

ON December 3, 1985, the country observed the first anniversary of the Bhopal tragedy. One day later, on the morning of December 4, a massive gas leak took place in Delhi, a leak which has so far claimed three lives and injured several hundred other people. The leak was yet another grim reminder of the dangers posed by chemical industries all over India. And once again, the sordid pattern of the Bhopal tragedy was revealed: the utter lack of social responsibility among some industrialists, the indifference of the authorities to public safety, the absence of emergency safety and health measures, and the subsequent attempts at whitewashing the tragedy.

The leak

The December 4 leak took place at the chemicals production complex of Sriram Foods and Fertiliser Industries (SFFI), situated in west Delhi on Najafgarh Road. At about 10.30 am a tank of oleum (H_2SO_4) collapsed, causing a rupture in a connecting pipe and letting loose tonnes of acid. This acid reacted with water, large quantities of which were sprayed on it in a thoroughly misguided attempt to neutralise the spill, to form a dense cloud of sulphuric acid and oleum mist, sulphur trioxide, and sulphur dioxide. This dangerous cloud travelled low along the ground for a distance of over 10 km, causing severe discomfort and panic among lakhs of people in the crowded localities of Sadar Bazar, Chandni Chowk, Kashmere Gate, Old Delhi Railway Station, etc. Markets closed down, traffic got jammed and people felt a choking, burning, nauseating sensation as visibility got reduced to a few metres. Fortunately the cloud did not linger long over any area, reaching the Jamuna, over 10 km away, 20 to 25 minutes after starting off. But by then the damage had been done: Over 700 people were hospitalised, one of whom died two days later, a second some 10 days after, and a third as late as in mid-February 1986. No one knows how many more will succumb, for the long-term health consequences of exposure to this mixture of gases is not yet fully known. Such consequences could range from consistent, mild irritation and moderate reduction in lung capacity to irreversible fibrosis and death.

In the public outrage that followed the leak, the SFFI management was ordered to shut down its factory by the Inspector of Factories, Delhi Administration, its general manager and two other officials were arrested (and subsequently released on bail), and a petition asking for its permanent closure at the present location was admitted in the Supreme Court.

Indifference and negligence

The leak did not really come as a surprise to those who had been observing the Sriram plant for some time. Indeed, warnings about the threat it posed were issued several times before the leak, both by government and non-governmental agencies.

SFFI is actually quite an old industrial complex, established in 1944 as DCM Chemicals. Spread over an area of 76 acres, the complex contains several production units, producing caustic soda, hydrochloric acid, sulphuric acid, alum, superphosphate fertiliser, bleaching powder, vanaspati, active earth, refined oil, soap, glycerine, and liquid chlorine. The complex also has a captive power plant meeting most of its needs.

Several times in the past, SFFI

Chronicle of a leak foretold

In an important judgment recently, a division bench of the Supreme Court allowed the Shriram Foods and Fertiliser unit in Delhi to restart operations but only after it has implemented strict anti-pollution and safety measures. Recalling the gas leak from this factory on December 4, 1985, which affected several hundred people and claimed three lives, ASHISH KOTHARI reports on investigations carried out by Kalpavriksh, an environmental action group, over the last six months.

has given clear indications of the threat it poses to its workers and to the surrounding population. The residents of several colonies nearby have been complaining about the irritating smell of gas and have reported frequent gas discharges from the factory. On December 17, 1982, 40 school children fell ill, some losing consciousness, while walking along a path adjacent to the place where SFFI discharges its effluents into the Najafgarh drain. On September 10, 1985, a leak from the sulphuric acid plant affected several hundred residents in nearby colonies. Other minor leaks have been reported and even two days after the December 4 incident there was a leak at the sulphuric acid plant.

While the sulphuric acid plant has been the most common source of leaks, it is SFFI's caustic soda-chlorine plant which has posed the greatest threat. This unit produces over 66,000 tonnes of caustic soda per annum, and as a by-product of this process about 26,500 tonnes of chlorine per annum. Part of this chlorine is used by SFFI in the manufacture of hydrochloric acid and bleaching powder, a substantial part is piped over to the adjacent Hindustan Insecticides Ltd. and the remainder bottled for sale to other customers. There is also a chlorine storage capacity of almost 300 metric tonnes.

It is the presence of chlorine in such a large quantity that has evoked the greatest alarm. Chlorine is known to be extremely toxic to humans, and was in fact used as a large-scale killer in World War I. Long-term (chronic) exposure to low levels, or sudden (acute) exposure to high levels can seriously affect the respiratory tract and cause lung oedema, suffocation, chest constriction, and death. The safety limit, or tolerance level value (TLV) for chlorine has been fixed at one ppm (ie one part per million parts of air) by most countries.

At SFFI the potential danger is of two sorts - regular low-level emissions, and sudden high-level leaks of chlorine. The former has frequently been reported by workers of SFFI, and in January 1985 the Central Pollution Control Board measured chlorine levels of upto two ppm, twice the TLV, near the stable bleaching powder plant. But it is the latter - sudden leaks - which could be disastrous. Till recently SFFI was storing liquid tanks of upto 100 metric tonnes capacity - an accident like the one which occurred in the sulphuric acid plant on December 4 could release tonnes of deadly chlorine in the form of a mist which would spread over several square kilometres.

Each of the expert committees which has looked at the caustic soda

plant has stated that the result of such a leak would be catastrophic: several thousand people may die or be permanently maimed, and several lakh could be affected in varying degrees. And the possibility of such a leak occurring has been far from remote - as has been repeatedly pointed out, safety conditions and emergency measures at SFFI, including at the caustic soda plant, are thoroughly inadequate. The most chilling reminder of this was the December 4 leak itself.

The negligence of SFFI's management is indicated by other observations too. Workers of SFFI, members of the Lokhit Congress Trade Union, have presented elaborate details not only of lack of certain basic safety measures but also careless maintenance of equipment. A Kalpavriksh member who visited the plant noticed a general state of disrepair, especially glaring being rusted and broken pipes all over the place. Two government reports, one in February 1985 and another in October 1985, both pointed out serious flaws in the maintenance system. On an inspection on January 8, 1985 the Central Pollution Control Board found the stack of the superphosphate plant broken - it seems it had been broken for quite some time. But one of the most damning pieces of evidence comes from an internal note of SFFI itself, in which the superintendent of another unit complained about the frequent overflows of acidic effluents from one of the units.

Finally, proof of SFFI's negligence comes from the highly revealing records of the Central Pollution Control Board. Measurements of air and water effluents over the last several years have shown levels of pollution consistently exceeding the prescribed limits. In March and April 1981, suspended solids in SFFI's combined industrial effluent were found to have an average concentration of 920 mg per litre as against the permissible limit of 100 mg per litre; average oil and grease, concentration was 94 mg per litre as against a limit of 10 mg per litre; and flourides concentration was 4.8 mg per litre as against a limit of two mg per litre.

Effects on the environment

The frequent release of gases, along with the normal emissions from the industrial processes at SFFI, have already created a highly unhealthy local environment. The constant presence of sulphur dioxide, and perhaps also chlorine, in the air has caused "burning" and bleaching of vegetation in the area. A PhD thesis by Poonam Mohindra of the Botany Department, Delhi University, revealed that the growth and yield of crops such as wheat and

sunhemp in the SFFI area are far lower than at a relatively unpolluted site in the Delhi University Botanical Garden.

It is, of course, necessary to point out that SFFI is not the only source of pollution in the area; there are several other industries. But SFFI is by far the single largest source. The human health impact of such high pollution levels is not well studied or documented, but interviews with residents of several nearby colonies indicated a high level of respiratory and eye problems.

Indeed, even low levels of sulphur dioxide and chlorine, which are not immediately dangerous, can cause, over a long period of exposure, problems like reduced pulmonary function and higher susceptibility to diseases like TB.

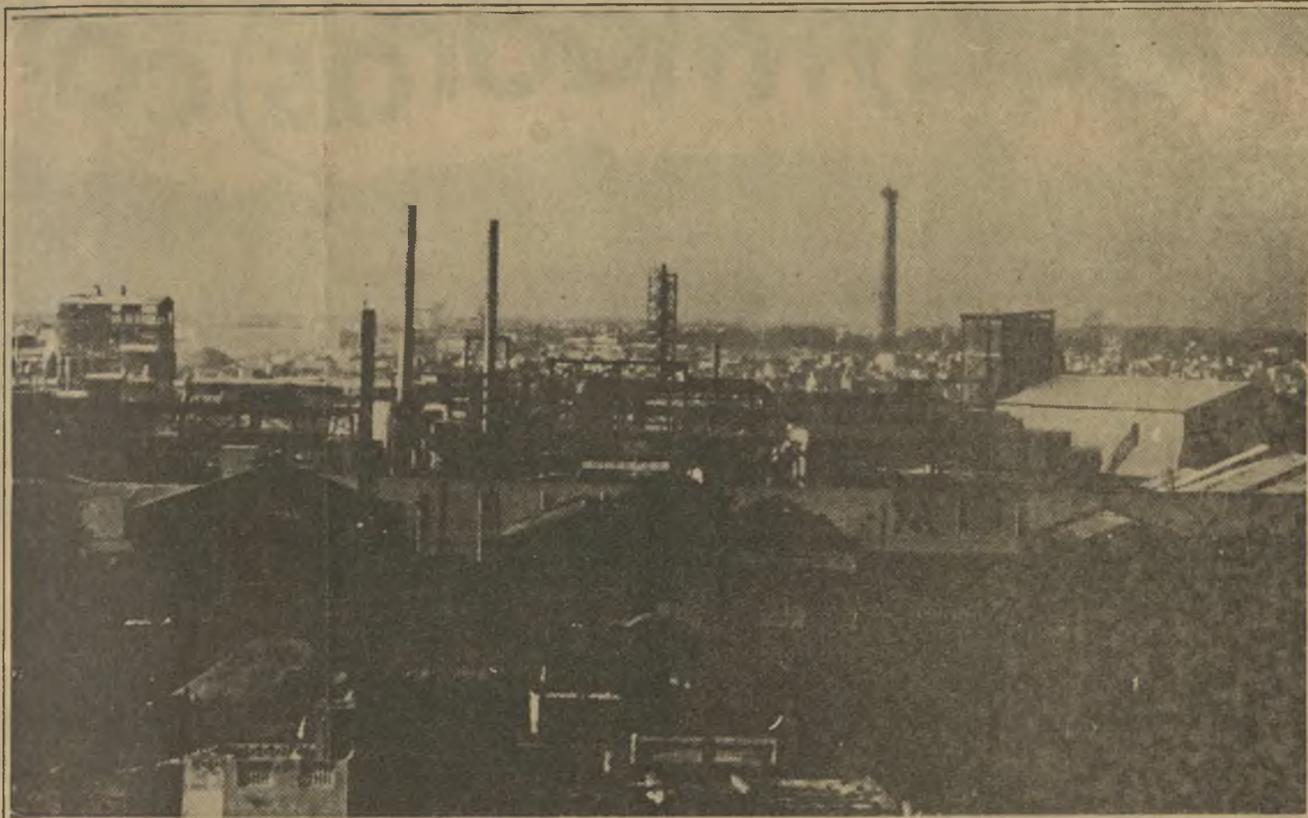
The plight of the workers

Perhaps the people most exposed to an unhealthy environment are SFFI's own employees. Working conditions in almost all of SFFI's units are hazardous, the major problems being dust, heat, noise, toxic gas, and machinery accidents. The DCM chemicals Lokhit Congress Trade Union has documented five fatal accidents in the last two years, all of them due to official callousness. Apart from these, several workers have been inflicted with a range of injuries caused by machine accidents and acute gas exposure. But the largest number of workers are being affected slowly, chronically, through constant exposure to dust, noise, heat, and low levels of gas. Dust levels, for instance, are extremely high at the coal handling plant and the superphosphate plant. The latter is always enveloped in a yellowish haze, consisting of particulate flourides which could lead to flourosis in the workers.

In the turbine room of the power plant, noise level is so high that one has to shout to make oneself heard to someone standing even a few feet away. Yet when Kalpavriksh members visited the plant they did not see a single worker at these units wearing dust screen masks, goggles, or ear muffs. Workers allege that such equipment is rarely provided; according to a trainee at the SFFI store, the equipment does exist but is rarely issued out. The SFFI management maintains, however, that it is given to workers, who do not use it because of the resultant inconvenience. But even if this is true, the management cannot escape the blame for having such a terrible working environment.

The inaction of the authorities

The atrocious safety and pollution control record of SFFI is an elo-



The Shriram Foods and Fertiliser factory in Delhi: spewing death

Photo: ASHISH KOTHARI

quent testimony to the kind of negligence shown by its management and owners. But they are by no means the sole culprits - a certain degree of negligence has also been shown by the various government agencies responsible for ensuring public safety. This is amply shown by the fact that despite repeated indications of the threat SFFI posed, the government allowed it to continue functioning in the midst of such a heavily populated area until the December 4 tragedy.

Specifically, one can pinpoint some agencies or officials who must be held accountable in this case. Under the Factories Act, 1948, and the Delhi Factories Rules, 1950, an inspector of factories is appointed who is supposed to ensure that all industrial units in Delhi comply with rules concerning labour, environmental safety and working conditions. Records of the factories inspector, Delhi Administration, reveal that periodic checks of SFFI had unearthed several violations of the rules in the last few years.

But the subsequent prosecutions only acted as minor irritants for SFFI; there was no serious effort to ensure that all the rules were complied with. Even more significant is that while the last inspection of the sulphuric acid plant, on May 28, 1985, revealed several violations, it did not expose the dangerously weakened support structure of the oleum tank which collapsed on December 4. Evidently the inspection was not thorough enough.

Similarly, the Central Pollution Control Board is supposed to ensure that an industry's air and water emissions do not exceed permissible limits. The board has indeed been pursuing this issue with SFFI for several years, and has repeatedly found excessive emissions, as discussed above. Yet despite this knowledge the board did not use its power to ensure compliance; it only repeatedly threatened to withdraw its consent order. At one point in 1985 it even threatened legal action, but none was taken despite continued violations by SFFI. Interestingly, when Kalpavriksh members had spoken to some of the board's

officials in October 1985, they were told that barring SFFI's vanaspati unit, none of the other units had excessive discharge. Why should the board try to shield SFFI?

The Union Government too is to blame. The then Union Minister of Chemicals and Fertilisers, Veerendra Patil, in a Lok Sabha discussion on SFFI's chlorine unit in March 1985, flatly rejected the demand made by some MP's to shift the unit. This was despite reports by a British chemical expert, Dr D. H. Slater, and by the then Secretary (Labour), Delhi Administration, Nita Bali, both of whom had explicitly recommended shifting the chlorine unit. Patil vaguely stated that the licence of a factory, once given, was not so easy to revoke. This sounded strikingly similar to the statement, made in the Madhya Pradesh Assembly long before the Bhopal tragedy, that the Union Carbide Plant was not a mere "stone" that it could be translocated. Quite clearly, in both Bhopal and Delhi, the government has given precedence to the interests of industrialists over the interests and safety of the public.

This is not to deny the fact that a few government officials did stand up for the truth. Some officials of the Central Pollution Board and the Inspectorate of Factories, Delhi, did conduct honest studies but were largely ineffective in getting these acted upon. The one person who took creditably bold steps was the former Secretary (Labour), Delhi Administration, Nita Bali. Way back in March 1985 she explicitly recommended that the Ministry of Chemicals and Fertilisers suspend SFFI's chlorine production licence. That she was transferred soon after this, before her term had been completed, indicates that she may have tread on a few toes.

Yet another facet of the negligence of the authorities is the total absence of an emergency safety and evacuation strategy for those living around SFFI or other such hazardous plants. Such a strategy requires that the surrounding population be fully aware of the potential hazards of a factory, and of how to react in

case of an emergency such as the one created on December 4. Furthermore, all local hospitals, police stations, fire brigades, and other such essential service agencies should know how to react. That there is no such strategy was amply demonstrated by the total chaos and panic which followed the leak. Many hospitals did not know what line of treatment would be most effective; the fire brigade was misinformed about how to stem the leak (they sprayed water on the oleum which only reacted and aggravated the situation); All India Radio's broadcast appealing for calm came only two hours after the leak; Door-darshan misleadingly stated that the gases which leaked were not "toxic"; teachers in many schools panicked and sent children hurrying back home even before the gas cloud had dispersed; and so on.

One of the most shameful parts of the December 4 leak was the public statement by Dr S. Varadarajan, Director General, Council of Scientific and Industrial Research, that the gases which leaked were "not toxic". He did add that they could be harmful, but it is the first statement which registered in the public mind; the finer scientific distinctions between toxicity, poison, and hazard are of little use while making a public statement. In any case some standard textbooks on the subject classify sulphuric acid and sulphur trioxide as toxic, and all of them state that they can be extremely harmful.

Look at what SFFI said in a note filed in the Supreme Court: "It is further submitted and as corroborated by Dr Vardarajan... that the sulphur trioxide gas that escaped on December 4, 1985 is not hazardous". And, shamelessly, even further: "This respondent (SFFI) is only aware of the death of one person as reported in the newspapers. It is submitted that the said unfortunate death cannot be attributed to gas leakage" (emphasis mine).

Public action

Following some publicity of the report of D. H. Slater on the

hazards posed by SFFI's caustic soda - chlorine plant, several individuals and agencies took up the issue. Some journalists wrote about it, and Municipal Councillor P. K. Chandla repeatedly highlighted it. Residents of colonies adjacent to SFFI also reacted publicly, especially after the leak of September 10, 1985 which affected them. In September, 1985, the Delhi Committee on Bhopal Gas Tragedy, an association of over 20 environmental, civil rights, cultural and other organisations, began investigating the issue. Convinced of the gravity of the situation the Delhi committee organised a full-day dharna on October 21, 1985 to press home its demands to relocate the chlorine and sulphuric acid plants and to provide a safer working environment. Around the same time M. C. Mehta of the Hindustani Andolan filed a petition in the Supreme Court pleading that the chlorine plant be shifted. On December 3, on the occasion of the first anniversary of Bhopal, the Delhi committee again highlighted the danger posed by SFFI. Fifteen hours later, the massive leak of oleum took place. It may never have, had the warnings of these individuals and organisations been heeded in time.

As in the case of the Bhopal tragedy, the whole sordid story of SFFI and the December 4 gas leak in Delhi raises a number of vital questions. Is the present developmental process in India insensitive to the basic human right to a safe environment? Do we really need the kind of dangerous industries represented by SFFI, and if so, can we ever ensure that they will indeed be more beneficial than harmful? Why do we not have a system whereby corporate and government liability is established and their accountability ensured? Why is it that in India, the public has almost no access to, let alone a right to, information which directly relates to their lives? With tragedies like the December 4 one coming increasingly into focus, proponents of such policies will find it harder to evade the questions being raised.