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THE ANATOMY OF AN IN-TRANSIT SPILL

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The manager of a railroad switchyard in a major city discovered that a railroad tank car had arrived in his yard empty. He learned that there had been a railroad accident the day before, and that the car in question was involved. What was left of the car had arrived in his yard strapped to a flatcar. Asked if he knew what had been in the car, he replied that it was acrylonitrile.

One of the loading dock foremen asked a truck driver one winter morning if he were not the same driver whose truck had been loaded the morning before. The dock foreman went on to comment about the driver's apparent speed because the load was destined for the truck owner's plant 700 miles (1,127 km) away. The driver told the foreman that he had been involved in an accident on an icy road a few miles out of town and that the previous load was in the highway ditch. The product involved was bagged pentachlorophenol.

The Problem

These two incidents indicate a serious problem in industry today, that is, the problem of handling in-transit accidents to prevent pollution of watercourses in the area of these accidents and to protect human life where domestic water intakes are involved.

The purpose of this paper is not to condemn the transportation industry. Such a general condemnation would be difficult to sustain because this industry hauls hundreds of millions of tons of potentially hazardous cargo annually without difficulty. The intent here is to discuss methods of improving the techniques in handling accidents when they do occur. Better handling techniques will help the wet processing industry as well as the transportation industry in this most public of all environmental problems.

Because the purpose of the paper is to discuss potential pollution problems that may occur, the safety aspect, though important, will not be discussed. There is no intent to belittle the complex safety problems that may arise in relation to such accidents.

If it is possible to boil all the actions and reactions necessary after an in-transit spill into two key words—they would be speed and preparation. There must be speed in reporting the accident, speed in reacting to the report and seeing that it reaches the proper authority, and speed in determining if all those who must know are well informed. It is necessary to insure that the company is prepared to handle any accident involving any of their products.

Planning

The whole issue of preventing pollution from transit spills requires considerable prior planning. This requirement makes it mandatory that companies who ship potentially hazardous products have a transportation accident plan that includes provisions to mitigate as much as possible the pollutional effects of such incidents.

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There are transit accident procedures in operation today that dwell exclusively on the safety aspects. A complete transit accident plan must include provisions for pollutional effects as well as contact safety effects.

Some states and many regional pollution control authorities have spill alert systems. These systems work on the advance warning principle. When a spill occurs, the plant informs the state pollution control agency as soon as possible, and gives this agency such necessary information as the amount spilled, the time the spill occurred, the toxicity and physical and chemical characteristics of the spilled material, and the exact location of the spill. The agency that receives this alert warning then passes on the information to other interested state agencies and to all water treatment plants below the point of spill if necessary. The agency involved must be able to make several important decisions in a short period of time. For example, they must be ready to tell the water treatment plants below the point of spill whether or not to shut down their intakes. This system works quite well in many areas. A modification of this procedure must be incorporated in transit accident plans if these plans are to protect the general public from harm successfully when such accidents do occur.

In an effort to develop the necessary components of a good transit accident plan, a hypothetical case will be studied, and incidents will be pointed out in terms of what did or what should have happened.

An Illustrative Example

A standard truck trailer and tractor loaded with 50 drums [55-gal (208-l) size] of highly toxic insecticide skidded on wet pavement and crashed into a ditch in a rural area in a midwestern state. The company that manufactured the insecticide was called by a district office of the state police. The call was directed to a nearby plant located in the state in which the accident occurred. The call was received at 3:30 AM Sunday morning by the night superintendent. After being told the name of the product, the superintendent told the officer that the product was not manufactured at that plant and gave him the company's home office telephone number. The state policeman then called the number provided and reached a guard on weekend duty at the main office who told him that no one worked at the offices at night or on weekends. The officer persevered to the extent of getting the home phone number of the company medical director.

This portion of the case contains the first of a series of time-consuming incidents that could have been eliminated by a good, functioning transit accident plan.

To continue this hypothetical case, the policeman called the company medical director and received emergency first aid information concerning the product and some recommendations concerning physiological tests for the truck driver and the police officer on the scene. The company medical director noted the telephone number of the state policeman. Then he called the physician on duty at the hospital near the accident scene and explained the tests to be performed on the truck driver and the state police officer who had not yet arrived. The company medical director then called the state health department and received no answer. In that particular state the health department is the agency that is responsible for both pollution control and domestic water supplies.

Here again the problem of time is encountered. There was no provision available to the company medical director to alert the state agency during nonworking hours. The problem was solved with a loss of time by calling the state medical officer at home after ob-

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taining his phone number from the local telephone information service.

The company medical director told the state health officer about the accident and gave him the information he had gathered. The state health officer said he would have his district pollution control engineer at the accident site as soon as possible. The company medical director then called the night emergency number for the manager of the plant where the product in question was manufactured. The plant manager was informed of the situation, and he stated that he would have an emergency crew at the accident site as soon as possible.

The company medical director then called the manager of the corporate pollution control group who sent one of his representatives to the accident site. The latter individual was in fact the pollution engineer from the nearest plant as was the emergency crew sent by the manufacturing plant manager.

When the company pollution engineer arrived at the accident site, the state police were directing traffic around the accident. The state pollution engineer had already arrived, and he and the company pollution engineer conferred about the best course of action. A quick reconnaissance at the accident scene indicated that the local drainage was accomplished through a small drainage ditch across a large farm and into a swampy area that drained into a nearby large river. The owner of the farm was contacted and asked to move his livestock out of the area of the drainage ditch. A check of water treatment plants indicated that the nearest downstream location was several miles below the confluence of the swamp with the major river.

A discussion was held with the company emergency crew chief about the pollution potential. The crew chief informed the two pollution engineers that about 700 lb (318 kg) of the product was spilled and that the emergency crew could remove about 500 to 600 lb (227 to 272 kg) of that at the accident site. The pollution potential was then about 100 to 200 lb (45 to 91 kg). The crew chief also explained that he had a load of neutralizing chemicals on the way that could render the remainder considerably less toxic. It was decided that the nearest water treatment plant should be alerted and informed that there was little chance of taste and odor problems and no hazard to the water potability.

The pollution engineers then inspected the drainage system from the accident site to the confluence with the large river, visually checking for other chances of hazard to humans or livestock. Periodic samples were taken throughout the system for 14 days after the accident. The early samples were rushed to the nearby state laboratory for analysis.

Accident Handling Procedures

This hypothetical case is, of course, a composite of a number of cases that the author either has been personally involved in or has heard about from other company representatives, state pollution and health agency professionals, and various other sources. It is only important in that it highlights the various phases of a transit spill. These phases are:

1. The reporting phase;
2. The information phase;
3. The action phase;
4. The follow-up phase.

Any action that can shorten the elapsed time from the actual accident to the action phase is very important from a pollution abatement point of view because the degree of success in controlling a spill and any possible hazard involved is almost always time-dependent.

In the author's opinion, an industrial in-transit accident plan must contain the following major steps:

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1. Handling the first call concerning the accident;
2. Informing the people within the company who need to know;
3. Informing the people outside the company who need to know;
4. Obtaining the emergency cleanup crew;
5. Assuring a good follow-up procedure.

A call concerning an accident may be received by any company office or plant. All offices and plants, therefore, must be instructed as a matter of policy in the case of a reported transportation accident to record and verify with the caller:

1. The name of the caller;
2. The official title and function of the caller (such as truck driver or police officer);
3. All the information available concerning the accident, such as
(*a*) Exact location (in sufficient detail to find the site on maps and on the ground);
(*b*) Time of occurrence (as close as possible);
(*c*) Name of transportation company;
(*d*) Product name;
(*e*) Amount of product involved (if known);
(*f*) Condition of the transportation equipment (tank trailer leaking, railroad tank car on fire);
(*g*) Who else has been informed (list name and title);
(*h*) Disposition of casualties if any (what hospital, clinic, or physician).
4. How to contact the caller or other responsible party at or near the scene;
5. Whether the caller, if not himself a law enforcement officer, informed the nearest law enforcement agency. If not, the caller should do so immediately. (Many trucking accidents are reported by drivers to their own companies or to the company whose products they are hauling. Railroad accidents are often reported to the railroad company or to the American Association of Railroads' Bureau of Explosives.

The receiver of the call now must inform the proper plant staff man because the call receiver is often a sales representative, a guard, or plant night superintendent. The most successful policy in this respect is to let the manufacturing plant act as coordinator for transit accidents involving its own products. The receiver of the call, therefore, by company policy, calls the manufacturing plant and relays the information he has received. The manufacturing plant representative must now make a number of decisions, the foremost of which is how serious a hazard may occur with the product in question. Many accidents involve nearly innocuous products that do not require much more than calling the accident site and informing those in charge that the product poses little or no risk. Some accidents do involve products that are hazardous from both a contact safety and pollution standpoint.

Assuming that the product is hazardous, the manufacturing plant representative must quickly inform a number of persons. Much of the information may be supplied, and many of the actual calls may be made, by individual company experts in medicine, safety, pollution abatement, transportation, and public relations. In any case these people must:

1. Call the accident site and give needed information such as first aid for their immediate use. If necessary, he must give the recipient of any injured or exposed people (such as the hospital and local physician) the phone number of a company physician familiar with the product. A responsible person at the accident site should be informed of the identity of the caller, his phone number, and the fact that he is the person to be contacted for the manufacturer unless otherwise informed.

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2. Call the state pollution control agency and relay the information available. Ask this agency to inform any other agency that should be contacted, such as the state health department or game and fish agency. Give the pollution control agency the information about the caller, his phone number, and any related information.

3. Inform the transportation company who should, in turn, contact its insurance carrier.

4. Call within the company and report the incident and all pertinent facts to:

(*a*) The medical department;
(*b*) The law or legal department;
(*c*) The public relations department;
(*d*) The safety department;
(*e*) The company insurance carrier or department; and
(*f*) The transportation or traffic department.

Assuming that it is deemed necessary for a cleanup crew to proceed to the accident site, the manufacturing plant representative must consider how this may be accomplished in the shortest possible time. In the author's company, except for two or three specific products, this is the job of the nearest plant. The manufacturing plant representative calls the nearest plant and gets the crew under way. The crew is usually composed of safety professionals as well as engineers who are familiar with the product. The crew can include pollution professionals, industrial hygiene professionals, public relations professionals, and others. Again it must be remembered that the manufacturing plant representative can and does get help from many departments within his own company.

When the nearest plant receives a request to send an emergency cleanup crew to an accident site, the crew chief is appointed by his plant manager and is usually a safety professional or an engineer who has had experience with the product involved. The crew composition is the responsibility of the crew chief and is often based on who is available. The crew chief can always call for additional specific help after viewing the accident scene. The emergency crew should have:

1. The necessary personal safety equipment for the crew;
2. The necessary first aid equipment and supplies to handle over-exposure cases with the product involved;
3. The necessary chemicals for neutralization (if possible) and such items as tools, containers, and vehicles;
4. The authorization to hire people and to purchase supplies and services at the accident site;
5. The authorization to call for special help from plant and corporate staffs.

The crew chief should be the manufacturing company's decision-making representative at the accident site. He should be given the widest possible latitude to facilitate a rapid, orderly, and safe cleanup. He should know all company personnel at the site, and all such personnel should be ordered to report to him on arrival. He should approve all purchases and orders for the movement of equipment or personnel. The crew chief should function as the job supervisor.

The crew chief should make or have made a pollution reconnaissance as soon as he arrives at the accident site. If this reconnaissance indicates any potential problems that the cleanup crew feels it cannot handle, help should be summoned from the company or the state pollution control agency. The crew chief should obtain water samples for analysis if it seems necessary or if he is so advised by company or state pollution professionals. Well water supplies should not be overlooked as a possible problem in the initial or subsequent pollution reconnaissances.

After the accident site has been cleaned up and before the cleanup crew departs, a follow-up plan should be

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decided on to assure that no hazard remains or develops after the crew departs. The best method here is to sample the nearby drainage systems or wells periodically to determine the fate of buried or dispersed materials. Such samples should be obtained and analyzed as long as there is any possible need.

Conclusions

There are a number of manufacturer's groups that have emergency programs now in operation. Such organizations as the Chlorine Institute, Inc. are primarily interested in chlorine and accidents involving the transportation of this product. The National Agricultural Chemists Association has established an excellent system of handling pesticide spills. The Manufacturing Chemists Association, the American Petroleum Institute, and others have worked on the problem of information availability for accident use by transportation companies and local, state, and federal agencies.

When the problem of in-transit spills is discussed, it often centers on the contact safety, fire and explosion hazards, and characteristics that describe these particular hazards. The characteristics necessary to evaluate the pollution potential are often not available or not considered important enough to transmit to a calling party when an accident has occurred. If this paper serves any useful purpose, it will be to highlight the pollution potential of such accidents and to call attention to the need for information on this hazard as a routine in handling transit accidents.

The characteristics most necessary to evaluate the pollution potential of the product in an in-transit spill are:

1. Solubility in water;
2. Toxicity to fish and other aquatic life;
3. Specific gravity to determine whether the product will be on top or on the bottom of the receiving water course;
4. The effect of neutralizing solvents on:
   (*a*) Solubility in water;
   (*b*) Toxicity; and
   (*c*) pH of receiving stream.
5. Treatment chemicals, if any, that can reduce the pollution effects;
6. Biodegradability;
7. Any other information on how to ameliorate the cleanup of spills of the product in question.

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