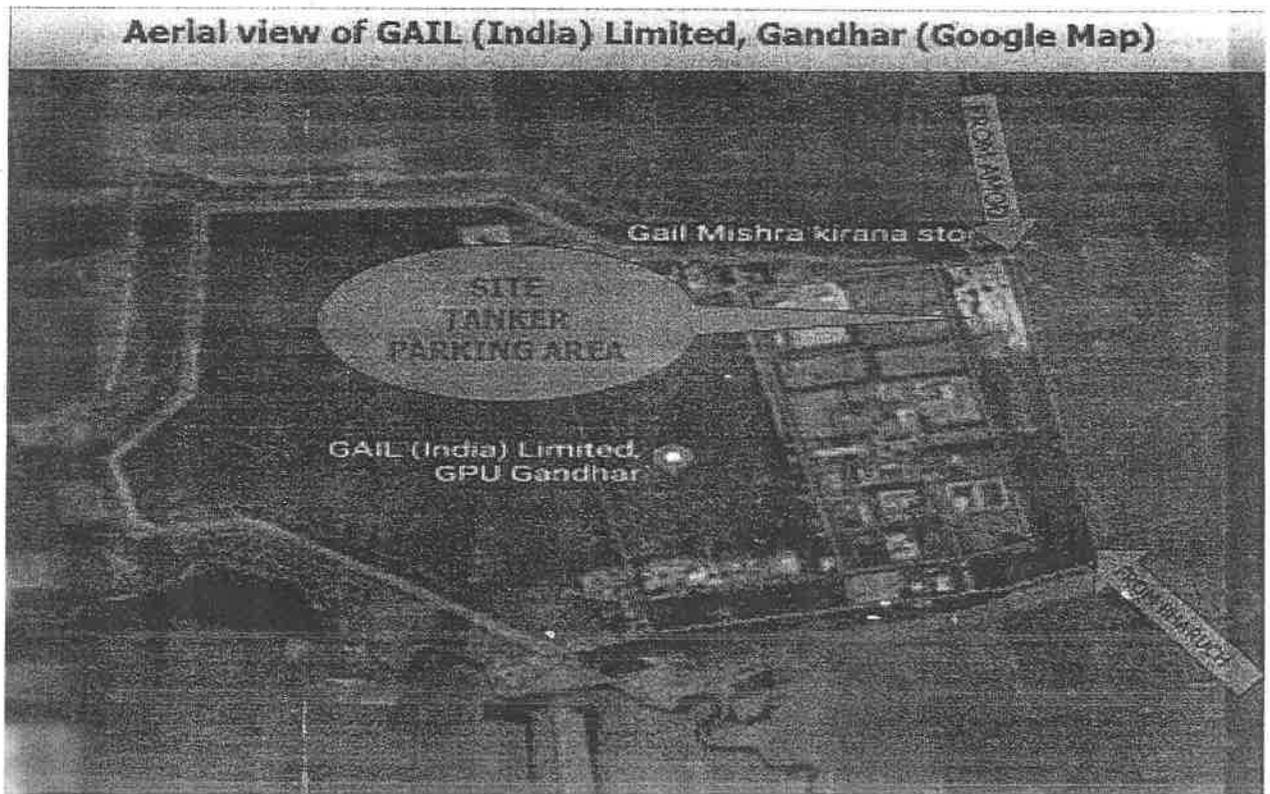
### OBJECTIVES

1. To test the disaster management plan of GAIL, Gandhar in particular & Mutual Aid Agencies, District Authority in general.
2. To find out the alertness and response time of the personnel involved in the Drill.
3. To find out the effectiveness of the communication system.
4. To check the coordination of reactions and response of emergency services
5. To evaluate the performance and inviting suggestions for further modifications and strengthening the plan.
6. To maintain better coordination between different agencies of the Mutual Aid & Government Bodies for better management of the disaster.
7. To Updated database of resources, equipment and manpower available

### SCENARIO:

A scenario of collision of an empty LPG tanker with loaded LPG Tanker was created as a part of the 'Offsite Emergency Drill' at Tanker parking area of GPU, Gandhar. Due to collision, the LPG liquid line between tanker body and 2" valve ruptured, resulting heavy leakage of LPG from the tanker.

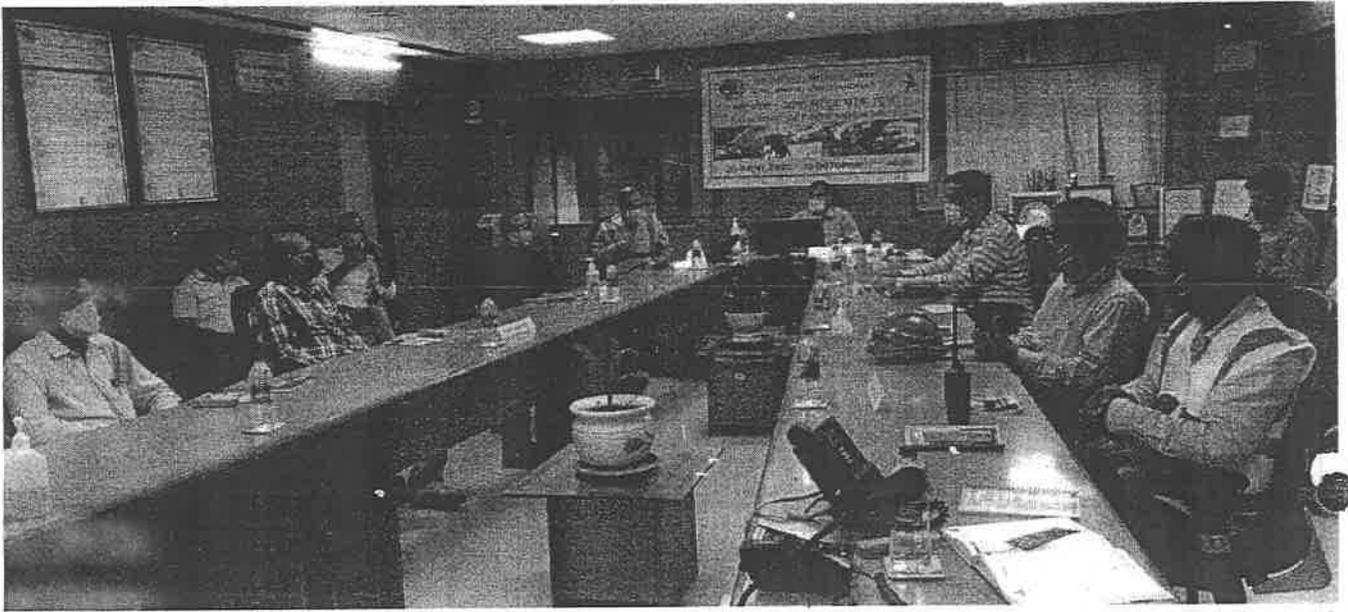
LOCATION OF DISASTER SITE: TANKER PARKING AREA, GPU, GANDHAR



## PRE MOCK DRILL MEETINGS & TABLE TOP EXERCISE

- On 13.12.2019 Letter was sent to district administration requesting for conductance of Off Site mock drill at Gas Processing Unit of GAIL (India) Limited, Gandhar.
- On 19.12.2020 a meeting was organised by Assistant Director, ISH, Bharuch at GAIL's O&M Base, Bharuch to discuss the modality of Offsite mock drill to be conducted at GPU, Gandhar. HoD (F&S) presented the details of scenario, location and activities.
- On 05/08/2020 again a meeting was called by Resident Additional Collector, Bharuch at conference hall of GAIL's O&M Base, Bharuch, which was chaired by Sh. JD Patel, Mamlatdar, Amod. District Project Officer, Officials from Industrial Safety and Health, Bharuch, Police department, SOG and GAIL (India) Limited participated in this meeting. A presentation given by HoD (F&S) to all participant to abreast about the details of Offsite Mock Drill.
- Date 14/09/2020 Meeting with mutual aid groups partners ONGCL and IOCL representatives to discuss the various issues & roles for "offsite emergency drill"
- On 20/09/2020, a Meeting with District Project Officer, Bharuch and other district authorities to discuss & brief the "offsite emergency drill" by GAIL Gandhar Officials.
- On 22/09/2020, an internal meeting was conducted for preparation towards off site emergency drill.
- On 24/09/2020, a meeting was called by Collector office to discuss the scenario of off site emergency drill, which was attended by HoD (F&S) who briefed the authorities about the drill.
- On 19/10/2020, Deputy Director (IS&H) & HOD (F&S) met the Resident Additional Collector, Bharuch district and invited for "offsite emergency drill" on 20.10.2020.

➤ On 20/10/2020, Resident Additional Collector, Bharuch district and Deputy Director & Astt. Director (IS&H) reviewed the preparation of the drill with other officials from district administration & OIC GAIL Gandhar. (Fig-01).

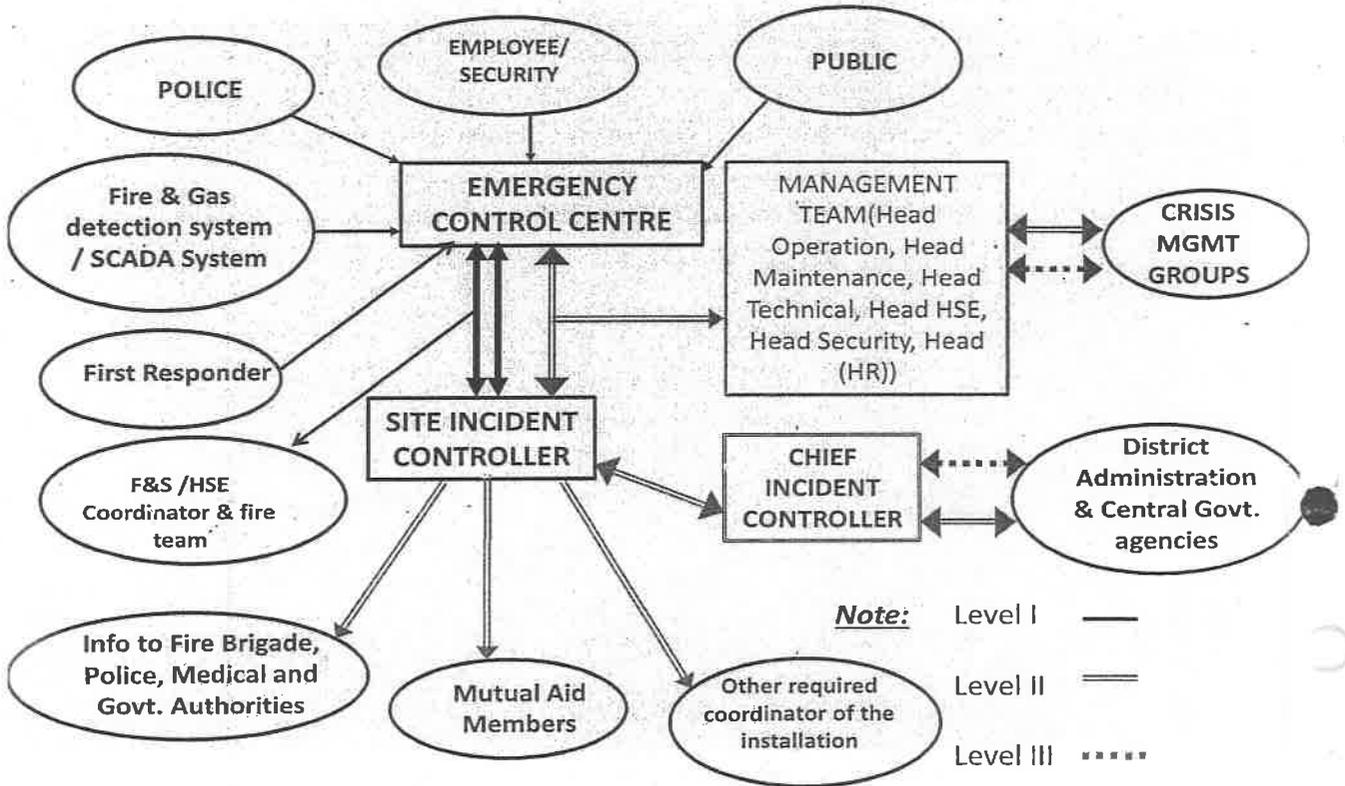


- In view of COVID-19 pandemic, all necessary precautions were adopted like, on arrival of all participants, sanitisation was done, Temperature and Oxygen level was observed, face masks were provided and safe distance was maintained as shown below:-



COMMUNICATION CHART FOR OFFSITE MOCK DRILL

**COMMUNICATION FLOW CHART**



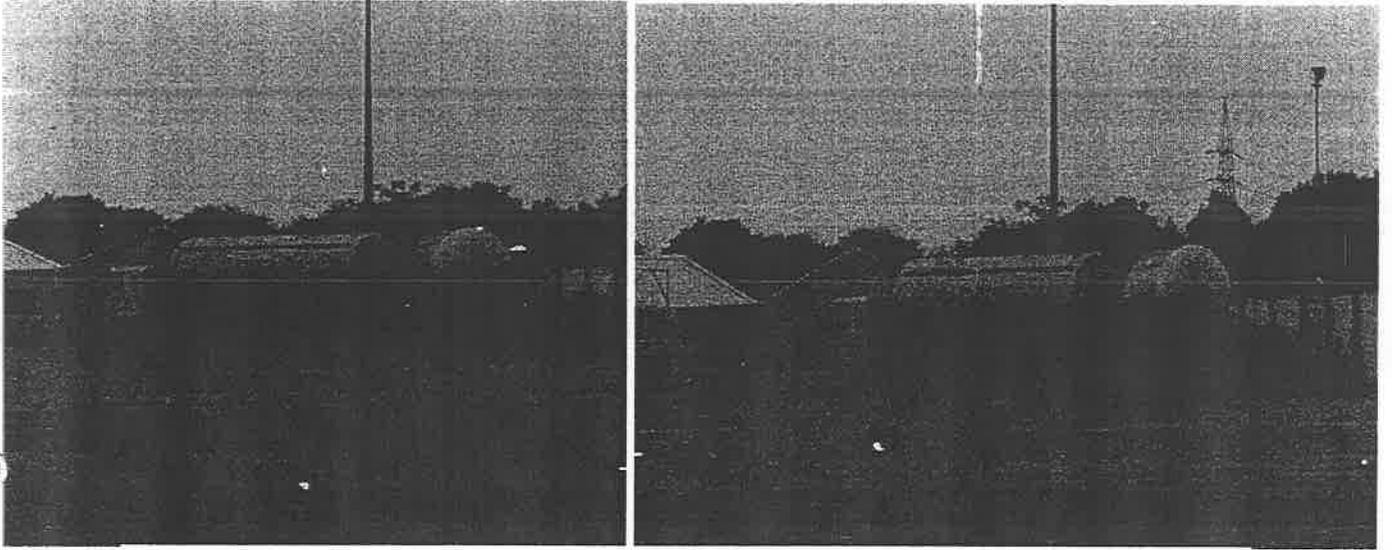
### OFF SITE MOCK DRILL CHRONOLOGY OF EVENETS

Time	Activity
1542 Hrs.	Empty LPG Tanker, while reversing at Parking area, dashed with loaded LPG tanker temporarily parked in the parking area resulting damage to 2" LPG line between tanker body and Valve.
1542Hrs.	Information of Leakage passed on to F&S and MCR by CISF from Material gate over HVJ phone.
1542 Hrs.	Fire Tender along with fire crew turned out from fire station.
1542 Hrs.	Telephonic information passed on to PA to CGM (O&M) & OIC, HOD (Opr.), HOD (F&S), Main Control Room, CISF, OHC (for ambulance) by operator, fire station control room.
1542 Hrs.	HOD (F&S) and CM (F&S) rushed to the site by Emergency vehicle.
1542 Hrs.	SIC proceed to the site.
1543 Hrs.	FT-01 with crew reached at the site.
1544 Hrs.	Ambulance reached at Site
1544 Hrs.	Warning announced over paging system to stop all hot jobs and to proceed to assembly point.
1545 Hrs.	Fire crew laid one delivery line and started pouring water on leaking gas. Also started water monitors installed on east side and south side of the incident spot.
1545 Hrs.	Site incident controller reached at site
1546 Hrs.	Fire crew laid down delivery line and with help of dividing breaching started 02 Nos. of water curtain branches.
1547 Hrs.	One fireman donned the LPG suit & checked the surrounding area with LEL meter, also checked for casualty and informed that there is one casualty in the area.
1547 Hrs.	CISF personnel barricade the area
1548 Hrs.	One casualty rescued from the site, shifted to the ambulance, male nurse started first aid and carried to OHC by ambulance.
1548 Hrs.	Heavy leakage of LPG from damaged 2" LPG line, spreading towards nearby highway, Site incident controller communicated to escalate the level of emergency to level-III.
1549 Hrs.	Chief Incident controller declared Major (Level – III) emergency.
1549 Hrs.	Fire siren was sounded indicating level – III emergency.
1549 Hrs.	Chief coordinator reviewed the situation and informed to District Authorities
1550 Hrs.	RAC Bharuch took charge as Chief incident controller
1550 Hrs.	Mutual aid group arrived at site
1551 Hrs.	2 <sup>nd</sup> Fire tender with crew reached at site Water application by fire crew,
1552 Hrs.	The crew from 2 <sup>nd</sup> Fire Tender laid one delivery line and started

	water spray on the leaking tanker.
1555 Hrs.	Fire tender from GAIL O&M Base, Bharuch reached at site and started water application from south-east side.
1555 Hrs.	Fire tender from CPF, ONGC, Gandhar reached at site and started water application from north side.
1555 Hrs.	One more casualty observed between the wall and tanker, who was shifted to OHC by ambulance.
1556 Hrs.	Mechanical team with Non-sparking tools, emergency kit and appropriate PPEs reached at site
1559 Hrs.	One technician with BA Set & LPG Tight suit reached to the leakage point of liquid line & arrested the leakage by tightening clamp on the leaking 2" LPG valve pipeline.
1600 Hrs.	LEL Level checked in the area, no traces of gas found and the same information given by SIC to Chief incident coordinator.
1602 Hrs.	Chief incident coordinator informed Chief incident controller about the LEL level
1602 Hrs.	Head count and health status report was given by Security Officer to the CIC.
1603 Hrs.	Chief incident controller declared "ALL Clear"
1603 Hrs.	ALL CLEAR siren was sounded

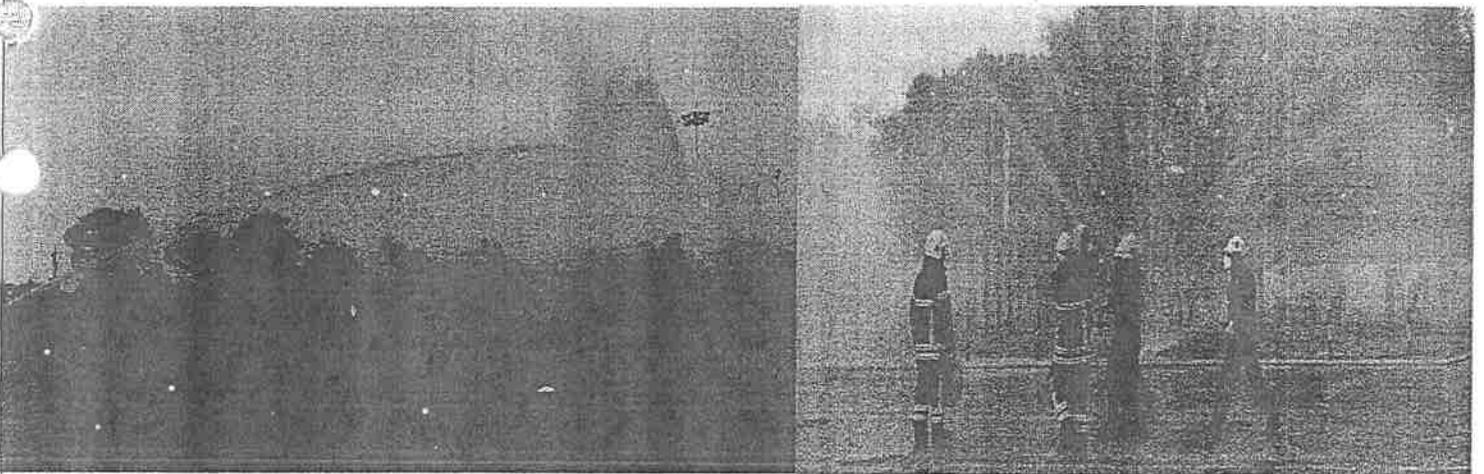
## OFF SITE DRILL DESCRIPTION

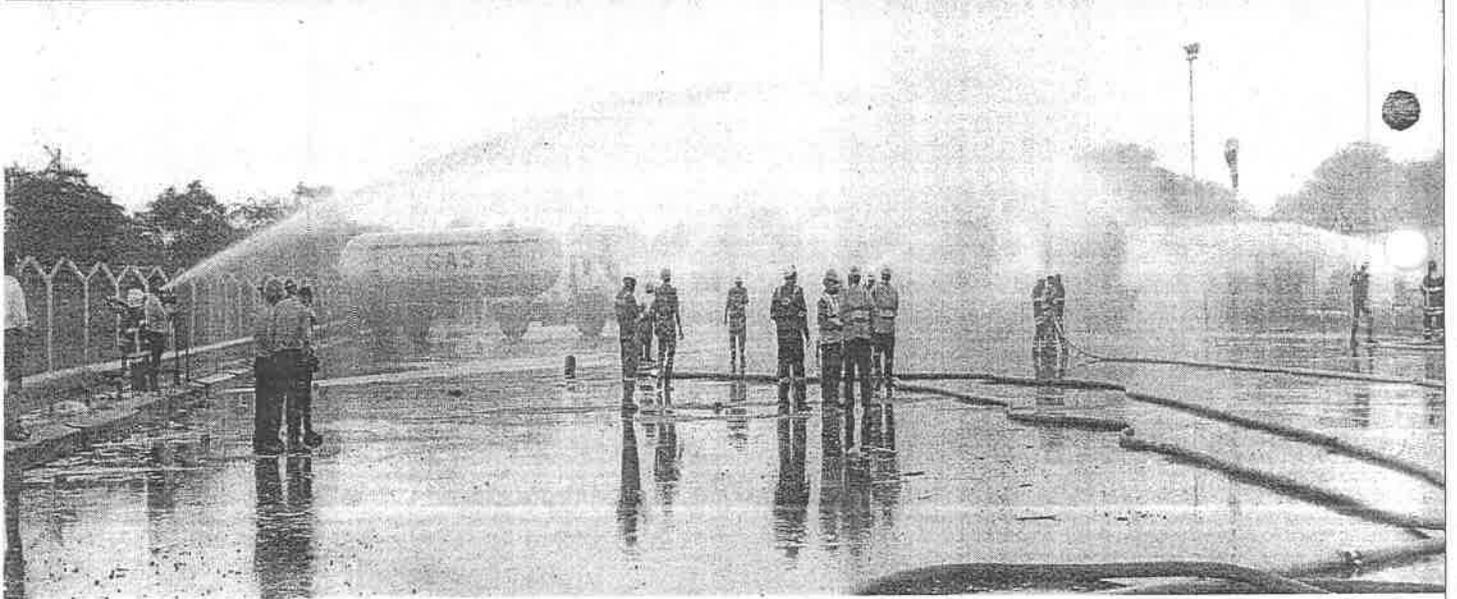
Around 15.42 hrs. an empty LPG Tanker dashed the valve box of a loaded LPG tanker while reversing the vehicle at Parking area, resulting damage to 2" LPG Pipeline between the tanker body and the valve. The LPG leakage started from the ruptured LPG line.



Collision of tankers resulted in LPG leakage

The driver immediately rushed to the nearby material gate and informed to CISF Jawan on duty about the incident. In turn, the CISF Jawan informed to Fire Station control room and Main Control Room over HVJ phone. On receiving the message, Fire Tender-1 with crew, HoD (F&S) and CM (F&S) with emergency vehicle rushed immediately to the site. HoD (Ops)- incident controller also proceed towards the site. Fire Tender-1 Fire crew laid down one delivery line and started water jet on the leaking tanker. One fireman started water monitors available at parking area. The fire crew also deployed water curtain at leakage site & water application from nearby fire hydrant.

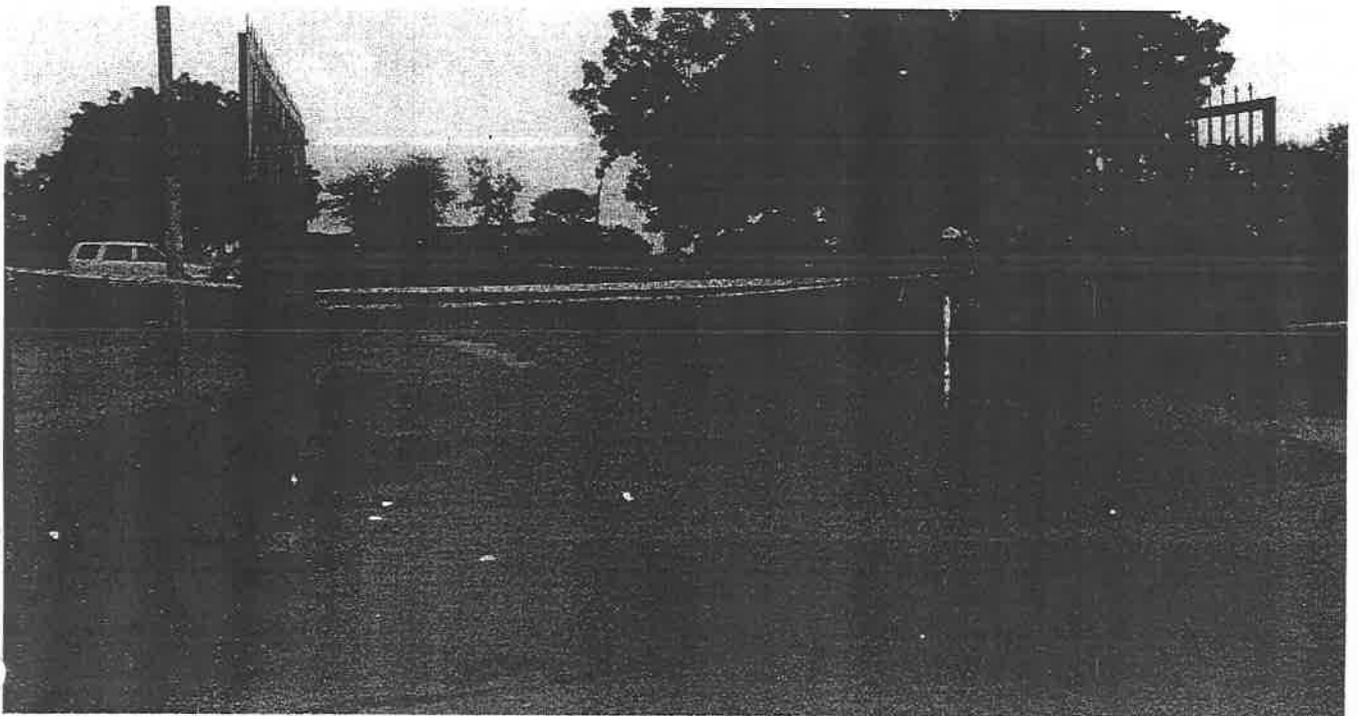




One fireman after donning BA Set and LPG Suit checked LEL in the area and searched for casualty. He noticed one casualty near the valve box of effected tanker, lifted with fireman lift and brought him out of danger zone. Further the casualty was shifted to ambulance by stretcher where the male nurse administered first aid and carried him to Occupational Health center.



CISF Jawans barricaded the public main road at both ends and also barricaded the entrance points of incident area to restrict the vehicular movement as shown in the following picture.

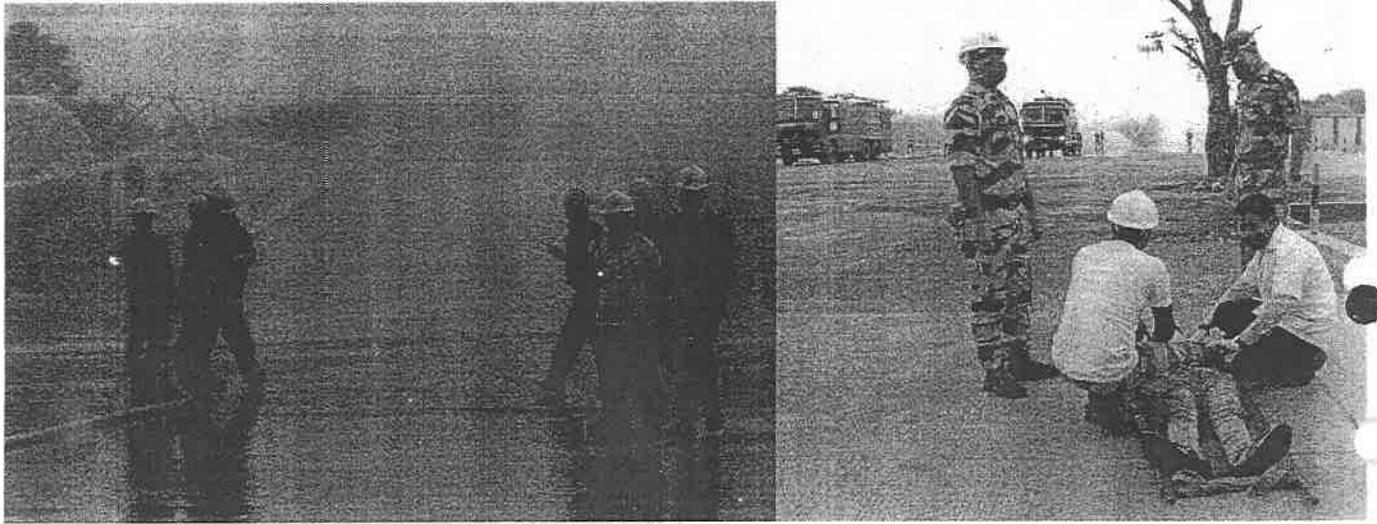


**Area cordoned off and high way blocked for movement of vehicle.**

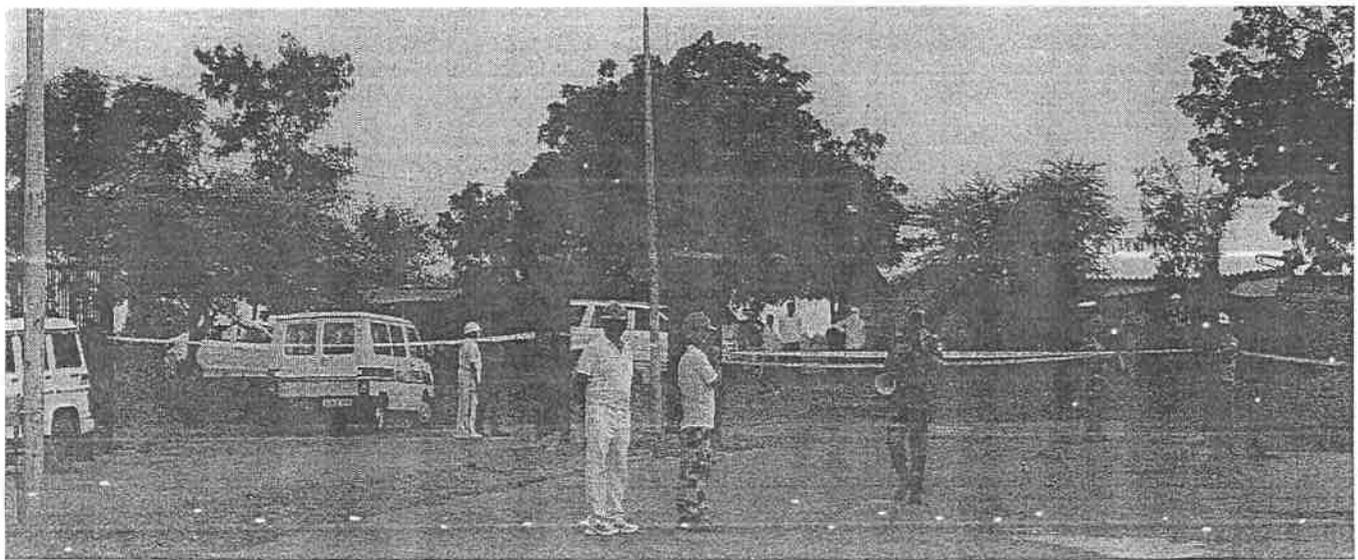


**Incident Controller - HoD (Ops), HoD (F&S) and Site Incident Controller (SIC), instructing the fire crew for further action in consultation**

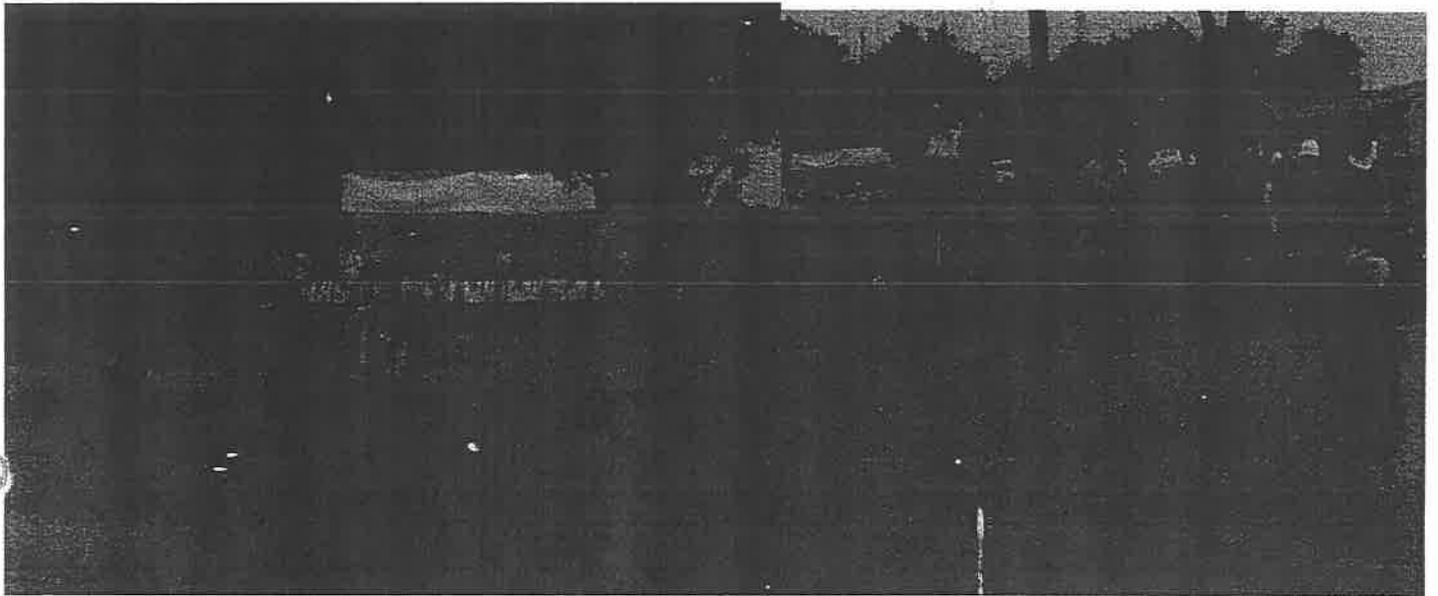
Due to favorable wind direction and increase in LPG leakage, the gas started spreading towards the adjoining public road, which may cause explosion due to vehicle movement. The incident controller and site incident controller informed to Chief Incident controller to declare it Level -III emergency. HoD (F&S) instructed fire control room for second turnout (Fire Tender -2) to rush to the incident spot. Water application was started by FT-02, Mutual aid groups (ONGC-CPF, IOCL) and fire tender from GAIL's O&M Base Bharuch arrived at site and start cooling & gas dispersal operation. Fire crew rescued another casualty, male nurse at site rendered initial first aid and then the casualty was shifted to OHC where doctor treated him.



As the situation was getting out of control, Chief incident controller informed to Resident Additional Collector, Bharuch, who took the charge as Chief Incident controller and declared the situation as "Offsite emergency" (Level-III) in consultation with site incident controller. Concerned district authorities were instructed to take action as per Disaster Management Plan of Bharuch District. 10 nos. of persons from nearby shops were evacuated & shifted to evacuation center, located at IOCL bottling plant (Parking area) with the help of CISF, Police & evacuation team of IOCL & GAIL.



HoD (F&S) informed to Site incident controller that Mechanical team with non-sparking tools and emergency kit is required to arrest the leakage, Site Incident controller informed CIC & HoD (Mech.) at ECC to send mechanical team with all tools and tackle for the operation. The mechanical team with requisite tools and PPEs arriving at site as shown in the following snaps:-



One technician donning the LPG tight suit & BA set approached the leakage point, closed the valve and clamped the damaged 2" LPG liquid line by using suitable clamp from emergency kit of LPG tanker. After clamping, the leakage was arrested.



Water application from all side was continuously done so as to mitigate any chance of vapor ignition. Continuous monitoring of LEL (Lower explosive limit) of LPG was done by Fire crew by using portable gas detectors, no traces of gas found and the same information was given to incident controller.

When the leakage was completely arrested Site incident controller, Incident controller and Fire & Safety coordinator analyzed the situation & apprised the situation to Chief Incident controller (RAC, Bharuch District). As the situation was totally under control and the entire nearby person were evacuated from the site. RAC, Bharuch District instructed site incident controller to declare "ALL CLEAR". The same was announced on PA system & communicated to emergency control room which in turned intimated to Disaster Management control room in District collector office & nearby industries.



## POST DRILL

To understand the deficiency of the mock drill & for continual improvement, the observers were appointed during the drill at accident site, Main Control Room, Fire Station etc. Post Mock drill, review meeting was conducted at Parking area in front of Material gate in which was chaired by Sh. JD. Patel, Resident Additional Collector of Bharuch District and Sh. Saibal Sarkar, District Project Officer, Bharuch; Sh. JD. Patel, Mamlatdar, Amod; Sh. Falgun Modi, Regional Officer, GPCB, Bharuch; Incharge, Amod Police Station, representatives from SOG (Special Operation Group), Intelligence Bureau and Health Department participated.





### Review meeting & Discussion on Observation

Debriefing meeting was conducted after completion of the Off-Site Mock Drill. Resident Additional Collector of Bharuch District, Sh. JD. Patel chaired the meeting to identify the improvement points. He appreciated the efforts of GAIL and congratulated the GAIL team for organizing the drill efficiently & effectively. He also appreciated the Mutual Aid members' contribution towards the exercise. Sh. ND Vaghela, Dy. Director (ISH) also appreciated the preparedness of GAIL and the mutual aid teams from ONGC & IOCL.

Sh. Amitabh Singh, GM (HSE), ONGC was observer at site. He briefed the district officials about the observations at site.

### OBSERVATIONS

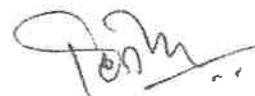
#### Positive observations:

- Excellent fixed firefighting system in parking area.
- The performance of all fire tenders was excellent.
- The communication between all coordinators, Emergency Control Center and Main Control Room was very good.
- The coordination among the mutual aid members was very good.

#### Observation for improvement:

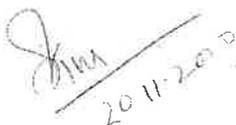
- Fixed firefighting system should be used preferentially over Fire Tenders.
- Use of PPEs by all members of maintenance team to be enhanced.
- Water monitor valve of 2<sup>nd</sup> turnout was open.

Sh. SK Musalgaonkar, Chief General Manager & Officer-in-charge, GAIL Gandhar presented the vote of thanks at the end of the drill.



(Hitendra Patle)  
Ch. Mgr. (F&S)

CGM (O&M) & OIC, GAIL, Gandhar



20/11/2010



**Action Taken Report**  
**by Gujarat Pollution Control Board.**

- As per the direction of Honorable National Green Tribunal, Principal Bench, New Delhi in O.A. 60/2021 vide order dtd. 11/06/2021, Chief Secretary of Gujarat held a joint meeting on 30/06/2021 with District Magistrate, Bharuch, Director-Industrial Safety and Health (DISH), Member Secretary- Gujarat Pollution Control Board (GPCB) and VC & MD- of GIDC as part of compliance of the said order.
- Accordingly, as per the minutes of meeting as well as referring the order dated 11/6/2021 of Hon NGT in O.A. 60/2021, Gujarat Pollution Control Board is required to implement the following :
  1. Installation of CAAQMS at Jhagadia.
  2. Assess cost of restoration of environment to be recovered from company.
    - Total EDC due to accident at UPL (U-5) is calculated as Rs. 219.71 lakh as per Hon'ble NGT order.
    - GPCB levied EDC of 1 Crs.
    - UPL (U-5) has to credit the amount in separate account.
    - This amount to be spent on restoration of environment by preparing an action plan to be approved by the GPCB and the CPCB.

- In view of above, action taken report by the GPCB is as below:

Sr. No.	Subject	Action taken by GPCB
1	Installation of Continuous Ambient Air Quality Monitoring Station (CAAQMS) at Jhagadia.	<p>The process for installation of CAAQMS has been initiated following due procedure which includes (1) Technical Specifications (2) Financial Cost and (3) Comprehensive Maintenance Cost.</p> <p>Upon availing the details, further process for procurement will begin following tendering process.</p>
2	<p>Assess cost of restoration of environment to be recovered from company.</p> <ul style="list-style-type: none"> <li>• Total EDC due to accident at UPL (U-5) is calculated as Rs. 219.71 lakh as per Hon'ble NGT order.</li> <li>• GPCB levied EDC of 1 Cr.</li> <li>• UPL (U-5) has to credit the amount in separate account.</li> <li>• This amount to be spent on restoration of environment by preparing an action plan to be approved by the GPCB and the CPCB.</li> </ul>	<p>The total cost of Environmental Damage Compensation due to accident at UPL (U-5) is calculated as Rs. 219.71 lakh as per Hon'ble NGT order dated 11/6/2021.</p> <p>As per Hon NGT order dated 11/6/2021 <i>"the compensation for damage to environment and the same may be credited to a separate account by the industrial unit for being spent on restoration of the environment by preparing an action plan, to be approved by the State PCB and the CPCB. The plan may focused on developing relevant infrastructure to prevent such accidents and provide relief in case such untoward incident happens"</i>.</p> <p>The unit is already been informed for the compliance of the directions of Hon NGT on 26/7/2021.</p>



# નિયામકશ્રી નિર્દિષ્ટ વિસ્તાર કચેરી, ગાંધીનગર

નિયામકશ્રીની કચેરી, ઉદ્યોગ ભવન, બ્લોક નં. ૩, ૪, ૫, સેક્ટર-૧૧, ગાંધીનગર-૩૮૨૦૧૧

ફોન નં. ૨૩૨૫૦૫૯૦, ઈ-મીએલ એડ્રેસ: [dirna@gidcgujarat.org](mailto:dirna@gidcgujarat.org)



ક્રમાંક:- જીઆઈડીસી/નિયામક (નિ.વિ.)/૨૧૯

તા. ૨૯/૦૭/૨૦૨૧

પ્રતિ,  
સેક્શન અધિકારીશ્રી,  
"ગ" શાખા, ચોથો માળ,  
ઉદ્યોગ અને ખાણ વિભાગ,  
સચિવાલય, ગાંધીનગર



L090010911532

Sender Name: N.A

Received

Date: 29/07/2021

વિષય : યુનાઈટેડ ફોસ્ફરસ લી. પ્લાન્ટ, અઘડીયા માં આગ લાગવાના કારણે થયેલ જનહાનિ સંદર્ભે  
નોટીફાઈડ ઓથોરીટી દ્વારા કરવામાં આવેલ કાર્યવાહી બાબત  
સંદર્ભ : આપના પત્ર ક્રમાંક :- પરચ-૧૦૨૦૨૧- મે ઈલ -૪૨-ગ તા. ૦૮/૦૭/૨૦૨૧

શ્રીમાન,

ઉપરોક્ત વિષયના સંદર્ભમાં જણાવવાનું કે, અઘડીયા નિ.વિ ખાતે યુનાઈટેડ ફોસ્ફરસ લી. માં આગ લાગવાના કારણે થયેલ જનહાનિ સંદર્ભે નોટીફાઈડ ઓથોરીટી દ્વારા કરવામાં આવેલ કાર્યવાહીની વિગતો નીચે મુજબ છે.

(૧) અઘડીયા નિ વિ ખાતે ભવિષ્યમાં આગ લાગવાના બનાવો બને તે સમયે ઈન્ડસ્ટ્રીઝ માં કામ કરતા કર્મચારીઓ/મજૂરોને તાત્કાલિક સહાય મળી રહે અને જન હાનિ ટાળી શકાય તે હેતુસર મુખ્ય અધિકારીશ્રી નિ વિ, અઘડીયા દ્વારા શ્રીમતી જયાબેન મોદી, હોસ્પિટલ સાથે તા. ૦૧/૦૭/૨૦૨૧ થી ૩૦/૦૬/૨૦૨૪ એમ ૩ વર્ષના સમયગાળા માટે MOU કરવામાં આવેલ છે.

(૨) અઘડીયા નિ વિ ખાતે ડીપીએમસી માટે એન જીટી ના નિર્દેશ અનુસાર સરકારશ્રીની એઆઈઆઈ સ્કીમમાં ઉદ્યોગ કમિશ્નરશ્રી, ગાંધીનગરને તા. ૦૮/૦૭/૨૦૨૧ ના રોજ ઓન લાઈન અરજી કરવામાં આવેલ છે.

ઉક્ત બંને કામગીરીની નકલ આ સાથે સામેલ છે. જે આપની જાણ સારું.

બિડાણ :- ઉપર મુજબ

નિયામક (નિ.વિ.)

જીઆઈડીસી, ગાંધીનગર.

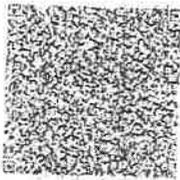
૦૧૮



सत्यमेव जयते

INDIA NON JUDICIAL  
Government of Gujarat  
Certificate of Stamp Duty

Certificate No.	IN-GJ81510156536894T
Certificate Issued Date	14-Jul-2021 02:29 PM
Account Reference	IMPACG (SV)/ gj13020304/ JAGADIYA/ GJ-BH
Unique Doc. Reference	SUBIN-GJGJ1302030498447149347828T
Purchased by	NOTIFIED AREA AUTHORITY GIDC JHAGADIA
Description of Document	Article 5(h) Agreement (not otherwise provided for)
Description	AGREEMENT
Consideration Price (Rs.)	0 (Zero)
First Party	NOTIFIED AREA AUTHORITY GIDC JHAGADIA
Second Party	SMT JAYABEN MODY HOSPITAL
Stamp Duty Paid By	NOTIFIED AREA AUTHORITY GIDC JHAGADIA
Stamp Duty Amount(Rs.)	300 (Three Hundred only)



0015678174

Statutory Alert

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Warning



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"Any alteration to this certificate renders it invalid. Use of an altered certificate without all the security features could constitute a criminal offence."

"This document contains security features like coloured background with Geometric Flexible patterns and Subtle Logo images, Complex fundamental design borders, Anti - copy text, the appearance of micro printing, artificial watermarks and other Overt and Covert features."



### Memorandum of Understanding

This Agreement ("Agreement") is by and between Smt. Jayaben Mody Hospital (JMh) on one side, and Notified Area Authority, GIDC Jhagadia (NAA), and Jhagadia Industries Association (JIA) on the other side, and is entered into as of 19/06/21 ("Effective Date").

#### SCOPE OF SERVICES:

- Smt. Jayaben Mody Hospital shall provide all Medical Services at Hospital Premises to Employees referred by either NAA or JIA.
- Tariff for treatment shall be finalized and agreed by all 3 parties on a yearly basis.
- Smt. Jayaben Mody Hospital shall provide all required available Treatment and Facilities at Hospital this includes
  - ✓ Ambulance Services & Emergency
  - ✓ Indoor Patient Services (IPD)
  - ✓ OPD Services – Consultations Only
  - ✓ Pre-Employment & Periodical medical check up
- JMh Consultant's reserve the rights to Transfer the patient during the treatment depend upon the condition of patient and available facilities, the decision of Treating Doctor of Smt. Jayaben Mody Hospital shall be final.
- JMh reserves the rights to file a Medico – Legal case with local authority if in any case it is found to be done as a part of patient treatment procedure.
- JMh shall generate the Invoice against Services provided to the particular member industry from whom a patient is received, on completion of treatment as per Agreed Tariff.
- JMh shall update periodically the Schedule of Charges in case any changes/updated in services.

#### SCOPE for NAA / JIA

- NAA / JIA shall refer the Employees whoever need Medical Services at JMh with Reference Slip signed by an Authorized Signatory only.
- In case Employees are covered under Health Insurance then employees need to submit the necessary document at Hospital Insurance Desk immediately after Admission.
- JIA Members shall be encouraged to utilize the services of JMh for Annual Health Checkups / Pre-employment Checkups for their Employee which will be offered at Special Rates with mutual understanding.

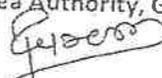
Terms & Conditions:

- JIA Member Industries will release the Payment in Favor of "Smt. Jayaben Modi Hospital" on receipt of Invoice within 15 days.
- JMH will provide support to the company for Health awareness activities, like Health talks, specialized camps etc. These will be complementary from hospital side.
- Any discrepancy in meaning of any words/phrases, interpretation shall be made with mutual agreement.
- Either party may terminate this Services Agreement at any time with cause upon Sixty (60) days prior written notice.
- This MOU shall be in existence for the period from: 1/7/2021 to 30/6/2024 and can be extended further with mutual agreement.

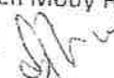
All three parties have signed and executed this agreement on the day, month and year mentioned in this in the presence of the following witnesses:

IN WITNESS WHEREOF, the parties hereto have executed and delivered this Agreement as of the Effective Date.

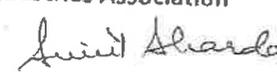
Notified Area Authority, GIDC Jhagadia

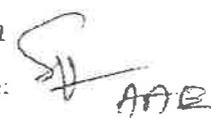
Signature: -   
Name: - Barmaniya Parash Kumar H.  
Title: - chief officer

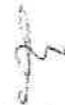
Smt. Jayaben Mody Hospital

Signature: -   
Name: - Dr. Anura D Chankhan  
Title: - Medical Superintendent

Jhagadia Industries Association

Signature: -   
Name: - SUNIL G. SHARDA  
Title: - GENERAL SECRETARY

Witness 1  
Signature: -   
Name: - SHAILESH CHOTHAM  
Address: - SIDC, Jhagadia

Witness 2  
Signature: -   
Name: - SUNIL KUMAR JHAGAT  
Address: - ANKLESWARA

IFF

Serial Number	Application Id	Project Name	Application Ref No.	Application Name	Application Submission Date	Pending Days	Last updated Date	Status	tying with User
1	1463151	Notified Area Authority, GIDC Jhagadia		Scheme for Assistance Industrial Infrastructure 2015	30/06/2020 12:17 PM	104/90	21/12/2020 01:25 PM	Under SLEC	Clerk One Infra, Gandhinagar
2	1928220	Notified Area, GIDC Jhagadia		Scheme for Assistance Industrial Infrastructure 2015	08/07/2021 03:32 PM	1/90	15/07/2021 09:37 PM	Under Scrutiny	Clerk One Infra, Gandhinagar