



Organization Resources
Counselors, Inc.

Memorandum

December 22, 1986

To: ORC ERPG Task Force
ORC Occupational Safety and Health Group
ORC Occupational Safety and Health Physicians Group
ORC Occupational Safety and Health Lawyers Group
ORC International Safety and Health Forum

From: Darrell K. Mattheis

Subject: A Potential "Bhopal" in Bombay, India

Hope is said to spring eternal, and one might hope that governments and businesses everywhere, but especially in India, would take every possible precaution to avoid another incident such as Bhopal. If the article that was published in Business India, (September 22-October 5, 1986, (here included) is accurate, the Indian Government and local businessmen have learned nothing!

Bhopal has been an expensive lesson for American industry as a whole, and particularly so for the chemical industry. But, because we did not "make hay while the sun shines", we can expect to face even greater difficulties. The environmental, health, and safety legislation currently on the books can be used in ways that could cause us major difficulties.

We still have two years in which to take some significant action; if we do not we can only blame ourselves for what happens. We have also included here an interesting article by Professor Lester Lave, from the University of Pittsburgh, which was published in the Wall Street Journal December 17, 1986. Dr. Lave discusses some of the problems that may face the business community in the next two years.

Darrell K. Mattheis

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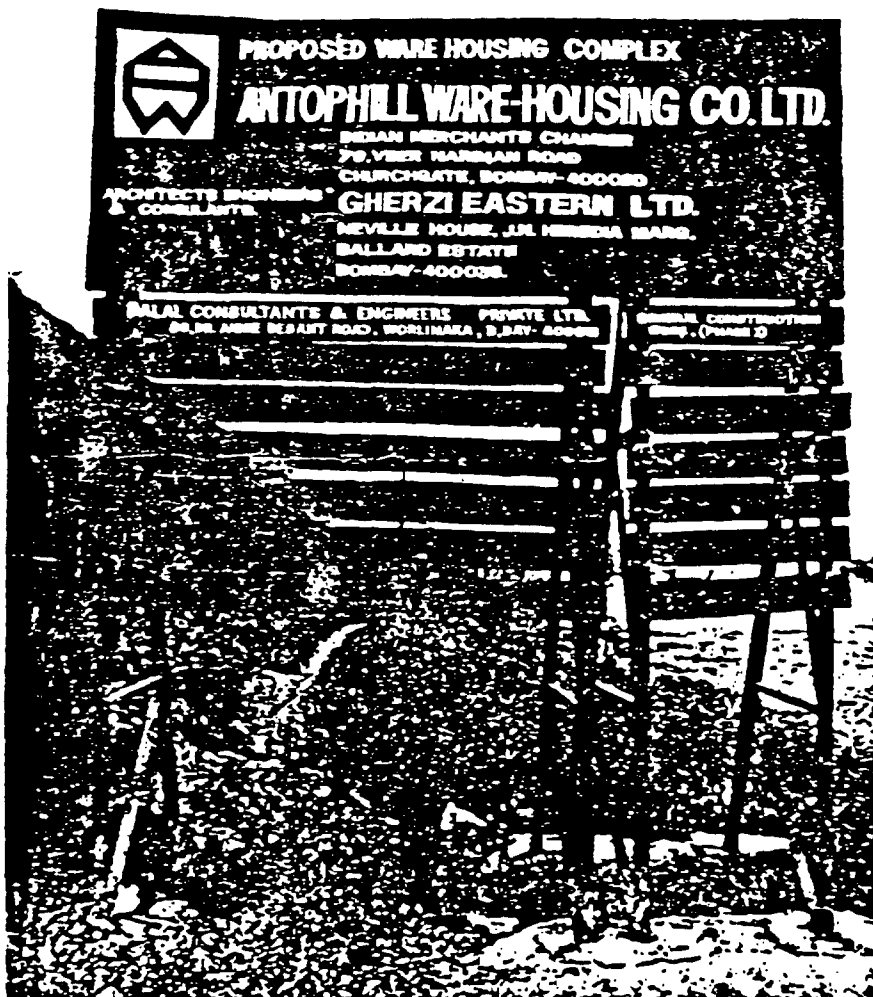
Cover Feature

This project will make Bombay a Bhopal

Incredible as it may seem, a large scale storage facility for 'hazardous' and 'extra hazardous' chemicals is under construction in the heart of Bombay city. The Antop Hill Warehousing Corporation, a Rs 34-crore project promoted by the Indian Merchants Chamber and approved by the government of Maharashtra and the Bombay Municipal Corporation, violates even the most basic requirements of safe chemical storage and constitutes a hazard to the people of Bombay on a scale that could exceed even the horrors of Bhopal.

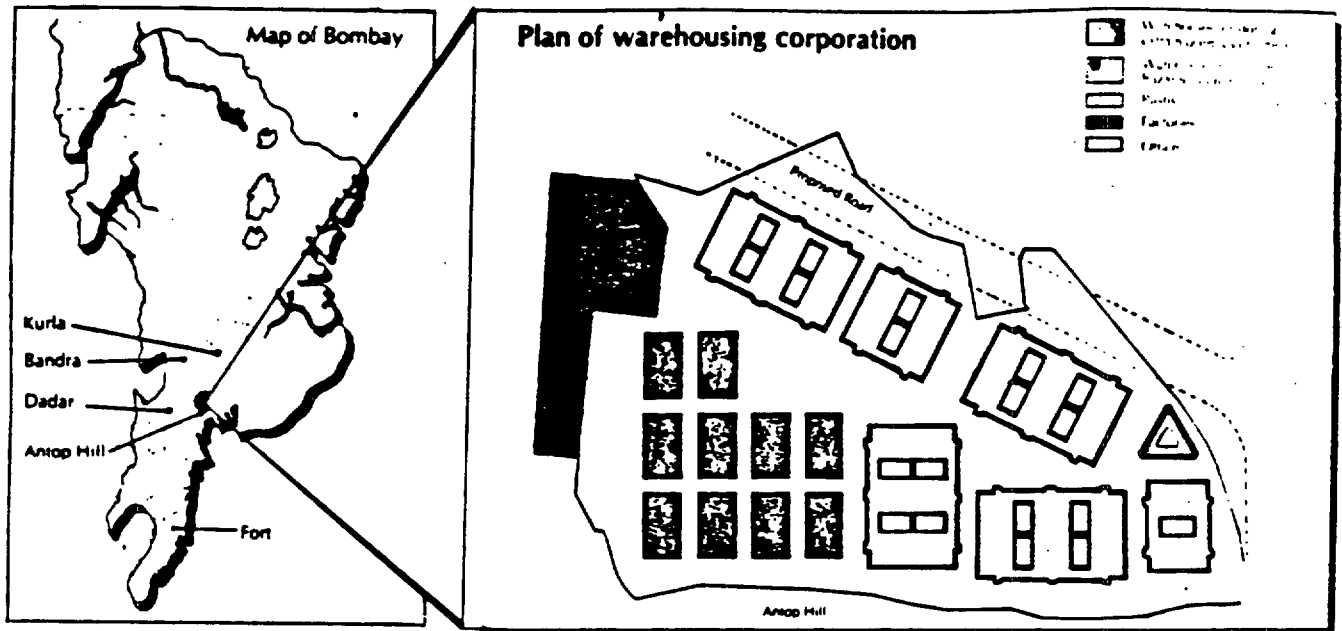
The government of Maharashtra must be credited with a sense of humour if nothing else. For how else would one describe it not as a bizarre joke, a policy that compels industry and even the wholesale markets to shut out of Bombay city in the interest of public health but permits, in their place, the construction of an enormous chemical storage facility especially earmarked for extremely hazardous chemicals, and that too located in the very heart of the city? Unfortunately, it is all too real. Within four years, Bombay will claim the distinction of housing what might well be the single most dangerous chemical storage facility in the world.

The Antop Hill Warehousing Company Ltd (AHWC) was conceived in 1975 as a solution to the problem posed by the haphazard (and often unauthorised) storage of hazardous chemicals within the city of Bombay. The chemical trade has traditionally been concentrated in the city's densely populated B and C wards, their proximity to the port made this area a natural choice for a trade that has



The Antop Hill Warehousing Corporation has a capacity to store 50,000 tonnes of extremely hazardous chemicals. Considering that in Bhopal just 40 tonnes of MIC escaping from a tank spread over 40 sq km in the space of one hour, killing 2,500 and injuring more than 200,000 people, the consequence of a mishap at Antop Hill can well be imagined.

Cover Feature



been principally centred on the import of chemicals. Unfortunately, however, the storage of chemicals within this area, usually in godowns located in the basements or ground-floors of predominantly residential buildings, exposed their inhabitants to extreme risk. In the last 15 years, this area has witnessed at least three major chemical fires, the most recent of which, in Vadgadi in 1975, claimed 40 lives and completely destroyed 8 buildings.

It was thus only a matter of time before the government decided to relocate these stores in a less densely populated part of the city. After considering several possible sites, the government offered to lease, through the Bombay Municipal Corporation (BMC), 19 acres of land at Antop Hill in Wadala, to the north east of the island city (see map), for the construction of a large warehousing complex. It was to be used exclusively for the storage of chemicals that are classified as either 'hazardous' or 'extra hazardous' under the BMC Act.

The project was promoted by the Indian Merchants' Chamber (IMC) on behalf of its four member associations in the chemical trade: the Bombay Kariana, Colour and Chemical Merchants Association; the Chemical and Alkali Merchants Association; the Chemists and Druggists Associations and the Indian Chemical Manufacturers' Association. In 1982 the AHWC was incorporated with a share capital of Rs 25 crores, a 20-member board of directors with equal representation of the participating associations and with IMC ex-president J. N. Guzder as chairman.

The complex, which is estimated to cost Rs 34 crores, consists of 16 large warehouses for chemical storage. Of these, 6 will be three-storied structures comprising a total of 1,040

independent units of approximately 6,000 cubic feet each, to store 'hazardous' chemicals. The other 10 buildings are ground floor structures which together contain 140 units of the same size, but exclusively meant for 'extra hazardous' chemicals.

Since the terms 'hazardous' and 'extra hazardous' were understood to refer primarily to the materials' explosive or inflammable properties, approval was sought and obtained from the Chief Controller of Explosives at Nagpur for the project's design and in particular its safety features. The chief controller of explosives, along with the fire department, were the only authorities to carry out some sort of technical and safety evaluation of the project; and it will be seen later how inadequate these were.

A population of over 75,000 resides on the perimeter of the site. Within a one kilometre radius lie Parel, Dadar, Matunga, Dharavi and Wadala — the combined population of which would be more than 1.5 million. Within a radius of 5 km, the better part of Greater Bombay falls.

Briefly, the safety features incorporated in the design of these buildings include 8 inch thick reinforced concrete walls, capable of containing a blaze for four hours; a double layered floor with a sump in between to safely dispose material that spilled; large courtyards within each building and a 4 feet verandah encircling each floor to enable easier access to the storage units in the event of fire; two entrances to each unit for ease of movement and an automatic water sprinkler system for the extra hazardous units.

The extra hazardous units are grouped in two rows on either side of an 11 foot wide uncovered corridor. Each unit is separated by a 2 feet air gap from the next, and is provided with a large ventilator in its roof. Each block of 14 such units is further protected with water curtains. The complex will store large quantities of water on site, in two 110 cubic metre tanks, which can be pumped out at the rate of a 1000 gallons per minute.

To minimise the risk of accidental spills while handling containers, the movement of chemicals within the complex will be entirely based on a system of trolleys and elevators. The complex will also include a special fire station, a 1,200 line telephone exchange and an electrical sub-station.

The 1,190 units will be sold to members of the participating associations, subject to a maximum of 1,200 sq feet each and restrictions on the right of re-sale. The purchaser shall be bound to use the space for the specified purpose, to be ensured by a special allotment committee which will have 2 BMC representatives with "the right to veto an application on grounds of improper use of valuable space", as Guzder puts it.

Cover Feature



When the site was selected in 1975 the area was virtually uninhabited. Since then huge hutment colonies have sprung up in the vicinity

As for the hazardous substances in question, they will include any of the thousand odd items listed in parts II and III of Schedule M of the BMC Act of 1888, including combustible solids and liquids, materials that emit inflammable gases when brought in contact with water, substances liable to spontaneously combust, oxidising agents, corrosives and poisonous substances. All these materials would have to be packed in discrete containers or drums in the case of liquids, since AHWC does not provide for bulk (tank) storage. Originally, the project was to have included storage of explosives as well, but permission for this was denied by the controller of explosives.

Guzder describes the project as "unique"; to the best of his knowledge, this is the only "integrated" warehousing complex for storing such a large variety and volume of hazardous chemicals anywhere in Asia, perhaps the world. This could well be true. Says S. S. Barodia, senior project manager, Gherzi Eastern Limited, architects and consultants to the project, "We asked our principals in Zurich for plans of similar facilities in Europe or the U.S. but they couldn't find any".

And that is precisely what is disturbing about the project. It does not seem to have occurred to its promoters that the reason why nobody else in the world has thought of storing such a vast number of chemicals in such large volumes in a single facility might be that the very concept of such a facility constitutes a unique invitation to disaster.

An important lesson the chemical industry learnt from the Bhopal gas disaster was that more than just the degree of toxicity or volatility of a chemical, it is the volume of the chemical in storage that determines the degree of risk involved. In the Bhopal gas leak, there can be little dispute that it was the sheer volume of

chemical released that transformed what might otherwise have been just another chemical accident into a catastrophe. This is why much of the efforts of the chemical industry since then have focussed on the need to minimise — and wherever possible totally eliminate — the storage of hazardous intermediates by their conversion into end products.

This, in fact, was also one of the most important recommendations of the Environmental Safety Committee set up by the government of Maharashtra in the wake of Bhopal disaster, under the chairmanship of Dr. R. K. Garg, then director, chemical engineering group, BARC. The Garg committee, which was asked to evaluate safety systems in hazardous industries in Maharashtra, recommended: "Storage of intermediate products which are hazardous in nature should be restricted to eight hours' requirements, and before any plant is shut down all such intermediate products should be consumed".

It is ironic that a committee set up to investigate and recommend measures for preventing other catastrophic accidents on the scale of Bhopal should have overlooked the one project with such a potential. Garg says that AHWC was never brought to his committee's notice. Worse still is the realisation that even after Bhopal, neither the government nor the industry (to the extent that the Indian Chemical Manufacturers Association is a participating body) have learnt their lesson, and that the government is actually giving fresh inducements to industry to store large volumes of extra hazardous chemicals in densely populated areas.

AHWC's proposed system of storing thousands of tonnes of chemicals in drums and cylinders cannot be described as an accepted method of chemical storage at all.

Drums, cylinders and carboys are used for temporary storage of chemicals and for ease of transport. Storage for any duration and on a large scale is an extremely complex (not to say, hazardous) affair, requiring extensive knowledge of the properties of the chemicals, especially their affinities and behaviour under different circumstances (temperature, pressure etc).

Bulk storage poses enormous technical problems of maintaining the material in a stable state, and in the event of an emergency, of disposing of it safely. Established industrial practices therefore stipulate that storage and safety systems should be specifically adapted to the material being stored. The tanks holding the chemical must be constructed of materials that the chemical does not corrode, the chemical might have to be stored under pressure in an inert atmosphere or insulated from moisture in the air; it might have to be continuously agitated to maintain uniform consistency and temperature; the tank might have to be insulated and refrigerated depending upon the storage temperature required. Some chemicals require the addition of inhibitors to prevent the material from reacting with itself upon prolonged storage, others have to be frequently monitored with the help of pressure, temperature and level indicating instruments.

In spite of these precautions, were the stored material to become contaminated, there could arise the possibility of its undergoing a violent reaction, generating heat and pressure and resulting in an explosion, or in the material escaping into the atmosphere. To cope with such an exigency, the storage unit would have to be provided with pressure relief systems which allow excess pressure to be relieved, water deluges to rapidly cool the tanks and finally, scrubbers and incinerators to neutralise the material before its release into

the atmosphere.

The design of the AHC does not reflect any awareness of these essential requirements. Conceived as a temporary storage or transshipment facility, the warehouses will not be equipped with either storage or safety devices. But there is reason to believe that in practice, the facility will be used for more than temporary storage. The few safety features that have been incorporated in the design are based on the mistaken assumption that fire constitutes the main hazard. (Recall, for instance, that there was no fire in Bhopal.) And here again, the emphasis is on effective fire control, quite oblivious of the fact that it is the proposed storage plan (or rather the lack of one) that, more than anything else, increases the risk of fire.

The crucial flaw in the proposed storage plan lies in its indifference to the danger of violent chemical reactions occurring between stored chemicals, ie the problem of chemical incompatibilities and affinities. The Safety Data Sheet for every chemical lists, under a separate head, 'reactivity data', ie the substances that the chemical in question is known to react with and should therefore be kept away from. For example, Ammonia (which is used in the manufacture of explosives, synthetic fibres and nitric acid) "reacts vigorously with chlorine, bromine, iodine, chlorate and hypochlorites releasing heat and poisonous gases... and may form explosive compounds with mercury, gold and silver". Or Acetone (a solvent for paints, plastic and rubber and a chemical intermediate) "reacts explosively in contact with potassium tert-butoxide, sulphuric acid-dichromate solution... and may react explosively with oxidising agents such as chlorine, peroxides or permanganate."

Over a decade ago, recognising the dangers of chemical reactivity, the UN committee of experts on the transport of dangerous goods devised a nine fold classification of hazardous substances: explosives, compressed or liquified gases, inflammable liquids, inflammable solids, oxidising substances, toxic substances, radioactive substances, corrosives and

miscellaneous substances. On the basis of this classification, the International Maritime Organisation developed guidelines for stowing these substances on board ships, specifying the minimum distance to be maintained between goods of different classes.

The lowest category (requiring relatively smaller physical separation) specifies that the substances must be "separated by a horizontal distance of not less than 3 metres"; the second category specifies 12 metres; the third states that the two substances should be "separated by a complete hold or compartment" and a distance of not less than 20 metres; the fourth category raises this to 40 metres. For instance, explosives, almost in every case, are grouped under category 4; organic peroxides are also grouped in category 4 in respect of inflammable gases, category 3 in respect of inflammable liquids and category 2 in respect of all other groups; and so on.

By contrast AHC's two fold classification of all the substances it intends to store as 'hazardous' and 'extra hazardous' is utterly inadequate and quite meaningless. It relies on a distinction made in schedule M of the BMC Act which groups combustible liquids into three categories to determine the maximum permissible limits for unlicensed storage. Thus the 'extra hazardous' category includes any liquid that has a flashpoint of less than 23°C, while 'hazardous' applies to those with flashpoints ranging between 23°C and 65°C. (Flashpoint is the temperature at which vapour from a chemical can ignite.) This classification is meant for licensing purposes and was never meant to function as the basis for a rational storage plan.

AHC has arbitrarily selected an index of volatility (flashpoint) as the basis for its storage classification. Apart from the obvious fact that this index is specific to inflammable liquids, which makes it quite irrelevant as a basis for classifying either solids or gases, the more important point is that this classification completely ignores both the toxicity and the reactivity of the materials stored.

Why AHC should insist on separate

buildings for storing the two classes of substances is something of a mystery, considering that within these buildings, and in fact within every one of the units, wholly incompatible chemicals are permitted to be stored.

The word 'permitted' is a bit misleading because there is no indication that the AHC's promoters have even considered the issue. This is apparent from the fact that every one of the 140 units for 'extra hazardous' goods has been provided with an automatic water sprinkler system for fire control. Clearly, units with water sprinklers are highly unsuited for storing chemicals listed under section 4.3 of the UN code, ie substances which on contact with water emit inflammable gases. Where, for instance, would AHC store methyl isocyanate (MIC), the gas involved in the Bhopal tragedy? It has a flashpoint of -18°C and reacts explosively with water. Little wonder then that S. B. Chandalia, professor of chemical engineering, University department of chemical technology, Bombay, describes the project as "absurd" and highly inconceivable."

Just how serious this problem of chemical reactivity is can be seen from the fact that the only other warehouse used for storing hazardous goods, operated by the Bombay Port Trust (BPT) at Haji Bunder, has seen 3 major fires since 1973, in each of which an entire godown was destroyed. In every case, the cause of the fire was ultimately traced to the improper storage of highly reactive chemicals. The BPT, at least, appears to have learnt something from these accidents. Its new hazardous cargo warehouse currently under construction at Haji Bunder incorporates the International Maritime Organisation guidelines, with separate storage areas for the 8 different classes of goods.

The absence of a segregated storage plan, coupled with the fact that the storage units will be privately owned, makes the already difficult job of regulating chemical storage quite impossible. Even if a detailed inventory of the materials stored, their quantity and location within the complex was to be maintained, this would not ensure against im-



The AHC's share capital is Rs 25 crores. It is headed by a board comprising representatives of the participating trade associations

proper storage. Nothing prevents an individual from placing containers of incompatible substances in close proximity to one another.

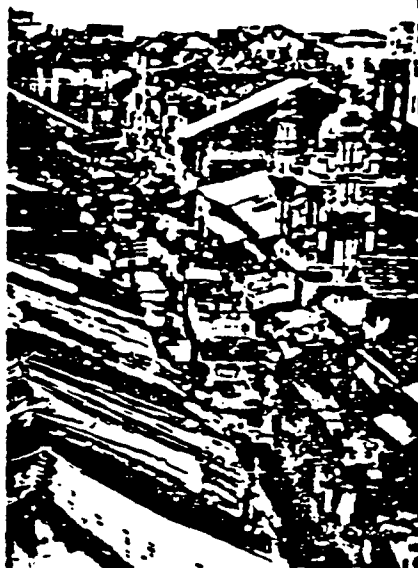
Given the present arrangement, the only way to ensure safe storage would be to keep the 1,190 units under continuous surveillance. But the BMC's team of four inspectors from the licensing department, or for that matter any staff that AHWC might employ for the purpose, are hardly likely to be able to monitor even a fraction of these. And their job is not made any easier by such routine trade malpractices as mis-labelling containers, understating the quantities stored and disguising the containers to resemble non-hazardous cargo.

It need hardly be stressed just how difficult this will make the task of fire control within the complex. Here, for instance, is what the Shell safety manual recommends: "Most important: know what you have got and where it is. Have a ground plan kept up to date... so that correct fire fighting procedures can be applied with maximum speed... group products for fire-fighting purposes into lots where water or foam can be used and into lots where only dry powder can be used."

It should be evident from this that the "approvals" obtained from the Chief Controller of Explosives amount to very little. AHWC's random storage methods blatantly disregard even such elementary and self-evident rules not only preclude the possibility of effective fire control, but actually increase the possibility of fire.

Guzder quite candidly admits that the project's planners have not given any thought to the problem of chemical aminities. Theoretically, nothing prevents AHWC even at this stage from regrouping the individual storage units along the lines of the Haji Bunder Warehouse, but would this be acceptable to the users? Very unlikely, for the reason that each trader deals in a variety of chemicals and would insist on keeping the entire lot in his possession. This allows him great flexibility in his operation, and more important, makes him so much less liable to any form of regulation or control. Consider the wealth of information that a detailed inventory plan would provide to the tax department! Given the current business practices of chemical dealers and small manufacturers, any storage plan based on complete and detailed disclosure of information about the materials stored would be sure to run into stiff opposition.

Even if the warehousing project were not so obviously unsafe, its location in the midst of the island city is sufficient cause for grave anxiety. When the site was selected in 1975, the area to the east of Antop Hill, stretching from Koliwada to Sewri, was virtually uninhabited. It had the advantage of being situated



Over ten years ago a chemical fire claimed 40 lives and gutted 8 buildings at Vadgadi, a traditional trading centre

on the northern boundary of the dock estate, thus permitting direct transport of these hazardous materials from Haji Bunder without having to use public thoroughfares. Moreover, BMC officials claim that Antop Hill provides a natural barrier between the site and neighbouring communities in Matunga and Matunga to the west. Finally, they argue that a north-east location is best suited for hazardous industry as the dominant wind pattern over Bombay (from the North west or South west) ensures that emissions or escaping material would be carried away from populated areas.

However, in the ten years that have elapsed since its selection, the site has lost almost every feature that had once recommended it. Huge hutment colonies have sprung up in the vicinity, some of which are actually located on land earmarked for the project. Some of these might be relatively recent, but others like Kamla Nagar, Shanti Nagar, Dalit Nagar, Barkat Ali and Ganesh Nagar have been included in the last census. In fact, the largest of the bastis, Sangam Nagar, probably has a population in excess of 25,000. To the north of the site, across the Indian Hume Pipe plant, lies sector 7 of the Central Government Staff Quarters with at least another 20,000 inhabit-

ants. To the south west, the BPT has constructed a large housing complex for its workmen.

All this could mean a total population of over 75,000 residing on the perimeter of the site! In fact, if one were to draw a one kilometre arc with the AHWC site at its centre, the area enclosed would include Sewri to the south, Parel, Prabhadevi, Naigaon, Dadar, Matunga, Mahim, Dharavi, Sion and Wadala — the combined population of which would be in excess of 1.5 million. Extend the radius to 5 km and the better part of Greater Bombay is covered.

To put the issue in perspective, it may be useful to consider that just 40 tonnes of MIC seeping from a tank in Bhopal spread over 40 sq km in the space of 1 hour, killing over 2,500 people and injuring another 200,000. AHWC, with over 7 million cubic feet of storage space, could potentially hold 50,000 tonnes of extremely hazardous chemicals. In a 'worst case' scenario, the consequences of a mishap involving such huge quantities can well be imagined.

As if this were not sufficient, the Indian Oil Corporation operates a tank farm on Antop hill, where over 10 million litres of kerosene are stored. The distance between the site and the tank does not exceed 500 metres. An explosion in the chemical complex could have a disastrous impact on the tank farm. And officials of the Indian Oil Corporation are not even aware of the nature of the AHWC project coming up right in their backyard!

In the event of an emergency, the neighbouring population would have to be evacuated. But both the major routes leading out of the city on the east pass so close to the site that they would in all likelihood be unapproachable. In any case the siting of the city's new truck terminus adjacent to the AHWC site will only increase the volume of traffic on these routes, rendering them impassable in the event of an evacuation. Finally, the dominant wind pattern cited in support of the location does not give a very good indication of conditions on the ground. In fact, as meteorological department itself states, "the surface winds blow from the NE sector upto 1130 hrs IST. From 1230 hrs onwards winds blow from NW sector upto 2130 hrs. Subsequently the wind gradually weakens with increasing calm conditions and turns to the NE sector". The point being that land breezes blowing through the night would carry any airborne material from the site towards the city. In the context of a major chemical fire which generated toxic fumes or even an accidental leak on the scale of Bhopal, a 100 ft hill offers very little protection indeed.

It isn't very surprising therefore that almost everybody familiar with the project, except of course its promoters, agree that it is fraught



That such an ill-conceived project should have progressed so far speaks volumes about the competence of our regulatory authorities and the recklessness of those involved

with risk. R. K. Garg, for instance, points out that the project having been conceived 9 years before Bhopal should be subjected to a fresh scrutiny by a committee of experts. At the same time, government as well as BMC officials try to justify the project on the ground that even in its present form the project presents a safer alternative to the present system of unplanned storage in the congested B & C wards.

But is this really true? For one thing, instead of the present widely dispersed storage, AHWC seeks to concentrate these extremely hazardous and volatile chemicals at one point, thereby actually increasing the risk manifold. Secondly, the dangers that the residents of Vadgadi are spared are instead inflicted on those of central Bombay. The argument about the proximity of the site to the port, which therefore obviates the dangers of transporting chemicals by road is equally specious; considering that the bulk of these chemicals are intended for consumption outside the city of Bombay they will in any case have to be transported on city roads. Besides the user industries in the city are in any case under pressure from the government to relocate. Why should they be allowed to enter the city at all? Consider that the BPT does not allow the storage of extremely hazardous substances (what it classes under group A) anywhere in the dock estate. These goods have to be unloaded in mid stream, carried in barges to Haji Bunder and immediately taken possession of by the consignee. Explosives are unloaded only in the Naval Dockyard.

But more important, AHWC significantly increases the risk of catastrophic failure by encouraging a larger quantity of chemicals to be stored. It is estimated that about 25,000 sq feet of godown space is currently used to store chemicals in the city. AHWC seeks to increase

this to almost 6,00,000 sq ft. BPT handles a total of 40,000 tonnes of hazardous goods a year through its Haji Bunder terminal. AHWC can store this entire quantity at one time!

So what is the alternative? The storage of hazardous chemicals within the city's B and C wards cannot be allowed to continue; but neither would it be prudent to relocate them elsewhere within the city. The most obvious solution would be to shift the entire project to the mainland as in the case of wholesale markets for agriculture produce and iron and steel. Nhava Sheva port offers a point of discharge for these materials and a separate pier could be provided (or reserved) for this purpose. The Maharashtra Industrial Development Corporation (MIDC) has several sites earmarked for development as industrial zones. One of these could perhaps be allotted for constructing a warehousing complex along the lines of the new Haji Bunder warehouse. Such a location would also be advantageous in view of its proximity to existing centres of chemical manufacture at Thana, Belapur, Talaja, Rassayani, Patalganga, Thal Vaishet and Nagothane, the site of IPCL's Rs 1,200 crores gas cracker project.

While shifting the project to a less densely populated area makes eminent good sense, such a measure would still not eliminate the intrinsic hazards of large scale chemical storage. Ultimately, the answer would have to lie along the lines suggested by the Garg Committee: reduce inventories of hazardous intermediates to an absolute minimum; eliminate the need for process storage by adopting continuous process, closed loop systems; and most important, like the BPT, insist that users take delivery of these materials directly from manufacturers. Says Professor Chandalia, "Why should traders be allowed to import such hazardous chemicals? Let users do it.

When the law is weak and authorities incapable of enforcing it, how can we permit such a decentralised method of storing and handling highly toxic materials?"

One could go a step further and ask why the government permits the handling and storage of dangerous substances by small traders and manufacturers who lack the financial and technical capacity to do so safely. Instead of complaining about the inadequacy of resources for creating an enforcement machinery, the government should consider whether it wouldn't make more sense to restrict the possession or use of such materials to those who can make the requisite investment in safety equipment, and who can afford to continuously monitor and improve the process employed with a view to making it safer for the public at large. In reconsidering the Antop Hill project and in evaluating possible alternatives, the government would do well to extend the scope of its deliberations to answer these questions.

It is shocking that such an ill-conceived project should have progressed so far. It speaks volumes about the competence of our regulatory authorities and the recklessness of those involved. That even the catastrophe at Bhopal has not sufficed to force a re-examination of the project, let alone its abandonment, is truly amazing. Every single element that combined to produce the horror of Bhopal is present in the Antop Hill venture — large quantities of highly volatile materials, insufficient care in storing the materials, inadequate safety precautions and a large neighbouring community at risk. That a threat of such a magnitude could be so casually overlooked by all concerned suggests something more than callousness. It is as if Bhopal never happened.

ARUN SUBRAMANIAM

A New Wave of Environmental Laws Looms

By LARRY LAVE

Jan. 28, 1988 will mark the onset of a flood of new health, safety, and environmental regulation that will swamp that of the early 1970s. Impossible? Didn't regulation dry up in 1984 with Ronald Reagan's mandate to "get the government off our backs"? To be sure, Watt, Burford & Co. attempted to curtail regulation, or at least to cork the flow. But they soon departed as liabilities, leaving the agencies with "technocratic" administrators and instructions not to antagonize either the public or business.

For six years Mr. Reagan has focused on taxes, the budget deficit and defense expenditures. Inattention has not solved the health and environmental problems. Six years of accumulating pressure is about to explode. The majority of Americans continue to want something done about toxic waste dumps, water quality, air pollution and occupational hazards.

No one should doubt the political appeal of these issues. Congress delayed adjournment and campaigning for reelection to pass the Superfund and Drinking Water Acts. Overwhelming majorities voted for laws that will impose major costs, that could be used to halt industry and that will do little to improve health or the environment. The bills focus on unrealistic worst cases and hypothetical risks, and embody unattainable goals, they divert at-

tention from pressing environmental problems such as radon in homes. Just before an election, Mr. Reagan could have tested his 1980 mandate, vetoing burdensome, un-sound legislation. If he had, the Republican Senate was ready to override.

Separately, he did veto an egregious pork barrel "clean water" bill that included sewer projects. It's a good bet Congress will put that one over the top when it reconvenes.

Looking ahead to 1988, will presidential candidates tell the voters in New Hampshire that Mr. Reagan was right: to do nothing about acid rain except some ill-focused research? Who will say that the Reagan regulatory agencies have done such a good job that no further action need be taken on air pollution, drinking water, waste dumps, occupational health and safety, and nuclear power?

No presidential candidate could win without attending to the environmental safety issues that have been ignored by President Reagan. Candidates will vie to be responsive to perceived needs, underlining the rift between business and the public.

The day will have passed when relatively inexpensive controls on sulfur emissions, which could have been tried but haven't, will buy time for understanding acid rain. The slowness in setting occupational carcinogen standards will prompt

hans or impossibly stringent standards. The failure to develop a program on toxic chemicals in the environment has led to wasting billions of dollars and given rise to Superfund and California's Prop. 65, an even harsher measure that passed with 60% of the vote last month. Chlorofluorocarbon refrigerants may be banned immediately to protect stratospheric ozone, rather than via a five-year phase-out that would allow development of environmentally benign substitutes.

Not taking timely action shifts the debate to motives and trust, away from how to accomplish near-term goals effectively. By 1989 a thoughtful approach will be precluded by the perceived need to act.

The nation is about to repeat the mistakes of the 1970s with legislation and regulation that are inefficient and ineffective. The scientific basis of the 1970s decisions was slim and often reflected outmoded or even incorrect science. Billions of dollars were wasted on sewage-treatment plants that were never operated, tall stacks to diffuse air pollution over a larger area, and jerry-rigged auto-emissions control. In the haste to be responsive to public demands, Congress and the regulators guessed rather than wait for facts and analysis to guide multibillion dollar decisions. Officials failed to inform the public about what was possible.

A repeat binge in 1989 will result in partial paralysis, more markets lost to foreign producers, and an environment not appreciably cleaner nor Americans appreciably safer.

If the scenario seems pessimistic or cynical, look at the extent to which the foundation for decision-making has been improved. Scientific advances in the past decade have done little to resolve the debate about the health effects of sulfur oxides and ozone in the air or trace amounts of chemicals in water. Of the 70,000 commonly used chemicals, only a tiny portion has been tested for toxicity. Our igno-

rance has actually increased since the size of the problem has grown more rapidly than scientific understanding.

A more promising scenario is possible. We aren't lemmings and can see the cliff. The Reagan administration and business have two more years "at bat" to demonstrate that health-environmental programs can be effective and efficient in meeting the public's goals, as many hoped would occur in 1981. Twenty-five months remain to show that air and water quality can be improved without needless expenditures or disruption, that the most important occupational health and product safety issues can be handled, and that a policy can be developed to handle the pressing toxic problems, despite the controversy about the ultimate solutions. Even if the White House doesn't act, business and the agencies can work cooperatively to shore up the scientific foundation, learn about the basis of public fears and desires, and learn how to initiate a dialogue with the public to decide how safe is safe enough and how clean is clean enough.

Twenty-five months is not sufficient time to complete this foundation, but beginning now is far less costly than day-dreaming until 1989. Anyone with the courage to look will see the Phoenix stirring in the ashes of environmental policy.

Mr. Lave is Higgins professor of economics at Carnegie-Mellon's Graduate School of Industrial Administration and a consultant to the Environmental Protection Agency.

Yesterday's News Today

By DONALD G. SMITH

I don't remember a lot about my college journalism classes.

I do recall the introductory course being devoted to memorizing "Who-What-When-Where-and-Why" and trying to remember who John Peter Zenger was. In Journalism II we learned to ask pertinent questions, and the rest of the four years was spent writing anti-establishment articles for the school paper. Our paper was markedly short on hard news and long on anti-establishment editorials.

One thing that wasn't taught was that wonderful old newspaper cliché—Anniversary Journalism, or two for the price of one on every news story. This allows the paper to wait for 12 months and then rehash the same thing under the "Time Flies" or "Has It Really Been a Year?" category.

I was first impressed with this thought: one pleasant spring day a few years ago—March 15, 1980, to be precise—when I saw an unfolded morning paper and knew that the name John Hinkley would present itself somewhere on the first ten pages. It did. The day was the first anniversary of Hinkley's unsuccessful attempt to remove Ronald Reagan from office.

I can already anticipate much of the newspaper output for the coming year. In 1981 we will see remembrances on the 60th anniversary of the Lindbergh flight (May 20-21) and the first nuclear picture with a sound track "The Jazz Singer" (Oct. 6). There will be prior 30th anniversary coverage about the Hindenburg disaster (May 6) and the Japanese sinking of the American battleship Panay (Dec. 12)—we will see

it all replayed before our apathetic eyes.

For those who want something a bit more current, and perhaps a tad more folksy, Billy Carter introduced Billy Beer on Oct. 31, 1977, and Key West, Fla., seceded from the Union for one day (April 23) in 1982, establishing itself as "The Conch Republic." Those writers looking for 10- and five-year anniversaries are already halfway home on those days.

What we are talking about here is a growing trend in the newspaper business to give the archives more prominence than the traditional helper, or backup, role that those great vaults have always played. (What's more, papers these days have reminder services lest they forget.) I suspect that many newspaper writers start the day in the files, looking for anything that happened on whatever date it happens to be; and if they have to settle for a fire in a shoelace factory, so be it.

Frankly, I would like to see the end of Anniversary Journalism. With the exception of the Fourth of July and possibly Errol Flynn's birthday (June 20), I don't see a lot that is worth commemorating in newsprint. I want to know what is happening now and what might happen tomorrow, and I have little interest in a stroll down memory lane with the ink-stained wretches. It all boils down to a desire for more who-what-when-where-and-why and a lot less tempus fugit. I think that Horace Greeley and William Allen White would agree with me.

The second anniversary of Mr. Smith's Journal debut comes up March 14.

Notable & Quotable

Jean Kirkpatrick, former U.S. ambassador to the United Nations, in a report published earlier this year by the Ethics and Public Policy Center, "History, Geography, and Citizenship: The Teacher's Role."

How can we prepare ourselves, not to mention our students, for responsible participation as democratic citizens in such a society and world as ours? I believe that, as teachers, we must do our very best to communicate to students the basic conditioning factors of the world in our time. Among these are the basic facts of geography. I truly believe that many of our most bitter foreign-policy disputes are a direct consequence of the fact that Americans decided sometime not to study geography anymore. My sons attended French schools for two years, and I know that the French, at least as of five or six years ago, had not abandoned geography. It was an important, intensive course. I myself live in rooms with world maps on the walls. It is impossible to think sensibly about foreign affairs without knowing what is where

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