

Sunday Outlook

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Is MIC unit safe or a potential Bhopal?

By Ken Ward Jr.

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A faint smell of mothballs lingers in the air.

A maze of pipes and valves surrounds 100-foot-tall tanks. A dark, thick steel net encloses one of them like a shroud.

A skull-and-crossbones sign stands guard over three more tanks buried beneath the earth.

This corner of its Institute plant is where Rhone-Poulenc Ag Co. makes and stores methyl isocyanate, better known as MIC.

MIC is a useful chemical. It reacts easily and can therefore help produce numerous pesticides.

While MIC may not be the Kanawha Valley's most deadly chemical, it is certainly the most feared. Thousands of people were killed or permanently injured when MIC leaked from a Union Carbide plant in Bhopal, India, in 1984.

Rhone-Poulenc officials say that on any given day, they store up to 240,000 pounds of MIC at their plant, just 10 miles from Charleston and right next door to West Virginia State College.

That total is three times the amount contained in the tank that leaked at Bhopal. It's nearly 4½ times the amount that actually escaped from that tank.

Institute Plant Manager Van Long touts the fact that Rhone-Poulenc has reduced total MIC inventory by 80 percent since 1985.

The company spent \$150 million over the last seven years to make the plant safer and more productive.

"Bhopal is certainly a bad event, but it's been overplayed," said Bill Frampton, a plant veteran and chief of the MIC unit.

"It's got nothing to do with the way we operate. It has no relevance anymore to me," Frampton said. "This unit has had more scrutiny than any other unit in the world. We've stood the test and we're proud of what we've done."

But a series of mishaps last year raised new questions about the safety of the Institute plant.

Rhone-Poulenc was fined a West Virginia record \$1.6 million by the U.S. Occupational Safety and Health Administration for alleged safety violations that led to the most serious of last year's accidents, an August explosion that claimed the life of plant worker Robert Ruby.

OSHA investigators concluded that the company tried to boost pesticide production without regard to safety. That action "may lead to a repeat occurrence . . . or more catastrophic failures" than that fatal explosion, the agency warned.

Rhone-Poulenc is appealing the fine.

Some chemical industry critics worry MIC's very presence makes Institute a Bhopal — or worse — waiting to happen.

David Dembo, a spokesman for the Bhopal Action Resource Center in New York, co-wrote the book "Abuse of Power. Social Performance of Multinational Corporations: The Case of Union Carbide."

"The fact that Rhone-Poulenc continues to store MIC, especially in such huge amounts, does not speak well of its concern for the safety of its workers or the community," Dembo said.

"Reducing storage from 400,000 pounds to 240,000 pounds is meaningless when you consider that the tank which ruptured in Bhopal contained 84,000 pounds," Dembo said.

"It would be more honest for Rhone-Poulenc to announce that thanks to their efforts, a disaster only 2.9 times the magnitude of Bhopal could now occur."

What is MIC, anyway?

Three small, labeled pipes fan out in different directions from Rhone-Poulenc's underground MIC storage tank.

One goes to Rhone-Poulenc's methomyl-Larvin unit, the same one that blew up in August. The company transfers 40,000 pounds of MIC every day through this line. Half is used by Rhone-Poulenc to make its Larvin brand of the pesticide thiodicarb. The other half goes to an adjacent FMC Corp. plant. FMC uses it to make Furadan, its brand of the pesticide carbofuran, said FMC spokesman Terry LaLonde.

A second pipe runs to a Rhone-

Poulenc unit that makes aldisol, a key ingredient in the powerful pesticide Temik.

The third line runs to a unit that makes cabaryl, a primary ingredient in Rhone-Poulenc's Sevin brand insecticide. Rhone-Poulenc makes Sevin with naphthalene, which produces the mothball scent that sometimes hangs over the plant.

How can one complicated chemical be used to make so many products?



Bill Frampton, who runs Rhone-Poulenc's MIC unit, says the dangers of the chemical were exaggerated after more than 3,000 people were killed by the Bhopal leak.

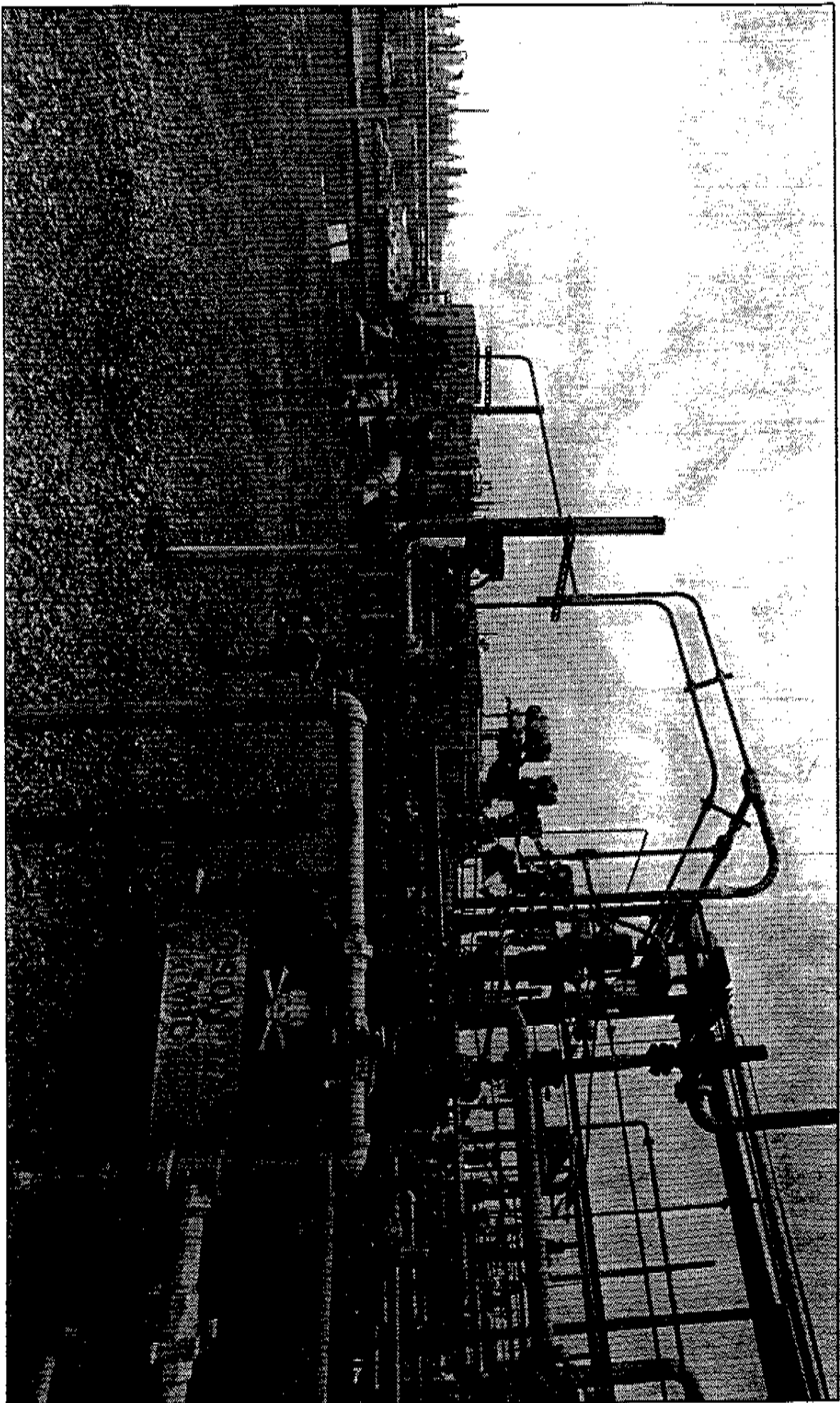
MIC is an isocyanate, part of a family of chemicals considered reactive, toxic, volatile and usually flammable. Isocyanates react with other chemicals in a much more vigorous manner than similar substances called aldehydes and ketones.

Rhone-Poulenc makes MIC by combining chlorine with carbon monoxide to make phosgene, an intermediate chemical nearly as deadly as MIC. Phosgene is then added to a

substance called monomethylamines to make MIC.

A 1985 article in Chemical and Engineering News magazine noted that the reactivity of isocyanates makes them "useful as chemical intermediates" but also "tricky to deal with."

The EPA says MIC is an "acutely toxic chemical," defined as one that "can cause short- and long-term health effects after a single, brief exposure."



Rhone-Poulenc Ag Co. stores up to 240,000 pounds of deadly methyl isocyanate at its Institute plant (above). Operators at the MIC unit

say they make sure the plant is safe so they and their neighbors won't be harmed.

Photos by JIM NOELKER



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David Dembo, Bhopal Resource Action Center

OSHA says plant workers should not be exposed to more than 0.02 parts per million of MIC over an eight-hour work shift.

The American Council of Governmental Industrial Hygienists notes that level is less than the mucous membrane threshold of 0.4 parts per million and the odor threshold of 2 parts per million.

That means you can't smell MIC coming.

MIC concentrations of 20 parts per million or greater can be immediately dangerous to life and health, according to the EPA's Technical Guide to Hazards Analysis.

At Bhopal, roughly 52,000 pounds of MIC escaped during a period of one to two hours. The toxic cloud spread out over a 25-square-mile area.

Concentrations reached 27 parts per million, according to a report from India's Central Water and Air Pollution Board.

The Philadelphia Inquirer noted on Dec. 6, 1984, that the Bhopal leak was "enough to kill every living thing in this central Indian city of 750,000."

Bhopal native Paul Shrivastava, in his book "Bhopal: Anatomy of a Crisis," wrote that "People were choking and gasping for breath. Some fell as they ran, and some lay on the roadside, vomiting and defecating. Others, too weak to run, tried to clutch onto people passing them in the hope of being carried forward."

According to estimates drawn from EPA's Technical Guidance for Hazards Analysis, a leak of just 1,500 pounds of MIC could send toxic gas over a 10-square-mile area around the Institute

Within that area, MIC concentrations would reach a level "above which there may be serious irreversible health effects or death as a result of a single exposure for a relatively short period of time."

Rhone-Poulenc's guide to MIC, filed with Kanawha County emergency officials, says "Danger. Fatal if inhaled. Fatal if absorbed through the skin. May be fatal if swallowed. Corrosive. Causes skin burns. Corrosive. Causes eye burns. May cause permanent injury."

In control

Greg Hodges of St. Albans watched the bright lights and dials of his control panel.

MIC

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The chemical flow was about right, but that wasn't quite good enough for Hodges. He touched the screen with his fingertip, instructing the machine to make an adjustment. A tiny line edged up a bit on the graph displayed on Hodge's computer screen.

"I'm just a perfectionist," said Hodges, an MIC unit operator. "I like my lines to be pretty straight."

A half dozen other Rhone-Poulenc employees sat around Hodges in front of similar television screens. Some leaned back in their chairs and chatted. Others flipped buttons or turned dials as they intently watched their control panels.

These employees work 12-hour shifts. They make an average of \$40,000 a year to watch over one of the most deadly chemicals known to man.

"This is a good job," said 35-year plant veteran Bill Stevens. "I wouldn't hesitate to put a cot up in that unit and go to sleep."

"I have no suicidal tendencies. If I thought it was going to do me in, I'd be somewhere else."

Stevens helped Carbide shut this MIC unit down in the dark days after the Indian disaster, when Bhopal became a household word in Charleston and other chemical-producing communities across the country.

Federal and state investigators swarmed on the Institute plant to find out if a similar accident could happen here.

Carbide closed down for nearly five months for its own review. But an OSHA study and an EPA review later gave the Institute plant a clean bill of health.

The Institute plant reopened in May 1985. Two years later, Carbide sold the plant to Rhone-Poulenc, a French-based chemical and pharmaceutical conglomerate.

Now the plant employs about 1,500 workers. About 1,250 work directly for Rhone-Poulenc.

Annual payroll is \$75 million, according to the West Virginia Manufacturers Association. Rhone-Poulenc pays \$3 million a year in state and local taxes. The plant purchases \$50 million a year in goods and services from area merchants.

And Rhone-Poulenc officials vigorously defend their efforts to improve production and safety.

The core of their argument is \$50 million in improvements, called the Institute Modification Project, completed last December.

"It was very positive for the Institute plant in a year that was very difficult in a lot of ways," said Assistant Plant Manager Jerry Kring.

Kring rattled off the improvements like a proud father:

▲ The phosgene unit was moved closer to the MIC process so MIC doesn't have to travel as far in pipes.

▲ A new cooling system for the MIC tanks uses chloroform, not water-based brine. Many scientists believe water contaminated the MIC tank at Bhopal, causing a runaway reaction that ruptured the tank.

▲ Additional and redundant warning systems were added to detect leaks early and keep an eye on pressure, temperature and possible water-contamination in the MIC tanks. Rhone-Poulenc water sensors can detect contamination down to two or three parts per million. It took 1 percent water — about 10,000 parts per million — to cause the Bhopal accident.

▲ An upgraded scrubber and flare would destroy MIC inventory and prevent a large leak if any dangerous reactions do occur. Such equipment existed at Bhopal, too, but wasn't operational at the time of the accident. The Institute MIC unit can't be used if both the scrubber and flare are turned off.

▲ A backup generator would power the scrubber and flare if the plant's two outside electrical lines somehow malfunctioned.

"I don't care if it's sabotage or an operational upset," said Phil Curry, a Barboursville native who is director of health, safety and environmental affairs at Rhone-Poulenc's Research Triangle Park offices in North Carolina.

"The issue is, about being able to deal with contamination of the MIC system," Curry said. "The way it sits now, there are at least four layers of systems that are involved."

"From a process and a technical standpoint, I personally feel very confident that we have the ability to keep water out of the system, to detect water at a very early stage, and to effectively and

very safely destroy all the MIC that's in the unit," Curry said.

No one has ever been killed by an MIC release in the Kanawha Valley.

A Freedom of Information Act request filed with OSHA produced records of only three safety fines totaling \$3,140 at the Institute plant paid by Rhone-Poulenc, prior to last year's fatal accident.

It's the inventory

Plant Manager Van Long backed away from the microphone, before a crowd of 150 at a first-ever Institute plant manager question-and-answer session at West Virginia State College.

The question was, "How much MIC is stored at the Institute plant?"

"We eliminated several MIC storage tanks," Long said. "All shipments of MIC from the plant were stopped to eliminate the opportunity for transportation accidents."

"These improvements reduced inventory by 80 percent when compared to the mid-1980s," Long said.

That wasn't good enough for Virgil Matthews, a former Charleston city councilman and West Virginia State chemistry professor.

"I really doesn't make any difference what the reduction is," Matthews said. "What's important is how much is there now. The ideal situation would be if they used it as the produced it, but that probably costs too much."

Some people don't think so.

A 1985 article in Chemical and Engineering News noted that carbamate pesticides like those produced in Institute "can be made — and made using MIC as an intermediate — without keeping large stocks of MIC on hand."

"For example, Bayer makes MIC in West Germany and in Belgium, using . . . a different process in which dimethylurea and diphenyl carbonate react at a fairly high temperature to form MIC," the article said.

"Phosgene — itself a rather hazardous chemical — isn't involved," the article said. "Furthermore, Bayer uses all the MIC almost immediately and doesn't ship it out of the plant."

At its plant in LaPorte, Texas, chemical giant DuPont also makes MIC without using phosgene. The process is similar to Bayer's.

DuPont used to buy its MIC — used to make the insecticide Lannate — from the Institute plant. It was stored in batches of 250,000 pounds.

The new process uses MIC as it's produced and lowers inventory to no more than a couple of pounds.

Bhopal author Shrivastava concluded that the Bhopal plant design, which like the Institute plant's allowed for bulk storage of MIC "is more dangerous than the two available alternatives — small drum storage and no storage of MIC in a closed-cycle production system."

An old story

The question of reducing MIC inventory at Institute has been raised before.

In 1986, then-Plant Manager Rudy Shomo said it wasn't economical for Rhone-Poulenc to use MIC as it is made.

Rhone-Poulenc once considered putting a bubble over the entire MIC unit to contain any leaks. Then-Plant Manager Ron Bearer dropped the idea, called "Project Michelle," in 1990 after a 1½-year study.

Tom Dalesio, Rhone-Poulenc's media spokesman, said to completely eliminate inventory the company would have to have a separate MIC-manufacturing unit for each of the products it makes with MIC.

Curry said a plant safety audit planned for early next year might find some ways to further reduce inventory. He doubts it will ever get as low as at DuPont's Texas facility.

"The problem we have here is the MIC unit has four customers," added Curry. "It would be very difficult to come up with a system that would serve those four customers and not have an inventory."

Still, a review of public documents and interviews conducted over the last six months highlight the concerns of local chemical industry watchers:

▲ Records filed with the Kanawha-Putnam Local Emergency Planning Committee show Rhone-

Poulenc could legally store up to 999,999 pounds of MIC at Institute.

Dalesio said the unit, as modified over the last two years, can hold only 460,000 pounds. He said the most Rhone-Poulenc ever stores is 240,000 pounds. On the average, Dalesio said, about 150,000 pounds is actually stored on a daily basis.

▲ While other chemical emissions have dropped dramatically, Rhone-Poulenc pumps more MIC into the Kanawha Valley air than it did in 1987.

Reports filed with the EPA show MIC emissions jumped from 5,329 pounds in 1987 to 7,654 in 1992.

▲ Rhone-Poulenc officials repeatedly took credit over the past several months for switching the MIC cooling system to chloroform from the more dangerous water-based brine used at Bhopal.

But when asked about a report showing Carbide made the switch under EPA pressure in 1985, Rhone-Poulenc changed its story.

Dalesio said Friday the underground MIC tank was always cooled with chloroform. Carbide did indeed switch the make-tank cooling system in 1985, Dalesio said, but Rhone-Poulenc changed to chloroform-cooling in the phosgene unit last year.

▲ Rhone-Poulenc's scientists admitted in December that they did few, if any, studies on the nature of a mysterious substance called blue oil they blamed for the fatal August 1993 explosion.

"Here they say they weren't certain of the technology they were using — and they're supposed to be professionals down there?" said Pam Nixon, an activist with the Institute group People Concerned About MIC. "How do we know they won't cause an incident of Bhopal magnitude here in the valley?"

Residents could find out in June, when Rhone-Poulenc and other companies release their "worst-case" accident scenarios.

Wendy Radcliff, a Charleston labor and environmental activist, hopes citizens find out what MIC could do here and pressure Rhone-Poulenc to further reduce its inventory.

"I don't believe it makes any sense to go beyond this point," said Dembo, the Bhopal activist. "There is no need to store MIC in quantity. One just gets caught up in their public relations games of percentage reductions that don't address the absolute amount still stored."

"I have no idea why people aren't freaked out about the quantities of MIC that are stored there." ■