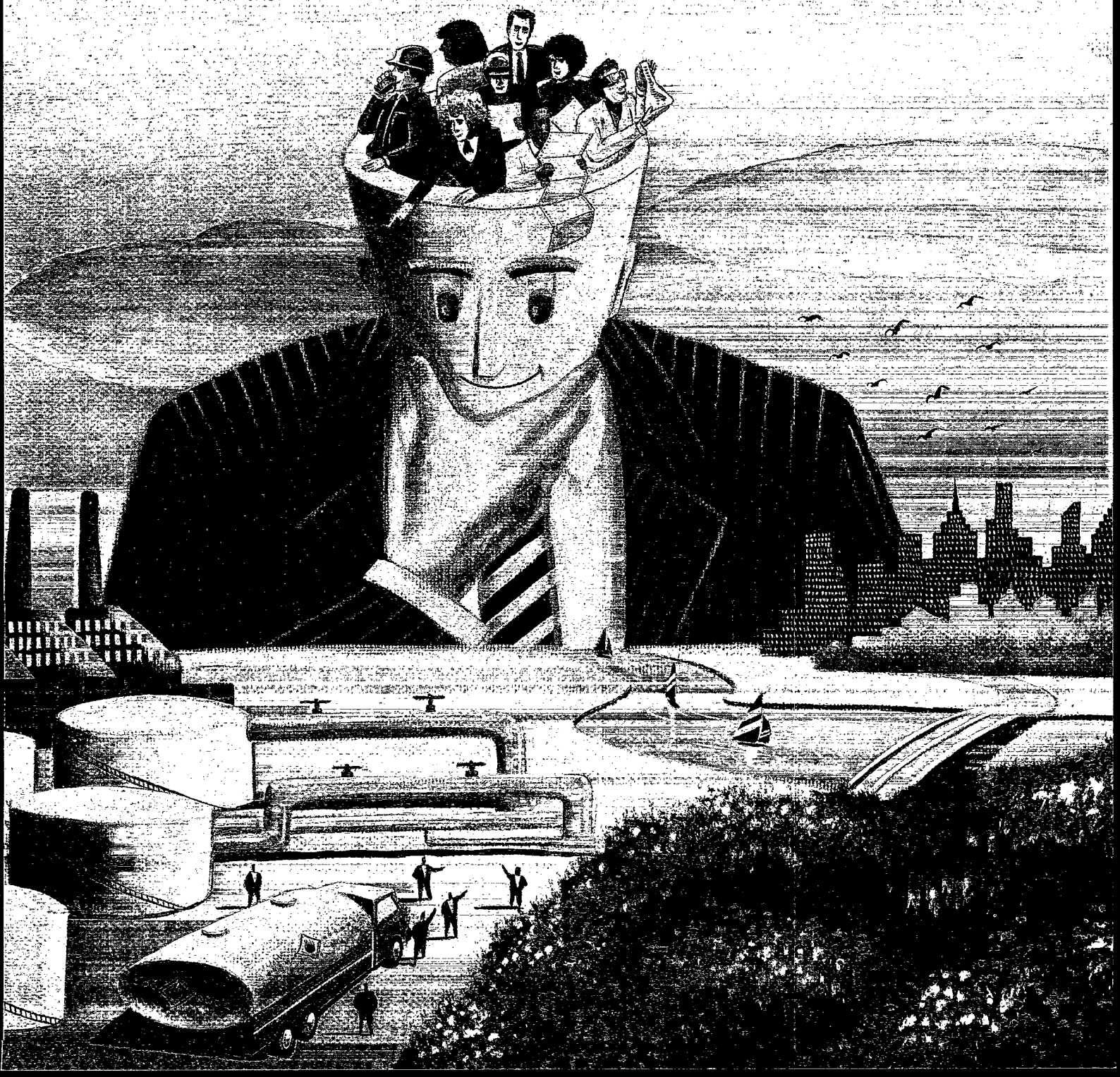
EPA-510-K-92-001

MANAGING CHEMICALS SAFELY

Putting It All Together



United States
Environmental Protection
Agency

Chemical Emergency
Preparedness and
Prevention Office (OS-120)

EPA-510-K-92-001
March 1992

Occupational Safety and
Health Administration,
United States Department
of Labor

The information in this publication is derived from sources believed to be reliable. However, it should not be assumed that every acceptable procedure or practice is included or that specific circumstances may not warrant modified or additional procedures or practices. Changing technology and practices and/or regulations may require changes in the recommendations herein. The information in this publication is not a substitute for federal, state, municipal, or other requirements.

Printed on Recycled Paper

CHEMICAL ACCIDENTS—

THEY DON'T HAVE TO HAPPEN.

Businesses that use hazardous chemicals can prevent accidents—if they have the right information. And. . . know how to apply it. It's up to industry, large and small, to manage chemicals safely. But an effective, integrated approach to prevention involves a whole network of other players, too: fire and emergency services, trade associations, labor organizations, professional societies, government at all levels, insurance companies and financial lenders, the environmental community and other public interest groups, and the media.

Sharing information across this network is what makes prevention work. This publication is one piece of that information mosaic. It shows owners and managers of smaller enterprises how to get started in chemical safety management. It gives basic definitions and describes the benefits. It suggests initial steps and recommends sources and resources for additional information.

You can help spread the word on safety. Please share this publication with your colleagues. Mention "Managing Chemicals Safely" in your meetings, newsletters, journals, indexes, electronic bulletin boards, training sessions, workshops—even on your coffee break.

Working co-operatively, we can all help make our world a safer place.

To order additional copies of "Managing Chemicals Safely," please use form on reverse.

Superintendent of Documents Publications Order Form

Order Processing Code:
***6179**

Charge your order. MasterCard VISA

Fax your order: (202) 512-2250

Please send me the following:

_____ copies of **MANAGING CHEMICALS SAFELY: Putting It All Together** S/N 055-000-00398-0 at $2 each.

The total cost of my order is $_____. International customers please add 25%. Price includes regular domestic postage and handling and is subject to change. **A 25% discount is available on purchases of 100 or more copies sent to a single address.**

Company or personal name (Please type or print)

Additional address/attention line

Street address

City, state, ZIP code

Daytime phone including area code

Purchase order No.

Please choose method of payment:

☐ Check payable to the Superintendent of Documents

☐ GPO deposit account ☐☐☐☐☐☐☐–☐

☐ VISA or MasterCard Account

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

☐☐☐☐ Credit card expiration date

Thank you for your order!

Authorizing signature

3/92

Mail to: Superintendent of Documents
P.O. Box 371954, Pittsburgh, PA 15250-7954

A SHARED RESPONSIBILITY

In recent years society has come to recognize that environmental safety is everyone's job. Industry, workers, governments, trade associations, environmental groups, local communities, and other "stakeholders" all share in this responsibility, just as they all benefit from a safer environment.

With that shared obligation in mind, these various stakeholders have been participating in focus groups and roundtable discussions sponsored by the U.S. Environmental Protection Agency's Chemical Emergency Preparedness and Prevention Office (CEPPO) to address the issue of reducing chemical risk in the community. This publication, intended to introduce smaller businesses to the practice of chemical safety management, is a result of those meetings.

The sponsors listed here recognize that the main responsibility for chemical safety lies with those who work with hazardous materials every day, in thousands of businesses all over the nation. Our hope is that this publication will stimulate owners and managers of smaller companies that use hazardous chemicals to learn more and do more about chemical safety management and to understand that safety should be among their highest priorities.

SPONSORS

Center for Chemical Process Safety of The American Institute of Chemical Engineers

U.S. Chamber of Commerce

Chemical Manufacturers Association

Chemical Specialties Manufacturers Association

The Chlorine Institute, Inc.

International Association of Fire Chiefs, Inc.

National Association of Chemical Distributors

Synthetic Organic Chemical Manufacturers Association, Inc.

United Steelworkers of America

U.S. Environmental Protection Agency

Occupational Safety and Health Administration, U.S. Department of Labor

Chemical Safety Management

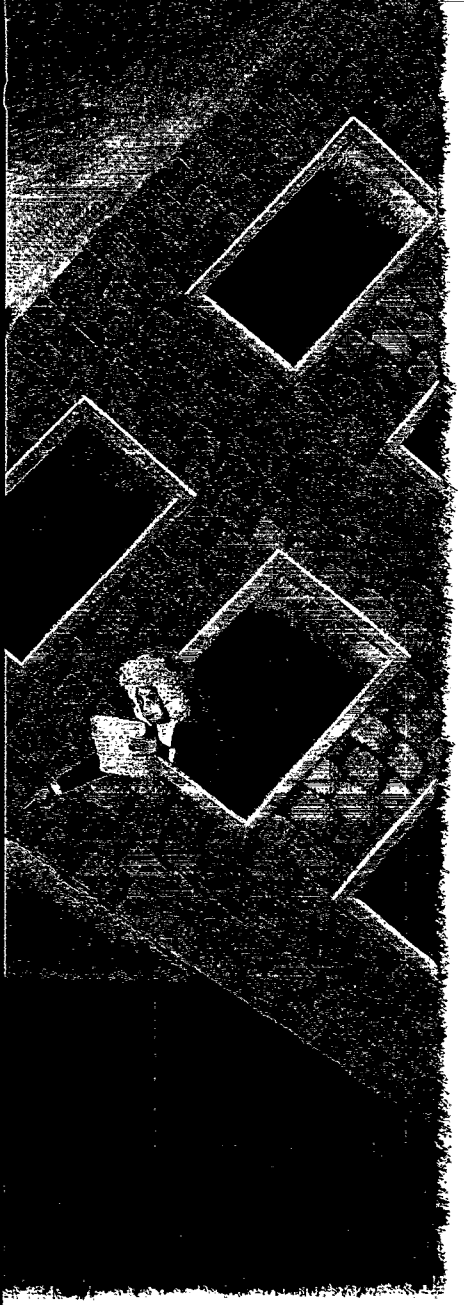
It's Not Just a Catch Phrase, It's Good Business

It's always easier to figure out why an accident happened after it occurs. Two seemingly unrelated events combine to produce an explosion, an injury, a chemical spill. Bad luck, you think. If only the regular operator hadn't been out sick the day the chlorine tank was filled, or that valve hadn't stuck open, maybe we wouldn't be in this mess.

Bad luck, or bad planning?

More and more, companies that use hazardous chemicals are turning to an approach called chemical safety management as a way to fight "bad luck" with good planning. Chemical safety management—also known as chemical process safety management or risk management planning—can help you identify potential risks at your site and establish an organized method for reducing those risks. It's not a formal procedure so much as a way of doing business, an integrated philosophy that considers your entire operation rather than just pieces of it. Chemical safety management involves everyone in your company, day in and day out. And it works.

Most companies that deal with hazardous chemicals probably



Know your operation: the hazards of the materials you work with, of your equipment, and of your processes. Identify safety requirements, and analyze your weaknesses and capabilities.

have many of the ingredients—emergency response plans, safety training, and the like—already in place. What's new about the chemical safety management approach is that it takes these existing measures, plus a few more, and integrates them into a co-ordinated system backed by a strong commitment from top management. A good chemical safety program is more than just a stack of documents gathering dust on the shelf. It's a living, evolving, vital element of your business.

"I know this business like the back of my hand." But does everyone else in your company?

IS THIS REALLY FOR ME?

You don't have to be a large chemical manufacturer to put a program like this into effect. Dry cleaners, small machining shops, food processing plants—*anyone* who uses hazardous chemicals—can benefit from chemical safety management. The program can vary from company to company, but all programs have several basic principles in common:

- Taking an inventory of your hazardous materials
- Reviewing your entire process, from piping and instrumentation to operational procedures
- Conducting detailed studies to identify potential hazards, to assess the likelihood of accidents, to evaluate their potential consequences, and to address the serious problems first
- Establishing and following a regular preventive maintenance program
- Developing standard operating procedures and training programs for employees
- Managing changes in the operation so that a change in one part of your process doesn't cause an accident somewhere else
- Investigating and documenting accidents and near-accidents
- Developing emergency response plans for your company and co-ordinating them with local emergency planners
- Sharing information with the local community

A key principle of chemical safety management is that all these steps have to be part of your everyday operation, which means that the commitment to safety has to include everyone in the plant, starting at the top. And it has to be more than just lip service from the boss. Too often, information on chemical hazards is known only to the shop manager, or is locked away in a file drawer where no one ever sees it. Keeping the information just within the plant won't do that much for safety, either. Certain information should be shared with the plant's neighbors in the surrounding community. In fact, your business should be aware of federal as well as some state laws that require specific information on hazardous chemicals

"Besides, we've never had a serious accident."

Yet.

CHEMICAL SAFETY MANAGEMENT IN A NUTSHELL

✔ **THE RIGHT ATTITUDE:** Commitment from every single member of the company is essential to making chemical safety management work.

✔ **KNOW YOUR OPERATION:** Know the hazards of the materials you work with and of your equipment. Identify safety requirements and existing capabilities and weaknesses. Correct the problems and implement appropriate procedures and practices.

✔ **REDUCE YOUR HAZARDS:** Find ways to make your operation safer. You could reduce your inventory of hazardous substances, find less hazardous substitutes, or change your processes.

✔ **PEOPLE ARE THE KEY:** Train your work force in proper procedures and practices, develop task requirements for employees and contractors, and update training to keep up with changes.

✔ **TAKE CHARGE OF CHANGE:** Any change in one part of your operation may affect other parts. Plan accordingly.

✔ **PROTECT YOURSELF:** Keep equipment in top shape, inspect and maintain it faithfully, conduct regular safety reviews, and have a working emergency action plan and appropriate emergency equipment available.

✔ **LEARN FROM MISTAKES:** Investigate accidents and near-accidents, determine the causes, and make whatever changes are necessary to prevent them from happening again.

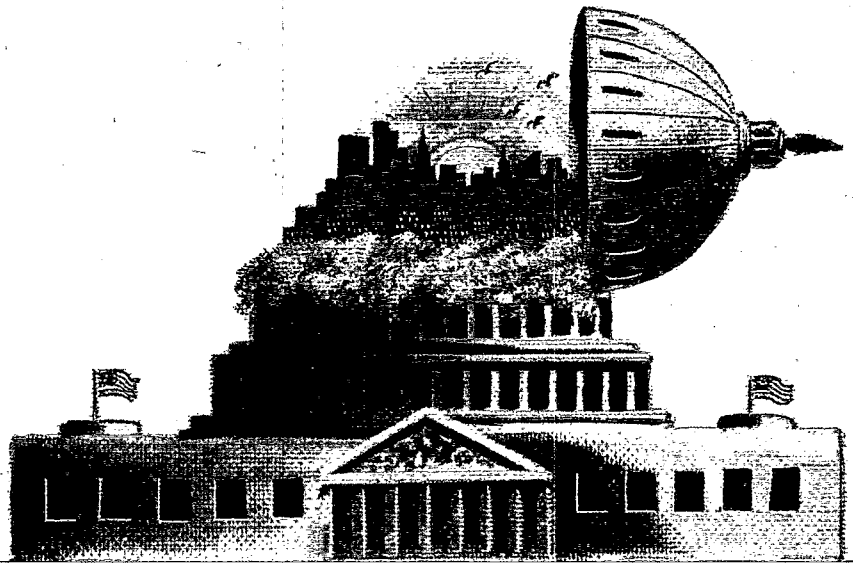
✔ **BE A GOOD CITIZEN:** Work with the community and with local emergency planning officials to reduce chemical risks.

✔ **ONCE IS NOT ENOUGH:** Managing chemicals safely is a continuing process. It's not a document on a shelf; it's an everyday part of running your business successfully.

and their risks to be made available to the public. "Be sure to share your emergency plan with plant neighbors," cautions Paul Orum of the Working Group on Community Right-to-Know, a coalition of environmental groups. "You can bet they will want to see your plan *after* an accident." Good chemical safety management requires that everyone be in on the plan—not just the company's safety manager.

BUT I ALREADY HAVE A SAFETY PROGRAM!

Most responsible companies have some kind of worker safety program already in place. That isn't the same as making sure your staff understands and can handle chemical risks, however. And just because one part of your operation meets safety requirements, it doesn't mean your entire business—or the surrounding community—is safe. You might be storing a particular chemical safely but running it through inadequate piping. Or you've bought a new plating tank but haven't gotten around to training your workers in how to load it properly. A good safety management program makes it impossible to overlook the way these things are interrelated because it takes in your operation as a whole.



Don't let the terminology used in chemical safety management programs scare you, says Sanford Schreiber of the American Institute of Chemical Engineers' Center for Chemical Process Safety. "I'll ask people if they ever did a hazard analysis, and they say, 'What are you talking about?' Then I say, 'Well, have you ever put down on a piece of paper what hazards you could confront, how they could happen, and what are the precautions you need to take so they don't happen?' *Then* hazard analysis makes a little more sense."

Because chemical safety management requires that you step back and take a thorough look at your entire business, it's an exercise that will serve any manager well. Instead of just reacting to every accident or near-accident after it takes place, you learn to identify the early warning signs of potential mishaps and shutdowns so that you can take action before they occur. The result is a safer operation, greater efficiency, and increased productivity.

And that's good for everyone.

"Chemical safety management encompasses safe practices, product stewardship, informing the public—all these and more," says Jim Makris, Director of EPA's Chemical Emergency Preparedness and Prevention Office. "What it really means is that people in the business of handling hazardous chemicals—whether they use, store, process, or distribute them—are coming to recognize that safety is not at the bottom of their list of responsibilities. It's at the top." ■

WHAT YOU SHOULD KNOW ABOUT THE 1990 CLEAN AIR ACT AMENDMENTS

Chemical safety management is a good idea for any business that uses hazardous materials. And for some businesses, it will no longer be optional.

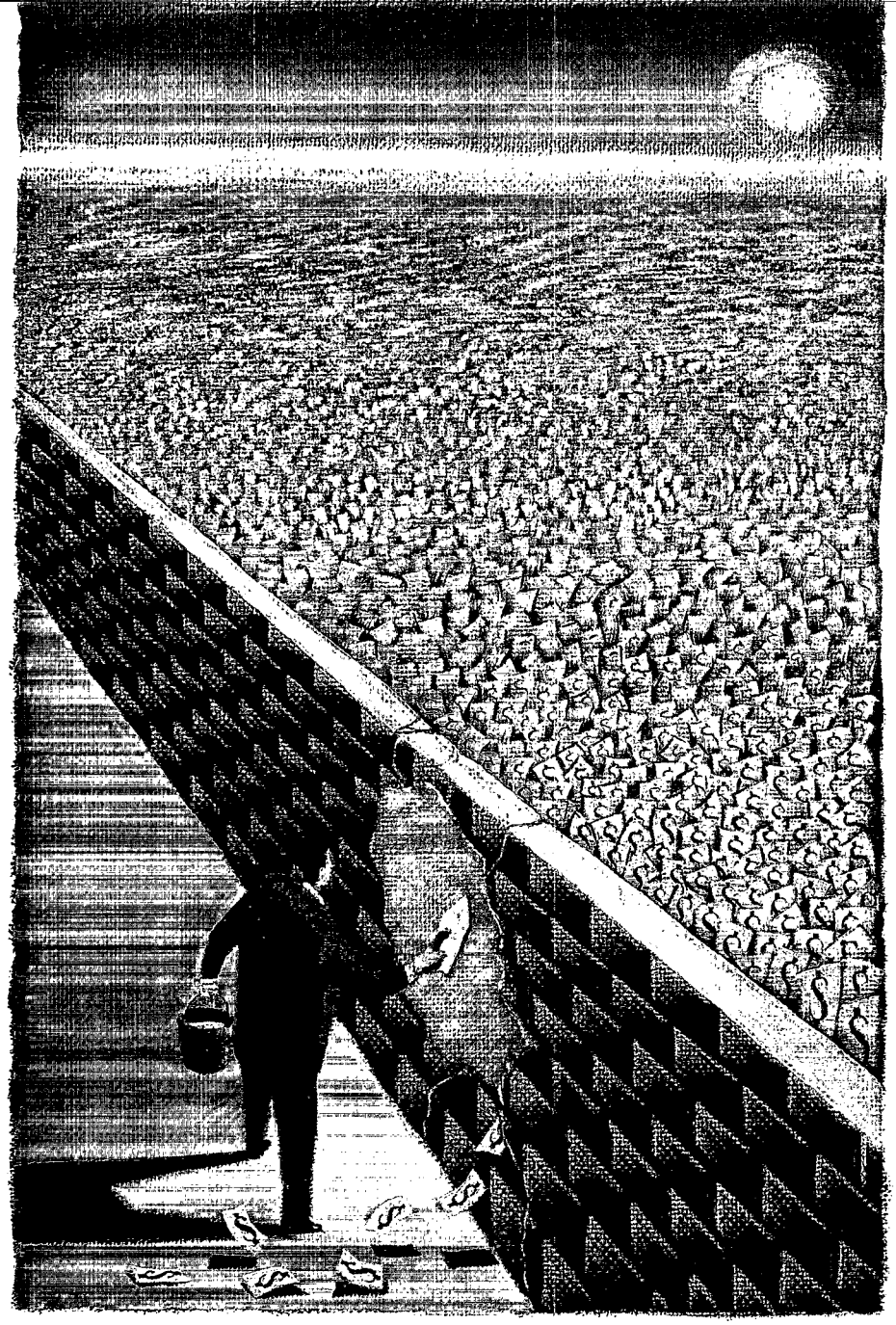
The Clean Air Act Amendments of 1990 require the Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) to develop regulations for chemical safety management. Companies that have certain chemicals above specified threshold quantities will be required to develop a system to identify and evaluate hazards and to manage those hazards safely. The purpose of the requirements is to prevent accidental releases and mitigate any releases that do occur. Information that companies develop on their hazards will be submitted to states and local emergency planners and will be available to employees and to the public.

For more details on the accidental release provisions of the Clean Air Act Amendments of 1990, call EPA's Emergency Planning and Community Right-to-Know Information Hotline at (800) 535-0202 or OSHA's Public Information Office at (202) 523-8151.

It doesn't matter whether you're a large or small business—if you use, manufacture, or store hazardous chemicals, your plant is vulnerable to accidents and other problems that can be minimized through the chemical safety management approach. The worst accidents result in injury or death, and almost all cost money. Think of what published cost figures for an accident don't include: downtime, increased insurance costs, and loss of customer business or confidence.

HIDDEN SAVINGS

Preventing accidents isn't the only reason for establishing a chemical safety management program, however. It may not even be the best reason, says Ray Brandes, retired director of safety for ICI Americas. "Process safety management is intended to help you recognize, understand, and control all of your process hazards. If you do that, you're going to understand your whole business. And once you understand and control your business, it runs better. You don't have quality fluctuations. You don't have shutdowns. It runs continuously, it's more efficient, and your quality's higher."



A good chemical safety management program can help ensure that you don't find yourself paying for property damage, lawsuits, insurance hikes, medical bills, and fines resulting from an accident that could have been avoided.

WHAT'S IN IT FOR YOU:

Unexpected Benefits

Once you understand and control your business, it runs better.

Some benefits are obvious and tangible. Preventive maintenance, for example, pays off in improved efficiency. Machines don't keep breaking down, and, like well-maintained cars, they last longer. Other benefits aren't so tangible.

For example, the analysis required to set up a chemical safety management program can help a new business by identifying and solving problems ahead of time. When your operation comes online, it does so smoothly, without hitches, and often reaches full production sooner than if no analysis had been done.

Chemical safety management is directly linked to worker safety, says Gerard Scannell, former Assistant Secretary of Labor for Occupational Safety and Health. "Safety in the workplace is our first line of defense against chemical disaster in the environment," notes Scannell. And worker involvement in any safety program has to be "more than superficial," says Jim Valenti of the United Steelworkers of America. It can be formal or informal, and where there is a structure, such as a labor-management committee, this resource should be tapped. "With complex chemical reactions," says Valenti, "one has to *understand* what's going on rather than just know which valves to open and close."

TAPPING WORKERS' WISDOM

The documentation that goes along with a good chemical safety management plan also takes full advantage of the knowledge and experience of your work force. One manager points to the example of a paper mill where his youngest employee had been on staff for 20 years. These "old-timers" were able to transfer much of the knowledge that was in their heads—knowledge that otherwise would have been lost when they retired—into a form everyone could use.

Businesses that open up the lines of communication between workers and technical staff find that workers can make important contributions. "Workers tend to have an inherent knowledge of the conditions of their work," says Valenti. "They may not have the technical terminology to explain what's going on, but some of these operators can tell you a bearing is giving out on a pump two floors down just by listening to the hum."

Similarly, communication between companies that handle hazardous chemicals and the outside world is critical. Mike Callan, former captain of the Wallingford, Connecticut, Fire Department, encourages chemical businesses in his community to include firefighters in employee training sessions. "It can really benefit your company," says Callan, "when the fire department is familiar with your business and the way it operates."

This emphasis on the "people factor" in chemical safety management often has a real payoff in terms of efficiency and employee morale. One manager who set up a safety program in a small chemical products plant recalls that "with the new energy devoted to safety management, we found that we developed efficiencies because we had to."

Wayne Tamarelli, chairman and CEO of Dock Resins in New Jersey, says, "I'm a true believer in safety, not so much from a dollar point of view as from a people point of view. The big saving from safety expenditures is that you prevent people from getting hurt and harmful materials from being released." ■

FROM PRINCIPLES TO PRACTICE:

Chemical Safety Management in the Real World

Chemical safety management makes sense on both the production line and the bottom line. But it isn't always easy.

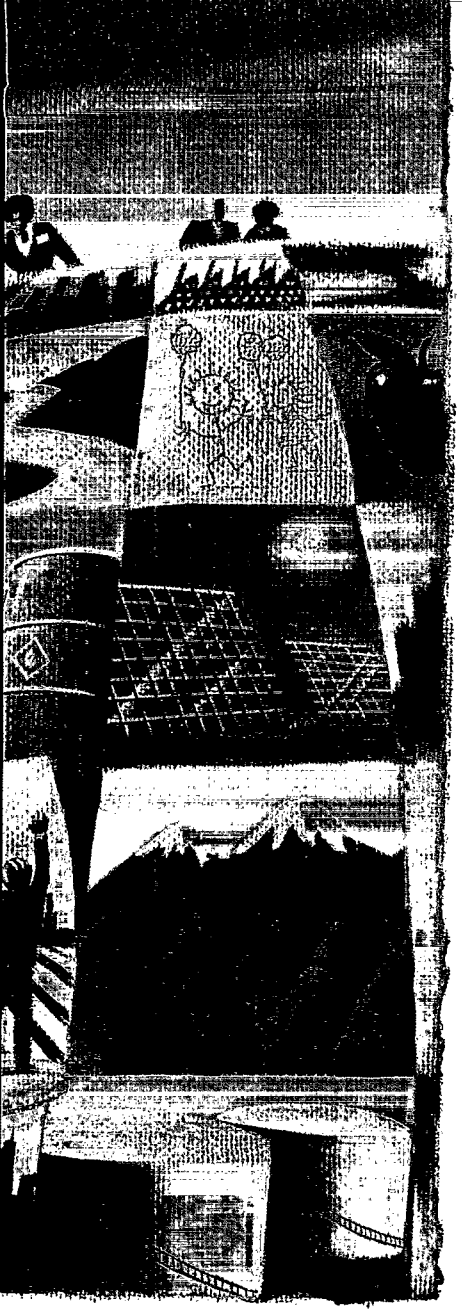
In fact, when Bill Toth first introduced a comprehensive safety management program to his 70-employee, agricultural products plant outside Houston, he says it was "easy to be overcome by the magnitude of it."

But three years later, Toth swears by the result. Other managers who have set up similar programs in their companies will tell you the same story: Stick with it, they say, and the payoff will come. It may be hard to quantify, but it's real.

That doesn't mean the programs are generic, though, or that one size fits all. You have to take a look at your own operation, and your own specific needs. Setting up the right chemical safety management program will depend on what kinds of hazardous materials you handle, how you use them in your business, and other variables, including the complexity of your operation.

TAKING STOCK: WHERE TO BEGIN?

For businesses that are already up and running, the first step may be



Chemical safety management reflects society's concern for safety and environmental issues. And—it can help your business be more efficient and competitive.

Stick with it, they say, and the payoff will come.

a detailed walk-through of your operation, along with an inventory of all chemicals on site. Dozens of questions will have to be answered: Which materials are hazardous? Are you currently handling and storing them safely? What are the regulations regarding their use and release into the environment? What about the integrity of piping, seals, and storage tanks? Is everything fully documented?

For the small business owner who's been in business a long time, a thorough safety survey can be illuminating as well as challenging. Familiarity with hazardous materials often breeds complacency, and even the most experienced workers may gain a new appreciation for all of the potential risks.

You may even discover hidden savings. Bob Brooks, a safety engineer with Amtrak's Philadelphia division, says that after conducting an inventory of hazardous chemicals on his site, he was able to reduce the number of hydraulic fluids he uses from ten to three. Now he's saving money—there are fewer storage and handling worries and not as many chemicals for the workers to learn how to use safely.

Who conducts this kind of review depends on the nature of the business. Abe Vizhansky, who runs Allied Metal Finishing, a 40-person plating shop in Baltimore, was able to do much of the analysis himself, relying on his years of experience as a chemist. But a more complex operation might require one or more people assigned to the job full-time, or even an outside consultant.

Being small can be an advantage. In a small company, the employees are likely to be closer to the processes they're working with, and there's probably a good amount of expertise already on hand. Workers on the shop floor have a great sense for what's really going on there. One technical expert familiar with chemical safety management cautions, however, that particularly in smaller operations, "there's typically a documentation problem because often a small company just doesn't have the resources to get everything down on paper. You have to do the best you can with what you have."

WHAT DANGERS LURK?

After taking stock of your overall situation, the next step is to take a detailed look at what accident risks you're facing. Practicing chemical safety management means fully understanding all the possible hazards at your facility, beginning with the materials themselves. Material Safety Data Sheets (MSDS), required by OSHA rules to be furnished by chemical suppliers, should list toxicity, flammability, reactivity, and other critical data for each chemical on site. This kind of information can alert a user to the

"They didn't cause any equipment damage, they didn't cause any injury, but they were incidents."

dangers of, say, mixing chlorine and ammonia, or putting a corrosive acid in a copper-lined tank. Likewise, all equipment and operations should have their own specifications for pressure, temperature, and other values.

The next step is to make sure those operating parameters—and the consequences of not staying within them—are clearly understood by all responsible personnel. It's not enough for the boss to understand the hazards on your site. They need to be communicated in a way that all employees can understand.

Hazards analysis goes beyond just listing the dangers of each individual chemical you use. It takes into account your entire operation—all the on-site hazardous chemicals, equipment, and people—and how they interact with each other. What's the worst accident that can happen, and how likely is it?

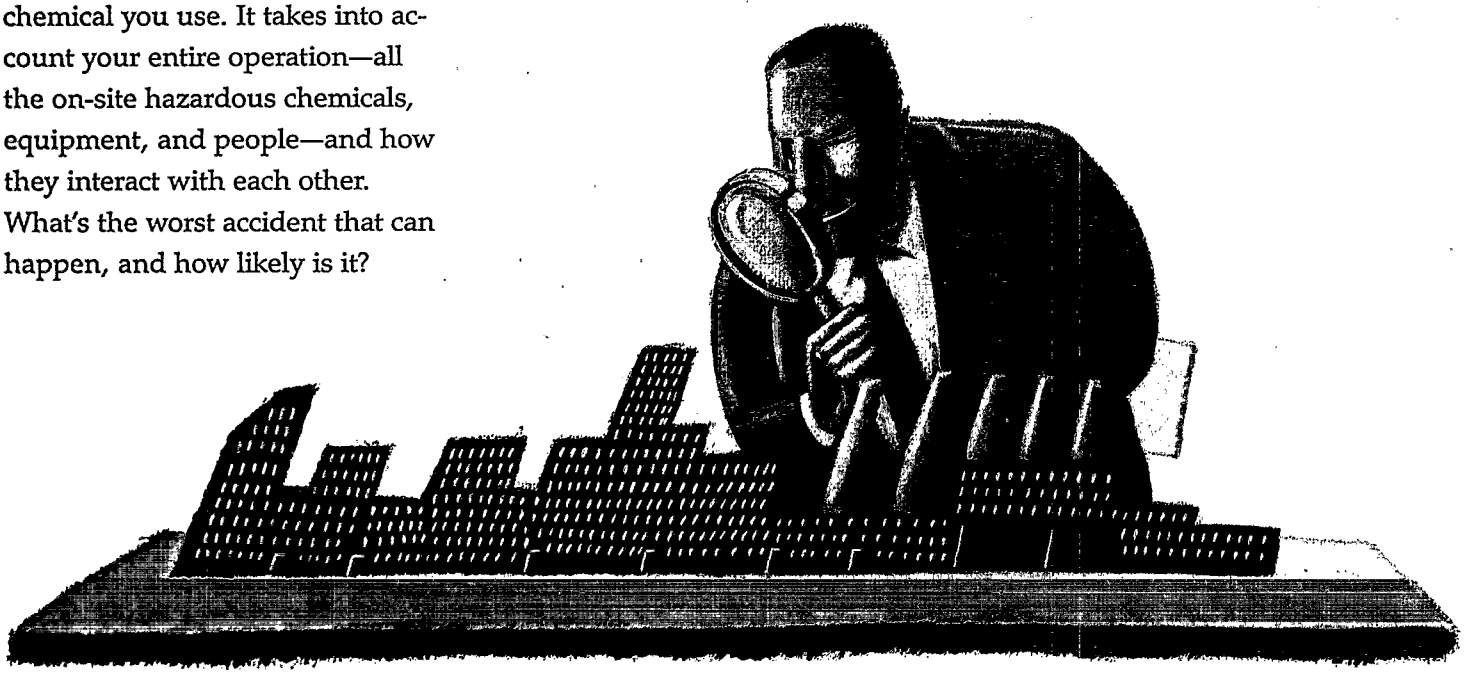
There are many different ways to do a process hazards analysis (see page 14), but they all have the same general purpose: to identify all potential hazards, estimate the likelihood of occurrence, and evaluate the consequences if they were to happen.

Whatever methodology you apply, you may need to seek the advice of an outside expert. Insurance investigators, trade associations, professional societies, and larger companies that use the same chemical process also can help.

"TRAINING, TRAINING, TRAINING"

People are vital to the chemical safety management approach. As Bill Toth says, "All personnel must be part of the program—no observers." This means that each employee should know how his or her work fits into the big picture.

Train your people thoroughly, advises Bob Brooks of Amtrak, and tailor the training to their level of education. If it takes extra time to present information in a way that employees will remember it, be sure to budget for that time—just



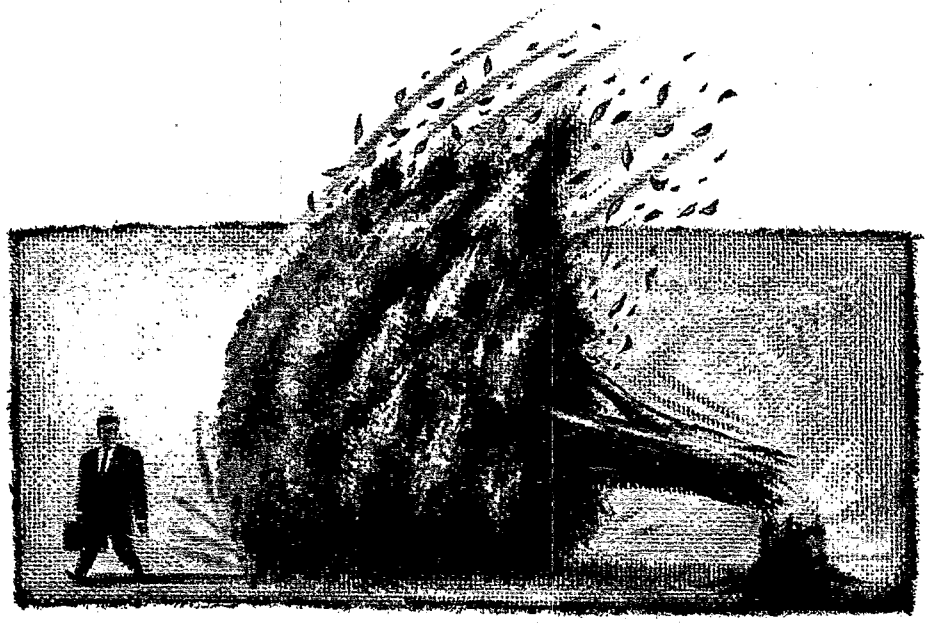
Take a good look at your own company with a thorough safety survey. Then study what risks you might be facing. Most important, understand how your company's equipment, processes, hazardous chemicals, and people are all interrelated.

because someone sits through a four-hour class doesn't mean they retained four hours' worth of information. And one more critical thing you can't leave out is an evaluation of the training itself. Be prepared to determine just how effective it is.

Classroom education and videotapes are certainly valuable, but hands-on training is the best, say the experts, and the more practical, the better. Larry Schongar, vice president of operations at Jones Chemicals, a chlorine repackaging company in New York, also recommends giving monthly refresher courses after initial training is finished, to make sure the information sinks in. The key to any good chemical safety management program, he says, is "training, training, training."

CHANGE ONE, CHANGE ALL

Chemical safety management demands that you think of your operation as an integrated whole. If, for example, you replace older valves with a new type of valve, the resulting changes in pressure or flow may be too much for downstream valves or piping to handle safely. When you make changes, it's important to think through and record the effects of those changes on your whole process and take appropriate corrective measures. The changes in the operation can change the hazards in the system you're looking at. Remember that your hazard analysis must be based on the real conditions in your plant and must take into account any modifications you made.



A mishap occurs. A key part of chemical safety management is investigating the near-misses to prevent the same thing from happening again.

AN OUNCE OF PREVENTION

The value of preventive maintenance is obvious. But the trick is actually doing it.

Make sure your equipment and facilities—particularly critical parts of the operation that pose the greatest potential risk—are in top shape when they're installed. Then make a schedule for regular maintenance, and stick to it. The manufacturer should be able to provide specific recommendations as to what parts of the equipment should be inspected and how often. At longer intervals, or whenever you install new equipment, you should also review your equipment, procedures, and personnel to make sure everything's still operating according to plan. Keep track of your preventive maintenance actions so you can check them against your schedule.

LEARN FROM MISTAKES...

A mishap occurs. It might have been worse, but fortunately no real harm was done. Rather than just breathing a sigh of relief and getting back to work, a key part of chemical safety management is to investigate potentially dangerous incidents or emergencies to determine the nature of the incident, its direct and indirect causes, and changes to prevent the same thing from happening again.

It's even important to investigate near-misses. Documenting small

THREE THINGS YOU CAN DO RIGHT AWAY

1. Make the commitment to chemical safety management, and have everyone—from the head office to the shop floor—agree on written goals and a written timetable. Sounds obvious, but this is probably a critical first step.

2. Get more information. If you're a small shop, gather as much free and low-cost advice as you can, whether it's sending away for literature or MSDSs or attending a meeting of the Local Emergency Planning Committee (LEPC). Help often comes from unlikely places. Your insurance carrier, for example, has almost as much of an interest in preventing accidents as you do, and may offer valuable advice at no extra cost.

3. Walk through your shop. Make a quick, initial survey to help determine what kind of a job you're facing. How much documentation is already on hand? How much will you need to produce from scratch?

mishaps, even if they're not serious, can reveal patterns and suggest solutions. John Wilbeck, who directs safety operations at a mid-sized Monsanto plant in Houston, points to a series of minor incidents that occurred once at his site. "They didn't cause any equipment damage, they didn't cause any injury, but they were incidents," he says. In time Wilbeck's crew was able to find the cause. But it was only through methodical record-keeping that the pattern was detected.

"If incidents happen two months apart, you might forget what happened," says Wilbeck. "But if you investigate, write up a report, and come up with a cause, then it becomes more evident when you've got a recurring problem."

...BE PREPARED...

No chemical safety management program is 100 percent guaranteed, and even in the safest business, something, sometime, is bound to go wrong.

That's why, when an accident does happen, you need to have an emergency action plan in place so you can respond quickly and efficiently without making a bad situation worse. Make sure the entire staff is familiar with this plan (regular practice exercises help), and that you have all the emergency equipment and information you need within easy reach.

When an accident does happen, you need to have an emergency plan in place.

You may already be required to provide the local fire department with information about your site's hazardous materials, but make sure those materials are easy to identify in the event of a real emergency. Clear labeling is essential: *You* may know that a particular drum contains an explosive substance, but will firefighters know it when they show up at your door in answer to an alarm?

When setting up an emergency response plan, similar companies in the same geographic area may want to pool their resources. Your Local Emergency Planning Com-

Real success comes only with an investment of time and resources.

mittee (LEPC) can also give valuable advice, help you "network" with organizations responsible for community safety in your area, and even assist in setting up practice exercises.

LEPCs were established under the 1986 Emergency Planning and Community Right-to-Know Act as a means for local government, law enforcement, health, and rescue officials to work together with industry, the media, and community groups to draw up formal plans for dealing with chemical emergencies. LEPCs vary in size from state to state. Call your State Emergency Response Commission (SERC) (see page 19) to find the LEPC in your area, or contact the local fire department—they should be able to put you in touch with the committee in your district.

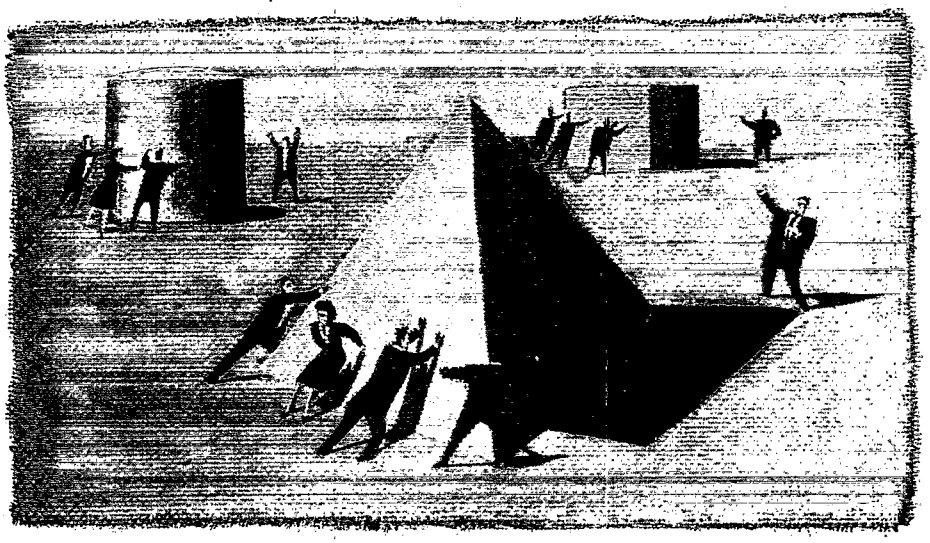
Mike Callan, former captain of the Wallingford, Connecticut, Fire Department, explains why good communications with the community are important. "In an emergency, emotions are high. If that's the first time [the public] finds out there are 40,000 gallons of vinyl cyanide stored in their community, they won't be happy." It pays, therefore, to have emergency responders, the community, and chemical facilities knowledgeable of each other's business—*before* an accident occurs.

...AND BE PATIENT!

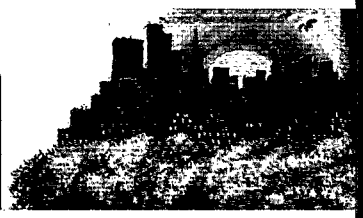
These tips will help the novice get into chemical safety management, but real success comes only with an investment of time and resources. Top management has to be fully behind the effort and shouldn't expect immediate cash savings. Be prepared to discover problems you may wish you didn't know about, then prioritize which ones to fix first.

When's the best time to begin? Given that environmental and workplace safety regulations soon will require chemical safety management procedures to be in place for many companies anyway (see page 5), it makes sense to start sooner rather than later. As Abe Vizhansky says, "I hate being caught by surprise, so I usually try to keep an eye on new proposed environmental regulations. If something's coming in two years, I want to start planning for it now, not wait until the deadline."

But whether or not you will be covered by the new regulations, chemical safety management is here to stay. It reflects society's new concern for safety and environmental issues, and it can help your business be more efficient and competitive. ■



"All personnel must be part of the program—no observers." This means that each employee should know how his or her work fits into the big picture.



WHICH HAZARD ANALYSIS IS BEST?

Some methods of hazard analysis are more involved than others. All, however, are designed to do the same thing: identify and describe all possible hazards, and determine their likelihood and consequences. That knowledge in turn helps plant managers assess risks and identify steps—then take actions needed to prevent accidents from happening in the first place.

Each method has its own advantages and disadvantages, and finding the right one for you depends on everything from the complexity of your operation to what stage it's in. Simpler methods might be applied to the overall operation in a preliminary survey, with more detailed analysis reserved for only the most serious hazards.

In general, simpler operations may only require simpler analyses. Books and outside consultants can help you choose which one is right for your facility. The American Institute of Chemical Engineers' Center for Chemical Process Safety (see **"Help!"**) publishes the *Guidelines for Hazard Evaluation Procedures,* a comprehensive survey of the different techniques and how to implement them.

Among the most commonly used methods are:

WHAT IF ANALYSIS

This method asks a series of questions such as, "What if Pump X stops running?" or "What if an operator opens the wrong valve?" to explore possible hazard scenarios and consequences. This method is often used to examine proposed changes to a facility.

HAZOP STUDY

This is the most popular method of hazard analysis used by the petroleum and chemical industries. The hazard and operability (HAZOP) study brings together a multi-disciplinary team, usually

of five to seven people, to brainstorm and identify the consequences of deviations from design intent for various operations. Specific guide words ("No," "More," "Less," "Reverse," and so on) are applied to parameters like flow and pressure in a systematic way. It requires the involvement of a number of people, working with an experienced team leader.

FAILURE MODES, EFFECTS, AND CRITICALITY ANALYSIS (FMECA)

This method tabulates each system or unit of equipment, along with its failure modes, the effect of each failure on the system or unit, and how critical each failure is to the integrity of the system. Then the failure modes can be ranked according to criticality to determine which are the most likely to cause a serious accident.

FAULT TREE ANALYSIS

This is a formalized deductive technique that works backward from a defined accident to identify and graphically display the combination of equipment failures and operational errors that led up to the accident. It can be used to estimate the quantitative likelihood of events.

EVENT TREE ANALYSIS

This method is a formalized deductive technique that works forward from specific events or sequences of events that could lead to an accident. It graphically displays events that could result in hazards and can be used to calculate the likelihood of an accident sequence's occurring. It is the reverse of fault tree analysis.

Community outreach means sharing information to benefit both the company and the local community.

Community Outreach

A Good Neighbor Policy

Managers at the Union Camp Corporation facility in Dover, Ohio, know all about the importance of good community relations. Their small organic chemical plant sits right in the middle of a residential neighborhood, surrounded by 100 or so households—most of whose members know very little about what goes on inside the fence. So when the company installed safety sensors on an ammonia refrigeration system near their property line a few years ago, they decided to let the community know about it.

Nick Dragna, technical manager for the plant, says he's glad they did. But Dragna remembers upper-level managers being nervous at first because "it was the first time anyone had wanted to go out and do that kind of thing in the community." In fact, when Union Camp told the mayor's office, the city council, and the local fire department that they intended to "go public" with their information, the city officials had a similar reaction. "They were concerned about alarming people unnecessarily, because we'd never had a serious incident," says Dragna.

Ultimately, though, Dragna and his colleagues went ahead with their plan. First they gave the fire department training materials on proper ways to handle ammonia. Then they installed a sensor system on telephone poles located across the street from the ammonia refrigeration system and linked those sensors to an alarm in the fire department.

The next step was to inform the community of what they had done. The company sent out flyers describing the sensor system and explaining what to do in the event of an ammonia release. Finally, the community was invited to a meeting at a local motel to learn more about the subject. Dragna and other plant personnel practiced their talks ahead of time and had them reviewed by a communications

If you have a good relationship with the community, you'll have support whenever you need it.

expert to make sure the engineers explained themselves clearly without creating undue alarm.

In the end, 35 to 40 people—approximately a third of the local homeowners—came to the meeting. "The reaction was excellent," says Dragna. During a question-and-answer period, someone in the audience asked whether the company was legally required to inform the public of what they had done. "The answer, of course, was no," says Dragna, "and that gave us an opportunity to say, 'We're doing this because we have a concern, and we want to be good neighbors.' I think that one question made the entire meeting worth it."

Community outreach, however, is more than just a neighborly gesture. It's also good business, says Lisa Doerr, Director of the Minnesota State Citizens for a Better Environment (CBE). "Companies should look at communities as a long-term investment. If you have a relationship with the people, you will have support when things go wrong, or when the company wants to expand or needs a zoning permit." Doerr advises, "You need to build bridges."

Doerr's citizens' group establishes "good neighbor agreements" with companies to involve community representatives in prevention planning. This pro-active outreach program brings in not only neighborhood activists, but business, school, and community leaders. "These agreements also give companies a chance to make their case to the community, to show their side in terms of plant processes, business goals, and responsibilities for prevention," she explains.

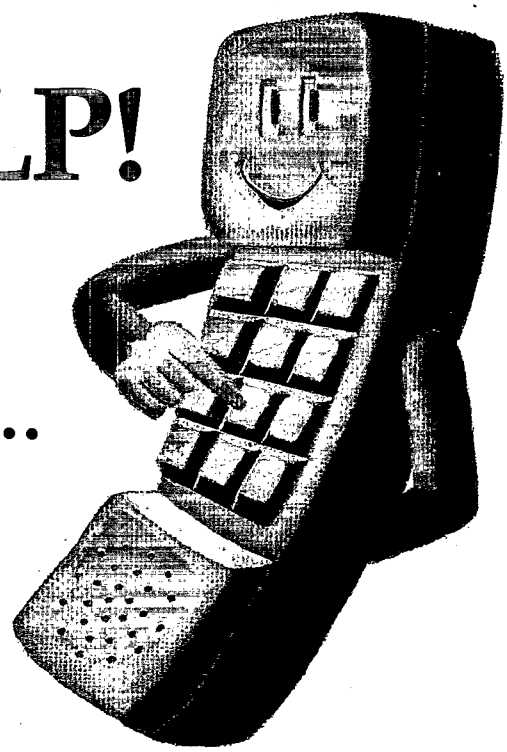
Lowell Johnson, chairman of the Community Action Group in the Minneapolis-St. Paul area, notes that a frequent stumbling block for small businesses is taking the time from their busy schedule to have these kinds of meetings. "But many companies may want to 'market' the idea that they've got a safety program," he says. He recommends that businesses take the first step and make that call to the local emergency planners or fire or police department, and say, "I'd like to introduce myself and tell you about my business." Johnson's definition of outreach is "breaking down barriers in interpersonal relationships." He explains, "If you get to know people as people, that makes the rest of the process go much better. We sometimes forget that. We get hung up a lot of times on chemicals and plans and equipment. But it still comes down to just dealing with people."

So share what you know. Being a good neighbor can only be good for your business. ■

RIGHT-TO-KNOW AND PUBLIC INFORMATION

The Emergency Planning and Community Right-to-Know Act of 1986 (also known as SARA Title III) requires companies to identify specific chemicals and their quantity and location within a plant. Companies must also be prepared to provide that information to the public upon request. Related requirements under the new Clean Air Act will make information available to the public on the way companies manage the risks of the chemicals they handle. Many businesses, however, will not be covered by these requirements, depending on the chemicals they use and the quantities they have on site. Beyond the regulatory requirements, a public information program targeted to the community can enhance good community relations.

HELP!



Chemical suppliers, trade associations, professional societies, regulating agencies, insurance companies, even other businesses can provide you with a lot of free information and advice on setting up a chemical safety management program.

These resources range from books and brochures to videos and training manuals. Many of the items can be rented from local technical and community college libraries or borrowed from larger companies in your area.

The following organizations can provide you with additional sources and resources.

ORGANIZATIONS TO CONTACT

TRADE AND BUSINESS ASSOCIATIONS

American Petroleum Institute. 1220 L St. NW, Washington, DC 20005. (202) 682-8000.

Chemical Manufacturers Association. 2501 M St. NW, Washington, DC 20037. (202) 887-1100.

Chemical Producers and Distributors Association. Suite 202, 1220 19th St. NW, Washington, DC 20036. (202) 785-2732.

Chemical Specialties Manufacturers Association. 1913 Eye St. NW, Washington, DC 20006. (202) 872-8110.

Chlorine Institute. 2001 L St. NW, Washington, DC 20036. (202) 775-2790.

Institute of Makers of Explosives. Suite 310, 1120 19th St. NW, Washington, DC 20036. (202) 429-9280.

National Association of Chemical Distributors. 1200 17th St. NW, Washington, DC 20036. (202) 296-9200.

National Association of Manufacturers. Suite 1500, North Lobby, 1331 Pennsylvania Ave. NW, Washington, DC 20004. (202) 637-3000.

Synthetic Organic Chemical Manufacturers Association. Suite 300, 1330 Connecticut Ave. NW, Washington, DC 20036. (202) 659-0060.

U.S. Chamber of Commerce. 1615 H St. NW, Washington, DC 20062. (202) 463-5533.

PROFESSIONAL ORGANIZATIONS

American Chemical Society. 1155 16th St. NW, Washington, DC 20036. (202) 872-4600.

American Institute of Chemical Engineers' Center for Chemical Process Safety. 345 East 47th St., New York, NY 10017. (212) 705-7319.

American Society of Safety Engineers. 1800 East Oakton St., Des Plaines, IL 60018. (708) 692-4121.

International Association of Fire Chiefs. 1329 18th St. NW, Washington, DC 20036. (202) 833-3420.

National Fire Protection Association. 1 Batterymarch Park, Quincy, MA 02269. (617) 770-3000.

LABOR ORGANIZATIONS

Center for Emergency Response Planning, Workplace Health Fund. Suite 301, 815 16th St. NW, Washington, DC 20006. (202) 842-7834.

Oil, Chemical & Atomic Workers International Union. Health & Safety Dept., PO Box 2812, Denver, CO 80201. (303) 987-2229.

United Steelworkers of America. Five Gateway Center, Pittsburgh, PA 15222. (412) 562-2580.

FEDERAL GOVERNMENT AGENCIES

Environmental Protection Agency (EPA). Chemical Emergency Preparedness and Prevention Office, OS-120, 401 M St. SW, Washington, DC 20460. (202) 260-8600.

Occupational Safety and Health Administration (OSHA). Office of Information and Consumer Affairs, U.S. Department of Labor, Room N3647, 200 Constitution Ave. NW, Washington, DC 20210. (202) 523-8151.

EPA INFORMATION HOTLINE

Emergency Planning and Community Right-to-Know Information Hotline. (800) 535-0202. Answers questions concerning chemical accident prevention, accidental release provisions of the Clean Air Act Amendments of 1990, SARA Title III, emergency preparedness, and other related issues.

STATE EMERGENCY RESPONSE COMMISSIONS (SERCs)

To find your SERC, call the information operator for your state government, or the chemical emergency preparedness and prevention co-ordinator in your nearest EPA regional office, or the EPA Emergency Planning and Community Right-to-Know Information Hotline (800-535-0202).

LOCAL EMERGENCY PLANNING COMMITTEES (LEPCs)

To contact your LEPC, call your SERC (see above) or your local fire department, or contact the nearest EPA regional office or the EPA Emergency Planning and Community Right-to-Know Information Hotline (800-535-0202).

PUBLIC INTEREST GROUPS

Working Group on Community Right-to-Know (environmental coalition). 218 D St. SE, Washington, DC 20003. (202) 544-2600.

League of Women Voters. Suite 1000, 1730 M St. NW, Washington, DC 20036. (202) 429-1965.

SMALL BUSINESS ORGANIZATIONS

Small Business Administration (SBA). 409 Third St. SW, Washington, DC 20416. General information hotline (800) 827-5722.

Small Business Hotline, EPA Small Business Ombudsman Office. (800) 368-5888. Gives advice and information to small business on complying with all EPA regulations.

State Small Business Assistance Programs. The Clean Air Act Amendments of 1990 require states to set up Small Business Stationary Source Technical and Environmental Compliance Assistance Programs. They will provide information on chemical accident prevention and detection as well as other subjects. To learn more, contact the EPA Small Business Hotline: (800) 368-5888.

REFERENCE MATERIALS

The following is a sampling of the resource materials offered by the organizations listed above and others. Contact the organization directly for current listings of publications, videos, training, and workshops.

CHEMICAL PROCESS SAFETY MANAGEMENT

Guidelines on Technical Management of Chemical Process Safety. This book describes each of 12 basic elements that must be considered in the development of a technical management system, explains why it is important, and provides information on alternative approaches to each element and its components. These elements are considered in the context of plant design, construction, operation, and management—a "holistic"

approach. American Institute of Chemical Engineers, Publications Sales, Dept. CAT-90, 345 East 47th St., New York, NY 10017. (212) 705-7657. Price: $100.

Managing Risk—Systematic Loss Prevention for Executives. Publication discusses risk analysis and cost with emphasis on bottom line performance. American Society of Safety Engineers, Department F, 1800 East Oakton St., Des Plaines, IL 60018-2187. (708) 692-4121, ext. 18. Published 1987. Order No. 8715. Price: $39.95.

Profitable Risk Control: The Winning Edge. How to identify risks to avoid accidents. Topics include performance measurements, hazard identification, loss control, and cost evaluation. One hundred case histories, with causes and effective risk controls. American Society of Safety Engineers, Department F, 1800 East Oakton St., Des Plaines, IL 60018-2187. (708) 692-4121, ext. 18. Order No. 8667. Price: $35.

A Resource Guide for Implementing the Process Safety Code of Management Practices. Provides an interpretation of the CMA process safety code, describes the scope of the code in relation to other Responsible Care™ segments, and provides advice on how to achieve continual safety improvement. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. Published 1990. Order No. 047024. Price: $25 members, $37.50 nonmembers.

Process Safety Management (Control of Acute Hazards). A CMA study of techniques of hazard identification, assessment, and control, and their application during process design and operation. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. Published 1985. 50 pages. Order No. 047023. Price: $5 members, $7.50 nonmembers.

A Manager's Guide to Reducing Human Errors. Provides a basic understanding of the causes of human errors and suggests ways to reduce them at chemical facilities. This guide also describes how to incorporate human reliability analysis (HRA) into process safety management activities. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. Published 1990. 63 pages. Order No. 022006. Price: $10 members, $15 nonmembers.

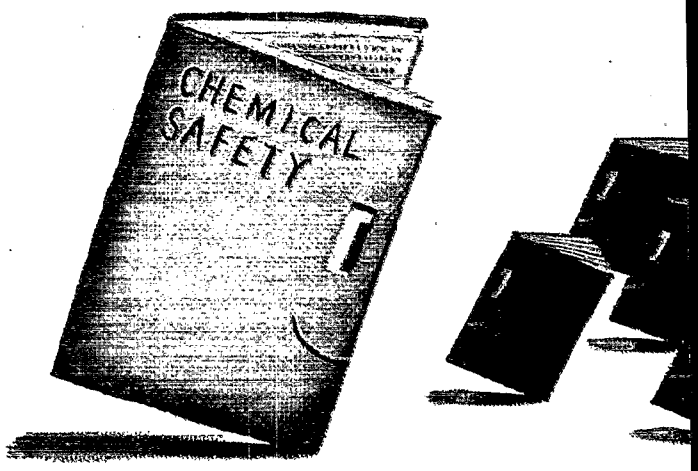
CCPS/AIChE Directory of Chemical Process Safety Services. Comprehensive directory of organizations offering consulting services, emergency services, testing services, or training courses from offices in the US and Canada. More than 350 firms are included in this subject-organized reference. American Institute of Chemical Engineers, Publications Sales Department, 345 East 47th St., New York, NY 10017. (212) 705-7657. Published 1991. 176 pages. Order No. 0-8169-0481-2. Price: $20.

CHEMICAL ACCIDENT PREVENTION

Blueprint for Prevention: A Guide to Preventing Chemical Releases. Guidebook for workers on surveying the workplace, protective equipment assessment, medical planning, and stress and emergency response. Workplace Health Fund, 815 16th St. NW, Washington, DC 20006. Price: $3 AFL-CIO affiliates, $5 non-affiliates.

Recommendations to Chlor-Alkali Manufacturing Facilities for the Prevention of Chlorine Releases. Guide for manufacturing facilities in implementing CMA's Responsible Care™ process safety code and OSHA's new process safety standard. The Chlorine Institute, 2001 L St. NW, Washington, DC 20036. (202) 775-2790. Published 1990. Item No. 86. Price: $7.50 members, $15 nonmembers.

Review of Emergency Systems, Final Report to Congress. Details the approach, findings, and recommendations of EPA's study as required under section 305(b) of SARA Title III.

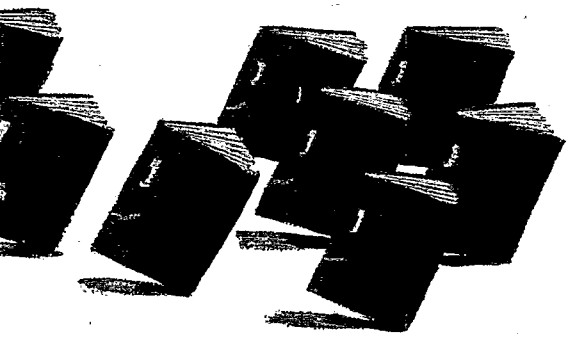


Documents the project's surveys, evaluations, site visits, and expert panels. US Environmental Protection Agency, Emergency Planning and Community Right-to-Know Information Hotline, OS-120, 401 M St. SW, Washington, DC 20460. Published 1988. Document No. OSWER-305B. Price: Free.

Why Accidents Occur: Insights From the Accidental Release Information Program. Bulletin focuses on the causes of accidents based on information collected under EPA's Accidental Release Information Program. Presents insights from the program to help LEPCs communicate with local facilities. US Environmental Protection Agency, Emergency Planning and Community Right-to-Know Information Hotline, OS-120, 401 M St. SW, Washington, DC 20460. Document No. OSWER-89-008.1. (Technical Assistance Bulletin 8). Published 1989. Price: Free.

Safe Warehousing of Chemicals. Resource manual outlines broad elements involved in the safe warehousing of chemicals. It addresses environmental protection issues, emergency planning and warehouse buildings, and features a guide to compatibility of chemicals, which shows chemical combinations believed to be dangerously reactive in the case of accidental mixing. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. Published 1989. Order No. 022003. Price: $10 members, $15 nonmembers.

Fixed Equipment Inspection Guide. Helps companies implement CMA process safety code. It serves as a management tool for defining and developing an inspection system, including a sample fixed equipment manual that can be modified for individual company and site requirements. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. Order No. 022008. Price: $75 members, $112.50 nonmembers.



Guidelines for Safe Storage & Handling of High Toxic Hazard Materials. Details the elements needed for a reliable system that can help prevent the equipment and human failures that might lead to catastrophic accidental release of high toxic hazard chemicals. American Institute of Chemical Engineers, Publications Sales Department, 345 East 47th St., New York, NY 10017. Published 1988. 119 pages. Order No. 0-8169-0400-6. Price: $65.

RELEVANT STATUTES

Emergency Planning and Community Right-to-Know Act of 1986 (SARA Title III), 42 U.S.C. 1101 *et seq.* SARA Title III is codified in Title 42 of the United States Code, which is available in public libraries and law offices. SARA Title III regulations are codified in Title 40 of the code of Federal Regulations, available in public libraries. Emergency planning and notification rules are at 40 CFR Part 355. Reporting under SARA sections 311 and 312 is covered at 40 CFR Part 370. The annual toxic release inventory reporting under SARA section 313 is covered at 40 CFR Part 372.

The **OSHA Hazard Communications Standard** is codified at 29 CFR 1910.1200.

The **Clean Air Act** is codified at 42 U.S.C. 7401 *et seq.* The chemical accident prevention provisions are in 42 U.S.C. 7412(r). The Clean Air Act Amendments are found in Public Law 101-549, November 15, 1990. The chemical accident prevention provisions are found in sections 301(r) and 304 of Public Law 101-549.

Occupational Health and Safety Act, 29 U.S.C. 651 *et seq.*

Hazardous Materials Transportation Uniform Safety Act of 1990, Public Law 101-615.

Oil Pollution Act of 1990, Public Law 101-380.

TRAINING

Accident Control Techniques, workbook (4 hours training). Information on general preventive maintenance

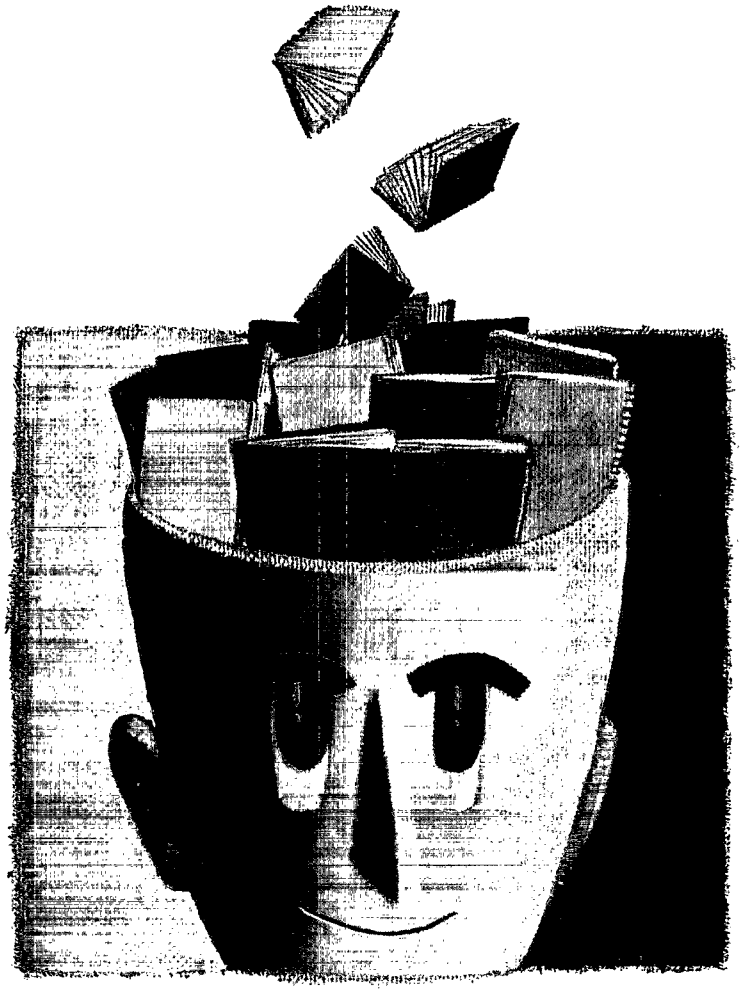
measures, safety information, fire prevention, safety devices, safe work practices, and injuries and illness. American Petroleum Institute, Publications Department, 1220 L St. NW, Washington, DC 20005. (202) 682-8375. Title Code 1120.

The OSHA Hazard Communication Standard: An Employer's Handbook. This 112-page guide explains in straightforward terms what businesses' obligations are under the OSHA Hazard Communications Standard. It is intended primarily for small- to medium-size companies. US Chamber of Commerce, Publications Fulfillment, 1615 H St. NW, Washington, DC 20062. Order No. 0089. Price: $15 members, $25 nonmembers.

Chemical Process Operator Certification Training. This worker certification program is designed to enable companies to train and certify their chemical process operators. Though intended for companies of all sizes, it is specifically designed for the needs of small locations. There are manuals for both workers and instructors as well as seminars for the instructors. Synthetic Organic Chemical Manufacturers Association, Suite 300, 1130 Connecticut Ave. NW, Washington, DC 20036. (202) 659-0060.

Chemical Process Operator Certification Training. Manuals and seminars. Includes Level I: Basic Operator Training and Level II: Process Specific Training, e.g., reactor systems, process safety, environmental controls and instrumentation. For information contact Synthetic Organic Chemical Manufacturers Association, Suite 300, 1330 Connecticut Ave. NW, Washington, DC 20036. (202) 659-0060.

Safety in The Aerosol Laboratory (A/V Program). Produced with the aerosol industry, this audiovisual program focuses on the safe use and handling of hydrocarbon aerosol propellants in the laboratory. Ideal for in-plant viewing by all levels of personnel. The program pinpoints ways to avoid fires and explosions, thereby preventing injury, lost research and development time, property damage, and medical expenses. The program goes with the updated Hydrocarbon Propellants Manual and "The Gassing Room" audiovisual program. Chemical Specialties Manufacturers Association, 1913 Eye St. NW, Washington, DC 20006. (202) 872-8110. Order No. TP-8. Price: $80 members, $95 nonmembers.



Hydrocarbon, Dimethyl Ether, and Other Propellants: Considerations for Effective Handling in the Aerosol Plant and Laboratory. Text includes instructions on the proper use, shipping, storage, and disposal of dimethyl ether (DME) and difluoroethane (DFE, 152a) and disposal of filled aerosol cans. Also discusses shipping and storage of propellants, gassing room disposal, laboratory guidelines, and proper training. Chemical Specialties Manufacturers Association, 1913 Eye St. NW, Washington, DC 20006. (202) 872-8110. Published 1984. Order No. TP-7. Price: $65 members, $85 nonmembers. For section updates, Order No. TP-7A. Price: $10.

HAZARD EVALUATION

Guidelines for Hazard Evaluation Procedures. This book lists qualitative procedures for hazard identification, helping readers learn to apply the proper hazard evaluation method to each process. American Institute of Chemical Engineers, Publication Sales Dept. CAT-90, 345 East 47th St., New York, NY 10017. (212) 705-7657.

Major Industrial Hazards: Their Appraisal and Control. Document presents methods of risk estimation and measurement of potential hazards against likely benefits.

American Society of Safety Engineers, Department F, 1800 East Oakton St., Des Plaines, IL 60081. (708) 692-4121, ext. 18. Order No. 8803. Price: $61.

Guidelines for Chemical Process Quantitative Risk Analysis. CPQRA identifies areas where operations, equipment, or management systems may be modified to reduce risk of catastrophic incidents. Text explains how this technique can also help identify cost effective process and operational improvements. American Institute of Chemical Engineers, Publications Sales Department, 345 East 47th St., New York, NY 10017. Published 1989. 585 pages. Order No. 0-8169-0402-2. Price: $150.

Guidelines for Process Equipment Reliability Data, with Data Tables. Supplements CPQRA guidelines with failure rate data to perform a CPQRA. Contains easily accessible data in the CCPS Generic Failure Rate Data Base, information on several generic data resources, and procedures to develop failure rate data using information from the plan and process studied. American Institute of Chemical Engineers, Publications Sales, 345 East 47th St., New York, NY 10017. Published 1989. 301 pages. Order No. 0-8169-0422-7. Price: $100.

EMERGENCY PLANNING

Hazardous Materials Emergency Planning Guide. Gives local authorities an overview of what's involved in selecting and organizing an emergency planning team, defining the team's tasks, and developing, testing, and maintaining the plan. National Response Team, US Environmental Protection Agency, Emergency Planning and Community Right-to-Know Information Hotline, OS-120, 401 M St. SW, Washington, DC 20460. Published 1987. Document No. NRT-1. Price: Free.

How to Prepare for Workplace Emergencies. Booklet provides guidelines for planning for emergencies, including sections on command, communication, and evaluation. Occupational Safety and Health Administration, U.S. Department of Labor, OSHA Publications Office, N3101, 200 Constitution Ave. NW, Washington, DC 20210. (202) 523-9667. Published 1988. Document No. 3088. Price: Free.

Preparing for Emergency Planning. Guide for plant managers describes basic provisions of hazardous substance laws. National Association of Manufacturers, Publications Co-ordinator, Suite 1500, North Lobby, 1331 Pennsylvania Ave. NW, Washington, DC 20004. Published 1986. Order No. 046. Price: $21.95.

CAER Code Resource Guide. Three-ring binder outlining the CAER process and the CAER code of management priorities under Responsible Care™. Provides approaches and checklists for developing and implementing local community awareness and emergency response plans and examples of successful CAER programs. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. Published 1990; revised 1991. Order No. 024012. Price: $50 members, $75 nonmembers.

Site Emergency Response Planning Guidebook. Comprehensive handbook looks at options for facility emergency response planning and is also an appendix to CAER Code Resource Guide. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. Published 1986; new edition 1992. 25 pages. Order No. 024041. Price: $7.50 members, $11.25 nonmembers.

CAER: Planning Emergency Exercises Videotape. Explains in simple way how to plan and conduct four types of community emergency exercises (10 minutes). Available in VHS and 3/4". Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. 1986. VHS Order No. 024027; 3/4" Order No. 024028. Price: $45 members, $67.50 nonmembers.

National Chemical Response and Information Center (NCRIC) Brochure. Provides information on CHEMTREC, CHEMNET, emergency response training, and the Chemical Referral Center. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. 16 pages. Order No. 012011. Price: 50 cents members, 75 cents nonmembers.

ICHIEFS. ICHIEFS information center is an electronic link to the latest training and education news, legislative activities, publications, workshops, conferences, hazardous materials news, and computer software applications for fire chiefs and related emergency service professionals. ICHIEFS gives direct access to state and national agencies and is compatible with either Macintosh or PC systems.

International Association of Fire Chiefs, 1329 18th St. NW, Washington, DC 20036. (202) 833-3420. Software: $149.

Fire Service Emergency Management Handbook. Insights to strengthen a community's ability to respond to a wide range of emergency situations. Ranging from earthquakes to hazardous chemical spills, text covers disaster management concepts and systems and checklists for specific hazards. International Association of Fire Chiefs, 1329 18th St. NW, Washington, DC 20036. (202) 833-3420. Price: $19 members, $23 nonmembers.

SARA TITLE III

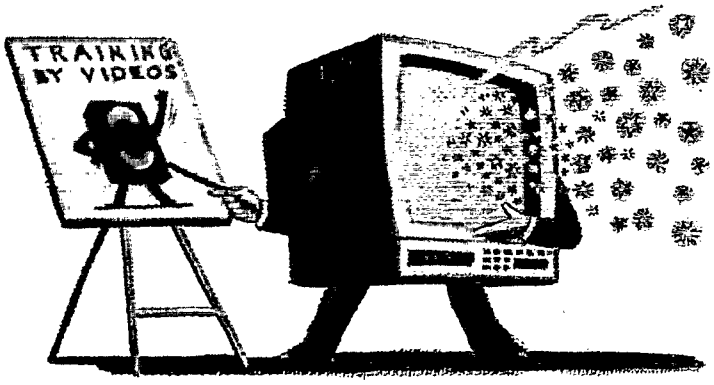
Chemicals in Your Community, A Citizen's Guide to the Emergency Planning and Community Right-to-Know Act. General overview of Title III requirements and benefits for all audiences. US Environmental Protection Agency, Emergency Planning and Community Right-to-Know Information Hotline, OS-120, 401 M St. SW, Washington, DC 20460. Published 1988. Document No.: OSWER-90-002. Price: Free.

It's Not Over in October: A Guide for Local Emergency Planning Committees. Suggestions for LEPCs to help them implement SARA Title III. Describes the function of LEPCs and provides ideas and examples based on past LEPC, EPA, and Federal Emergency Management Agency experiences. US Environmental Protection Agency, Emergency Planning and Community Right-to-Know Information Hotline, OS-120, 401 M St. SW, Washington, DC 20460. Document No. OSWER-90-004. Price: Free.

A Manager's Guide to Title III. Provides the chemical facility manager with a summary of federal requirements under Title III and some practical approaches to complying with them. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. Published 1987. 75 pages. Cost: $25 members, $37.50 nonmembers.

Resource/User's Guide to Title III Materials. The complete list of CMA publications and videos available on Title III as well as a guide to using materials with various audiences. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. Published 1988. Order No. 024037. Price: 50 cents members, 75 cents nonmembers.

Title III Community Awareness Workbook. To help plant managers communicate with the various segments of their communities, this workbook covers communications approaches for the specific sections of Title III, risk communications, community relations, working with the media, a timeline for communications activities, and an appendix of examples of communications activities. Chemical Manufacturers Association, Publications Fulfillment, 2501 M St. NW, Washington, DC 20037. 74 pages. Order No. 024042. Price: $17.50 members, $26.25 nonmembers.



GENERAL INFORMATION

Small Business and Clean Air. Pamphlet explains the new small business obligations set by the 1990 amendments to the Clean Air Act. US Chamber of Commerce, Resources Policy Department, 1615 H St. NW, Washington, DC 20062.

Cleaning Up Toxics in Business. This 25-minute videotape, by the League of Women Voters of California Education Fund, suggests what small businesses—drycleaners and auto repair shops, for example—can do to prevent pollution and control toxic chemicals. Emphasizes both environmentally safe and cost-effective practices. Contact Peter Epstein, The Video Project, 5332 College Ave., Oakland, CA 94618. Rental: $35; purchase $59.95.

Occupational Health and Safety in American Industry. This booklet teaches employers (both large and small businesses) some possible ways to organize in order to assure a safe and healthy workplace as well as ways to respond to unforeseen hazards. It also presents new information concerning workers' health. US Chamber of Commerce, 1615 H St. NW, Washington, DC 20062. Published 1991.

The following organizations are the sponsors that have worked together to develop this publication.

CENTER FOR CHEMICAL PROCESS SAFETY
of The American Institute of Chemical Engineers
345 East 47th Street
New York, New York 10017
(212) 705-7319

US CHAMBER OF COMMERCE
1615 H Street, NW
Washington, DC 20062
(202) 463-5533

CHEMICAL MANUFACTURERS ASSOCIATION
2501 M Street, NW
Washington, DC 20037
(202) 887-1100

CHEMICAL SPECIALTIES MANUFACTURERS ASSOCIATION, INC.
1913 Eye Street, NW
Washington, DC 20006
(202) 872-8110

THE CHLORINE INSTITUTE, INC.
2001 L Street, NW
Washington, DC 20036
(202) 775-2790

INTERNATIONAL ASSOCIATION OF FIRE CHIEFS, INC.
1329 18th Street, NW
Washington, DC 20036
(202) 833-3240

NATIONAL ASSOCIATION OF CHEMICAL DISTRIBUTORS
Suite 400, 1200 17th Street, NW
Washington, DC 20036
(202) 296-9200

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION, INC.
Suite 300, 1330 Connecticut Ave., NW
Washington, DC 20036
(202) 659-0060

UNITED STEELWORKERS OF AMERICA
Five Gateway Center
Pittsburgh, PA 15222
(412) 562-2400

US ENVIRONMENTAL PROTECTION AGENCY
Chemical Emergency Preparedness and Prevention Office, OS-120
401 M Street, SW
Washington, DC 20460
(202) 260-8600

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)
US Department of Labor
Room N3647, 200 Constitution Ave., NW
Washington, DC 20210
(202) 523-8151

For additional information about this publication, please contact the EPA Emergency Planning & Community Right-to-Know Information Hotline: 800-535-0202