

GIASPURA, LUDHIANA
APRIL 30, 2023

7:15-7

Individuals from five families were affected in the Ludhiana gas leak. Of these, three families lived in the houses seen in the photograph. Overall, 15 people fainted in a span of 15 minutes and were taken to hospital. Of them, 11 were declared dead on arrival while four survived

1 Residence of brothers Gaurav and Saurav Goyal; their mother Kamlesh; Saurav's wife Preeti and their son Yug. A house guest, Amit, was also present. Except Yug, all fainted, starting with Gaurav, who survived; rest died.

2 Residence of Navneet and Neetu. Navneet's brother, Nitin, also present. All of them fainted; only Nitin survived

3 Residence of Harishchander and Ruby Devi. Ruby Devi fainted but survived

4 Arti clinic (not visible in the image, adjacent to House 2), run by Kavilash, a doctor who lived upstairs with his wife Varsha and their three children. All fainted and died.

5 Residence of Rajesh Kumar (across the street, not visible in the image) and his wife Kavita Devi. Rajesh fainted, but survived.

These two manholes, the residents suspect, released the gas that caused the deaths

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5-7:30am



Despite ample laws and implementation structures, industries continue to release untreated effluents into the environment. What can be done to make the defaulters follow the law? A report by **ROHINI KRISHNAMURTHY** from **LUDHIANA**, **SEEMA PRASAD** from **VAPI** and **SHREYA VERMA** in **DELHI**

EARLY MORNING on April 30, Giaspura, a nondescript locality on the outskirts of the heavily industrialised district of Ludhiana, Punjab, witnessed a bizarre sequence of events. Gaurav Goyal, a neighbourhood grocery store owner, had barely opened his shop around 7.15 am when he sensed a foul smell. Two minutes later, he fell unconscious. There was a commotion. Neighbours alerted his mother Kamlesh, his brother Saurav and his sister-in-law Preeti, who lived upstairs. Amit Gupta, a guest of the family, was also present. All of them were knocked unconscious as they climbed down the stairs to help Gaurav.

Meanwhile, neighbours Navneet Kumar, Neetu and Navneet's brother Nitin ran to help. They all fainted on the street. Kavita Devi, whose refreshment shop is across Goyal's, also sensed the stench. It was unbearable, she recounted, when *Down To Earth* (DTE) visited the town on May 5. She tied a napkin around her nose and mouth and picked up Saurav Goyal's eight-month-old son, Yug. Amid the melee, Navneet Kumar's neighbour Kavilash, a doctor, stepped out to help the victims. He then entered his house to alert his wife and three children. All of them fell unconscious.

Police reached the scene at 7.30-7.45 am and cordoned off the area. The ambulance arrived at 7.45 am. Overall, 15 people in the locality had fainted and were taken to hospitals. Of them, 11 were declared dead on arrival and four survived. Yug, who was orphaned, was sent to his maternal aunt.

On May 22, when the magazine went to print, the authorities were still trying to find the type of gas that leaked, its source and how it killed people. Hatinder Kaur, civil surgeon in Ludhiana, who was involved in the treatment, tells DTE that preliminary evidence shows the cause of death was asphyxia (deprivation of oxygen) due to inhalation of a poisonous gas. Post-mortem and clinical features of the survivors suggest that hydrogen sulfide or a combination of gases was responsible. "We cannot be certain about the gas until viscera analysis and pathological examination are done, which may take a month," Kaur adds. Hydrogen sulfide is produced naturally when organic matter decays without oxygen. The gas gives an unpleasant smell at concentrations above 0.5 parts per million (PPM); can cause irritation and nausea at over 10 PPM; and result in respiratory and eye injuries above 50 PPM. Concentration above 50 PPM is life-threatening and fatal at 700 PPM, resulting in "immediate collapse and death, within just one or two breaths," as per the US Department of Labor.

"I have never heard of people dying of gas emanating from a gutter," says Vishal Singh, a crane operator in Giaspura. Singh and other residents DTE spoke to suspect that an industry dumped chemicals into a manhole in the locality, which reacted with sewage, creating a deadly cocktail of gases that they inhaled. Such instances are not uncommon in the region. In 2019, the state government's Punjab Biotechnology Incubator found many industries releasing untreated effluents directly into municipal sewers. Anand Kumar, who oversees operations of sewage treatment plant at Jamalpur, Ludhiana, says industries discard wastes into sewers at night and that the municipal corporation is not clear about the underground sewer network.

Shena Aggarwal, commissioner of the municipal corpo-

PRELIMINARY EVIDENCE SHOWS THE CAUSE OF DEATH WAS ASPHYXIA (DEPRIVATION OF OXYGEN) DUE TO INHALATION OF A POISONOUS GAS. POST-MORTEM AND CLINICAL FEATURES OF THE SURVIVORS POINT AT HYDROGEN SULFIDE OR A COMBINATION OF GASES



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ration, acknowledges this and says the corporation has plans to map the sewer network using GIS technology.

Small wonder, local activists have been demanding relocation of industries that operate out of areas like Giaspura, where factories and residences coexist. "This is a wake-up call," Lakhanpal, a retired colonel of the Indian Army and member of Buddha Darya Action Front, tells DTE during a protest in the city on May 7. The civil society group has been demanding since 2014 an end to industrial waste dumping in Buddha Nullah, a 40-km seasonal rivulet that runs through Ludhiana and empties into the Sutlej river. "Factories have been allowed to come up in residential places. So, they send waste into domestic lines," Ahhbaab Singh Grewal, spokesperson of the ruling Aam Aadmi Party, tells DTE. "Notices have been issued and culpable factories sealed last year," Grewal says, acknowledging that more needs to be done and industries should be removed from residential areas.

Meanwhile, the police commissioner of Ludhiana has registered a case under section 304 (causing death by negligence) of the Indian Penal Code, and has constituted a special investigation team (SIT) to investigate the Giaspura tragedy. The National Green Tribunal and the deputy commissioner of Ludhiana have also constituted committees to investigate the issue. The authorities are looking at two possibilities. First, uncleaned sewers may have caused hydrogen sulfide to build up to deadly levels. However, Aggarwal tells DTE that the sewers were cleaned as per schedule. The second possibility is illegal dumping of industrial effluents. To investigate this, the authorities are considering the role of other gases, such as carbon monoxide, ammonia and phosgene, Suhail Mir, additional deputy commissioner of police, Ludhiana, and member of the SIT, tells DTE. Samples from the manholes have been collected to zero in on the source. To nab people who may have dumped chemicals into the sewers, the police have collected CCTV footage from the vicinity. "So far, we have found no leads," says Mir.

CHEAPEST WAY OUT

Industries across India do not seem to mind releasing untreated effluents in the environment—sewers, roads, rivers, even pumping into aquifers—if no one is watching

THE LUDHIANA gas leak highlights a nagging problem common throughout the country—illegal disposal of industrial effluents. The Environment (Protection) Act, 1986 and the Water (Prevention & Control of Pollution), Act 1974, require industries to have effluent treatment plants (ETPs) or common effluent treatment plants (CETPs) as well as sewage treatment plants (STPs), and to treat their effluents/sewage to meet the stipulated environmental standards before discharging into waterbodies. In practice, however, things are quite different. The authorities do punish industries that flout environmental norms. The actions include closure of the unit, fines, disconnection of the sewer line, closure of the unit and filing of FIR with the police. For instance, the Punjab Pollution Control Board (PPCB) shut down Ramal Industries, a dyeing unit in Focal Point locality of Ludhiana, after it was found discharging effluents into the municipal sewer on April 26. But industry bodies resist such actions.

After the April 30 Giaspura gas leak tragedy, industry associations are holding a protest at the office of general manager, District Industries Centre, Ludhiana, demanding that they be allowed to run operations from mixed land use areas. Even before the gas leak, on March 2, Ludhiana industry representatives asked PPCB to not take action against units that do not meet rainwater

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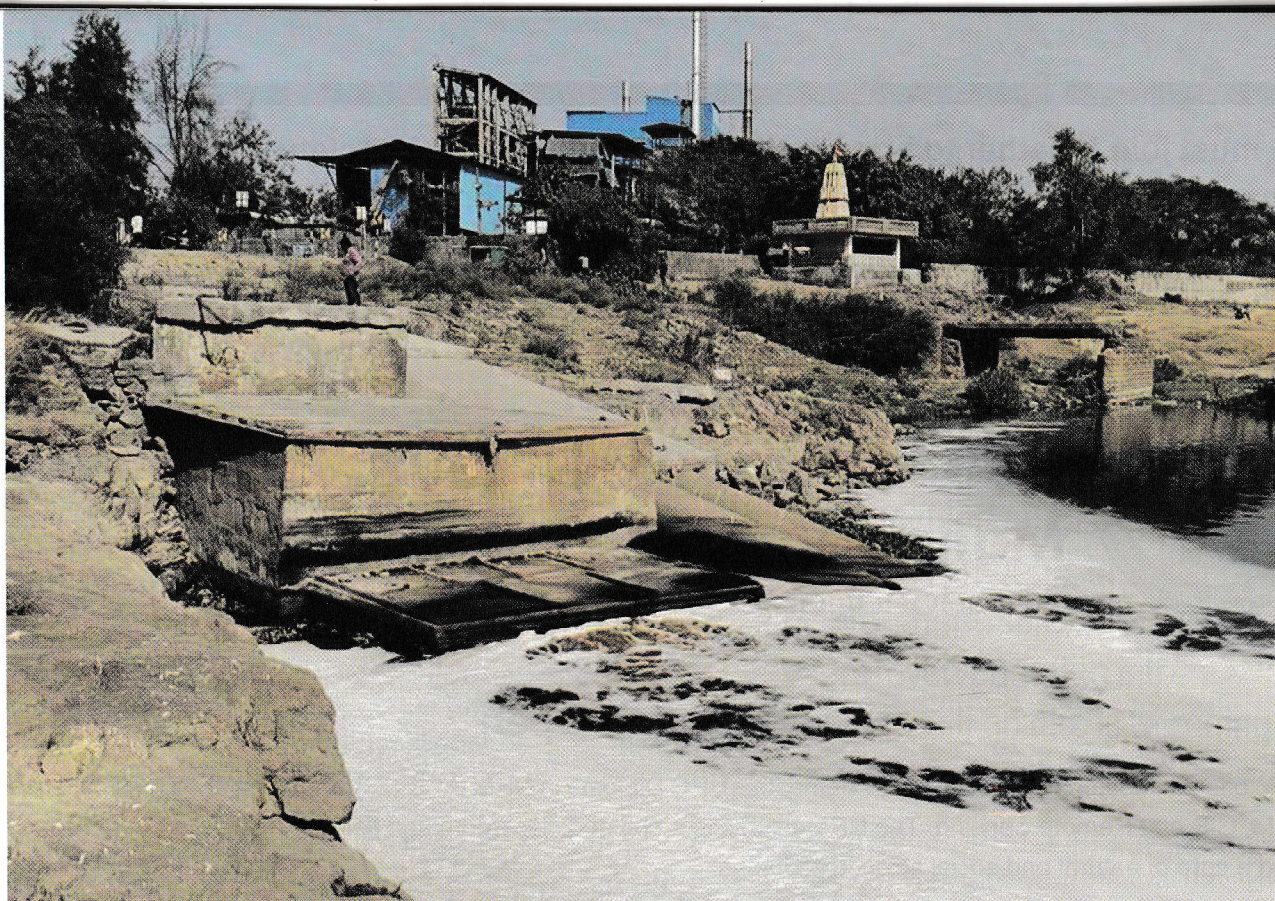
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harvesting norms or are operating in mixed land-use areas.

Some 40,000 registered industries operate in Ludhiana, Rakesh Kansal, general manager, District Industries Centre, Ludhiana, tells DTE. The district has 2,028 of Punjab's 2,423 polluting industrial units. This includes 228 dyeing and 1,649 electroplating and surface treatment (treating a material to make it receptive to inks, paints, adhesives or resistant to weather or chemical attack) units. Some 20,000-30,000 units could be unregistered, Kansal says. Many of these discharge their effluents, directly or indirectly, through the Buddha Nullah, a seasonal rivulet that passes through Ludhiana and empties into the Sutlej river. Waters of the Sutlej are used for drinking in southern Punjab. PPCB has graded the water quality of Sutlej as Class C (drinking water sources with conventional treatment followed by disinfection) before it merges with Buddha Nullah. But after the two waterbodies meet, the grade drops to Class E (suitable for irrigation, industrial cooling but not for drinking).

Activists working in the area call for urgent reforms. Jasjit Singh Gill, a retired colonel in the Indian Army and former

The common effluent treatment plant at Vapi industrial cluster of Valsad district, Gujarat, releases treated industrial effluents in the Damanganga river, but surveys have found the discharge does not meet the norms

member of the State Task Force on Buddha Dariya Rejuvenation Project, says the authorities should conduct a chemical audit of sewage outlets of all industries in the city. "Since these industries operate hand-in-glove with officials, the administration and the municipal corporation should take environmental activists along while conducting the audits," he says. Gill also asks industries to be forthcoming. In Giaspura, boards in front of buildings list the company's name and consent from PPCB, but do not reveal the type of industry (electroplating or cycle parts manufacturing) or the types of chemicals used in the process. According to Gill, these companies should also mention if the effluents are treated in-house or sent to a CETP.

PAN-INDIA STORY

Similar is the case of Vapi, an industrial cluster of 500 units located between two rivers, the Damanganga and the Kolak, in Valsad district of western Gujarat. Vapi has one CETP that treats industrial effluents as well as sewage. While treated industrial effluents are released into the Damanganga river, the treated sewage reaches the Kolak river through Bill Khadi, a natural drain. Both the discharges have caused problems in the two rivers, say residents of villages



CARRYING CAPACITY MATTERS

Government must set the discharge norms on the basis of the carrying capacity of the area

Rohit Prajapati

THE COMPREHENSIVE Environmental Pollution Index reports of 2009, 2011, 2013 and 2018 prepared by the Central Pollution Control Board have raised fundamental questions about the reliability of environmental impact assessment (EIA) reports and environmental clearances (ECs). The assessments are done by accredited consultants and the clearances are granted by government authorities. They are based on the norms prescribed by the authorities for air and water pollution, industrial effluents discharged and the carrying capacity of the area.

But when the government sets the discharge norms, does it set them on the basis of the carrying capacity of the area? It is important to note that since land and water-related ecosystems are dynamic and interconnected, their carrying capacity also varies with the other interventions we implicate on them. Untreated or poorly treated sewage and effluents could cause irreversible damage to land, groundwater

and waterbodies. The characterisation and quantification of pollution load through chemical oxygen demand, biological oxygen demand, ammonia-nitrogen and heavy metals in kg/day in the industrial effluents and sewage getting dumped will help prepare plans for the restoration and rejuvenation of the natural resources.

The treatability of any wastewater depends on its constituents and the way the treatment system is operated. Depending upon the constituents, the wastewater may be termed biodegradable (having simple, biodegradable compounds), difficult-to-biodegrade (having complex organic compounds), or non-biodegradable (having toxic chemicals, heavy metals). It appears that the major method of treatment being used is to convert one form of pollution into another—for instance, from liquid to gas or solid—to achieve the prescribed norm for the wastewater. At times, to reduce pollution in the river, the liquid effluent is converted into powder form and dumped at a hazardous waste dumping site. This method only diverts surface pollution to groundwater pollution.

(The author is an environmental activist based in Ahmedabad, Gujarat)

situated on the banks of these rivers.

Fishers who depend on the Kolak say their catch has reduced to half in the past two decades. Raksha, a fisher from Kolak village along the Kolak, attributes it to the chemical effluents dispersed into the river along with treated sewage from the CETP. "There are also two textile industries upstream that directly release effluents into the river once every fortnight," says Aziz Nizamuddin, deputy sarpanch of Kolak village. He says the prevalence of mouth, skin, blood, and spine cancer is very high in the village. "You can say that almost one person in every household has or has had cancer, but they do not identify themselves because they want to protect their kin's marital prospects."

Nearly half of the units in Vapi are manufacturers of chemicals, dye and textile. The units have their individual ETTPs to bring down the chemical-oxygen demand (COD, a measure of oxygen available in the water to break down pollutants) of the effluent to 1,000 mg/l, and then send it to Vapi's CETP, which further brings the COD down to 250 mg/l, before releasing it into the Damanganga. However, at the point of release in the river a yellow trail is clearly visible, indicating high pollutant load. An inspection by the Gujarat Pollution Control Board (GPCB) and the Central Pollution Control Board (CPCB), from July 2022 to September 2022, also shows that the quality of samples at the inlet and outlet of Vapi CETP are beyond the prescribed limits. At the CETP's outlet, the concentration of total suspended solids was 167 mg/l (against the prescribed norms of 100 mg/l), fixed dissolved solids at 8,961 mg/l (2,100 mg/l), chloride at 2,768 mg/l (600 mg/l), sulphate at 1,351 mg/l (1,000 mg/l), COD at 258 mg/l (250 mg/l) and cyanide at 0.22 mg/l (against the norms of 0.2 mg/l).

Instead of ensuring that the industries adhere to discharge norms, the state government, since 2019, is trying to implement a project to divert industrial effluents through a pipeline from Vapi CETP to the Arabian Sea. The Daman administration has taken a stay on the project from the Supreme Court in 2019.