

Hazardous Materials Transportation Regulation

[Editor's Note: This is a three-part paper on the general subject of hazardous materials transportation regulation. The three parts examine the purpose and direction of regulation, the process of hazardous materials regulation, and the complexity of regulation. Although there was some coordination of subject matter among the authors, there are overlaps and, in some cases, conflicts in views expressed. The goal of the overall document is to spark discussion, and these differences should advance that goal.]

PART 1. PURPOSE AND DIRECTION OF REGULATION (C.H. Thompson)

As noted in the portion of this paper on the regulatory process, there is no clearly stated National Hazardous Materials Transportation Policy, except for the very general statement found in the enabling legislative policy, which can be used to accurately quantify the specific purpose of the regulatory program. This situation has existed for so long that a complex industry and regulatory schema has evolved that operates on a concept of federally issued "minimum standards" to assure the safety of hazardous materials under "conditions normally incident in transportation." A careful examination of this concept and of the current interests of the many federal agencies and several state and local agencies in hazardous materials suggests that a definition of purpose is not only desirable but has become mandatory. The purpose of these regulations must address at least the following issues:

1. What are the targets or receptors that require protection: the general public, the transportation worker, the public along the transport route, private property or property in general, including the broader context of the total environment?
2. What are the conditions normally incident in transportation, and how do these conditions relate to catastrophic events in transportation?
3. If shippers and carriers can choose for various reasons, including economic pressures resulting from product loss, to operate at a higher degree of safety than required by federal regulations, do the minimum safety standards satisfy even the general legislative policy?
4. What level of protection should be acceptable, and how should it be measured?
5. What limitations on regulatory scope are needed, such as "transportation in commerce" and intra- or interstate commerce, especially in light of other legislative demands and agency programs?
6. How can the regulations be prepared to be understandable, useful, and enforceable to both the regulated and the regulators, and yet not stifle technological innovation?

These issues are examined in more detail in the context of directions to be considered in hazardous material transportation.

Direction of Hazardous Materials Transportation Regulations

It is clear that when more than 1200 pages of detailed material specification regulations issued by one federal agency are added to at least that quantity issued by two or more other agencies, coupled with nonfederal requirements, a new direction in regulation is needed. Those who would disagree with this premise must then accept that the alternative left to the regulated community is the "best affordable effort" in awareness and compliance. In some cases, this may be no compliance at all. The size, complexity, and changing detail of regulations in a field as dynamic as hazardous materials transportation level a mighty challenge to the regulated community that can be fully met by few. And yet, with all the complexity and change, the regulatory base is always behind in technology applications and has to improvise relief mechanisms such as exemptions to avoid total chaos and halting of progress. The costs of the delay and the controls offered by the existing regulatory schemata are further reasons for new directions to be considered when it is recalled where the true responsibility of safety lies. This responsibility is not on the regulator, but on the shipper, carrier, and packaging manufacturer (see 49 CFR 172.2).

As previously noted, the existing regulations "evolved" over decades and, as such, a group of talented and dedicated persons grew with this evolution. Many of the reasons for regulatory modification were known (and still are known among a few) and, therefore, compliance programs could be built by using this experience to anticipate the pace and nature of pending changes. Now and in the future, however, other agencies have demands that, if not accommodated, will contribute to a continuation of regulatory proliferation. This widening effect has expanded the regulated community, and now there are many more people attempting to use these regulations who do not have the evolutionary background. These people are often at a total loss to understand why a given requirement exists. It is often difficult for the government to explain the reason because, in this evolutionary process, it often was not the government's initiative or experience that caused the regulatory posture but, rather, someone in the regulated community who is now unavailable or not responsible for providing guidance. It must be recognized that to assure regulatory understanding by this ever-increasing group of newly aware persons, the purpose of the rules must be defined and new directions explored.

Prior to assuming the omnipotent role of defining the purpose of the regulations and direction that should be explored, it would appear appropriate to expand on the issues that should be addressed. The issue pertaining to the target or receptor would be validated by those who have an awareness of other regulatory programs that are defined by effects that must be prevented. Recognizing that there are deficiencies also in these other regulatory strategies, there is an important principle to explore. An example would be the use of "receiving water quality criteria" on which to base a management program to protect the quality of the nation's waters. Receiving water quality criteria are scientifically derived numerical indicators and descrip-

tions suggested as protective of identified beneficial uses of water. Included in the beneficial uses of water is, for example, protection of fish and wildlife. Research work would be conducted to determine what level of a variety of materials in question would cause irreparable harm to species potentially threatened. These research results would be examined and interpreted in terms of scientifically valid criteria. The next step is to take these criteria and examine extenuating circumstances in a social and political context as a receiving water quality standard is derived. It is not the purpose of this discussion to defend this procedure, but rather to demonstrate how those who invest in equipment and training to achieve the water quality standard have before them an understanding of what it is that they are achieving or protecting.

The same is not specifically true in the hazardous materials transportation regulations. It cannot be, or there would not be the internal inconsistencies that so clearly exist. If the purpose of these regulations is to advise the general public of the hazards involved in the transportation of the materials, it would appear that the elaborate labeling, placarding, marking, and documentation system would fall short of the mark for a population even as well informed as that encountered in the United States. If the purpose of the regulation is to protect the transportation worker, then it is clear that materials that pose effects other than from acute exposures should have been regarded as significant years ago. If the purpose of the regulations is to protect the public in close proximity to the transportation activity, then it would appear that decisions with the railroad right-of-way would be more in keeping with distances provided by ancient concepts such as buffer cars. If the purpose of the regulation is to be the protection of property, perhaps even the environment, then materials that have only recently been listed in a rather ineffective manner should have been listed long before the needs were identified by EPA.

Regarding the question of the purpose of these regulations from the perspective of whom are they designed to protect, the answer is not clear. It is not even clear what the rationale is for selecting the hazards that have evolved into the regulatory system. It is thought by some that these hazards are primarily those resulting from acute exposure, such as flammability, explosion, and perhaps corrosion. However, that does not explain the inclusion of low-level radioactive materials, etiologic agents, and some materials that, when shipped in such small quantities, pose so little hazard that special categories must be created to exempt them from vigorous regulation.

If it were clearly understood whom or what we were trying to protect with these regulations, the next question would be, Under what conditions are we interested in providing this protection? Traditionally, we talk in terms of conditions normally incident to transportation. There has been very little work done to accurately define what these conditions represent in useful engineering terminology. Efforts have been made by the DOD to quantify conditions incident to certain types of transportation, and there have been other sporadic and limited efforts by the federal government and certain parties in the regulated community to define some of these conditions. The material specification regulations and the limited amount of testing associated with them are not clearly related to any defined conditions normally incident to transportation. It always is perplexing to an individual to understand the relationship of a limited drop test to conditions in transportation of a package moving

at tens of miles per hour and experiencing a variety of pressures, humidities, vibrations, shocks, torsions, tensions, and compressions. And even if these conditions were defined in engineering parameters that could be used for design, the question that still stands is how these conditions relate to catastrophic events in transportation. Once again, if these regulations are designed to protect the general public, then the rationale that has been traditionally used, which suggests that these regulations are not intended to prevent or control the catastrophic event, does not seem consistent. It will be argued by some that the location of certain valves, safety vents, and quantity limitations are deliberately designed to minimize and control damage resulting from catastrophic events. Some may be critical of this prevailing theme, which would suggest that it should be illegal to have an accident. This is not without precedent, in that Section 311 of the Clean Water Act clearly makes it unlawful to have a spill that many people would consider an accident. Therefore, the traditional view that the catastrophic event is beyond the scope, purpose, or purview of the hazardous materials transportation regulations would appear to be unnecessarily limiting and inconsistent with the claims of who is being protected by these regulations.

Because these regulations were not designed to satisfy a specific purpose, nor was there an architect laying out all aspects of hazardous materials transportation and directing a grand strategy or research program to fill in all the missing pieces, and because the responsibility for safe transportation of these materials lies entirely with the shipper, the carrier, and the packaging manufacturers, these regulations have frequently been referred to as minimum safety specification regulations. If any of the regulated parties felt that a higher degree of safety was required, their decision traditionally has been respected and that flexibility provided. This traditional view should be reexamined. There are new concerns about the transportation of hazardous wastes and other materials that have broadened the needs for these regulatory requirements. These new programs are intended to be implemented at the state level, and all efforts are being made to make this happen expeditiously. The same regulations, which a few years ago were regarded as minimum safety standards, may now be referred to by some as adequate safety standards. The desirability of establishing this viewpoint is to convince those who might establish more stringent requirements that these requirements are not necessary, so that the nationwide regulatory program can maintain some semblance of order. Those who would find fault with this examination may be in a position to point to studies that demonstrate that additional safety precautions are not warranted or cost effective. The number and comprehensiveness of those studies, however, seem extremely limited. It would appear, therefore, that if the established minimum safety standards are to be regarded by (a) state government, (b) interested federal agencies other than DOT, and (c) other interested parties as adequate or even maximum safety standards, then some very careful study and documentation must be published to explain the context in which that evaluation may be valid.

The determination of acceptable levels of protection and how to measure levels of protection represents a pervasive challenge in the 1980s for all forms of regulation. It is inconceivable that a regulatory program, which addresses the quantities of materials and the numbers of people that the hazardous materials transportation regulations do,

would go through the 1980s without demonstrating cause and effects and an evaluation of risks involved. Several other agencies are engaged in risk assessment work that may be viewed by the transportation community as esoteric. However, it would appear that we should not hide from this issue, and if the risk of transporting some of these materials is equal to or greater than predicted risks, for example, by the National Cancer Institute for exposure in the workplace or in the environment, then the traditional view that the materials have to move anyway may be subject to examination. In other regulatory programs, the concept has been launched for the regulated community to consider alternatives and substitutes for materials that are infeasible to control at the levels needed to afford the acceptable level of risk. There is no clear reason why the transportation community cannot in the 1980s come to grips with these risk assessment considerations and provide the required leadership to these pervasive hazards as it provided to more obvious hazards years ago.

A challenge that confronts the direction of hazardous materials regulation must be related to the content and format of any words that must be published. The existing regulations represent millions of person-hours of dedicated energy and the format is familiar to those experienced in the hazardous materials transportation field. A portion of the regulated community would argue, however, that the existing regulatory format is more useful to the regulator than to the regulated. The exception to this, of course, must be the creation and maintenance of the hazardous materials table found in 49 CFR Section 172.101. As the uninitiated becomes more familiar with the existing regulations, a variety of suggestions is often discussed. One of the most common suggestions is to remove from the regulations those parts in which the reader is not interested. Those in favor of the existing format argue that the several parts and subparts were created to meet the need. The reader, regardless of need, is still confronted with more than a thousand pages of information with which he or she must have some working familiarity in order to ensure that his or her operation is in compliance.

The enforceability of the existing regulations is yet to be aggressively demonstrated. Considerable reliance is placed on manual specification type standards and yet, traditionally, the program has operated as a voluntary compliance program. If enforcement is truly needed, and inspector resources will continue to be limited, it would appear that other directions should be considered so that advance forms of technology could be used to assist in the enforcement. If it is determined that the only way to assure safe transportation of hazardous materials is through aggressive enforcement action, then these regulations, which were developed for voluntary compliance, should be reexamined in light of the changing statutes and enforcement attitudes.

Related to enforcement and regulatory compliance is the relationship of technological innovation in modernizing hazardous materials transportation. Under the existing regulatory format it is often most difficult for the shipper, the carrier, or the packaging manufacturer to innovate, even though those parties are fully responsible for their actions. To encourage technological innovation and increase productivity, it follows that new directions are required in these regulations to allow those who are ultimately responsible to act responsibly without stifling control.

With the view in mind of stimulating discussion, the following purposes and directions of hazardous materials transportation regulations are offered.

It is the purpose of the hazardous materials transportation regulations (a) to protect the general public from involuntary exposure to transported materials determined to pose health risks greater than those determined to be voluntary accepted risks, (b) to provide the central coordinating function for the protection of transportation workers from exposure to materials designated by the occupational health and safety agency, (c) to provide the central transportation coordinating function to minimize ecological damage resulting from releases of material as determined by the environmental agency, and (d) to provide protection to property involved in or adjacent to hazardous material transportation activity.

To accomplish this purpose, a program should be established that includes at least the following directions.

1. Materials identified as hazardous by all the interested agencies should be accepted and incorporated in the transportation regulations and appropriately categorized so that protection to the general public, the transportation worker, the environment, and property is assured. This comprehensive listing should be promoted for national adoption.

2. The conditions of transportation should be defined, representing both normal and accident conditions. The resulting information should be reported in engineering parameters suitable for evaluation and design.

3. With the conditions of transportation and the materials to be transported known, the population at risk during transportation should be assessed, thereby defining several program elements including hazard communication needs.

4. With the conditions of transportation understood and the population at risk quantified, the listed materials can be examined and situations described so that exposure levels may be defined.

5. With exposure levels defined, a careful examination of available health effect criteria as well as criteria that would protect property would be established that would define levels of protection required.

6. Knowing the exposure level potential and the protection levels required, criteria may then be used in an aggregate form to establish transportation performance standards that would operate under the conditions previously defined. It is at this key point where those who would invest to comply with these performance standards would have a rationale to understand what that investment would protect. The transportation performance standard would be prepared in such a manner that technology would be stimulated to achieve the required levels of protection.

7. To assist in the transition from material specification type standards, a significant public and private research and development program will evolve methods that are shown to meet the performance standards.

8. At this point, the existing regulations could be critically examined and the packaging material specifications phased out of existence except as useful guidelines where it can be clearly shown that the material specification does in fact meet the performance standards.

9. An aggressive random packaging and package performance testing program would be introduced to assure that those with the responsibility of ensuring the safe transportation of hazardous materials are in fact using the flexibility available and meeting the performance criteria.

10. The commodity packaging standards could then

be phased out, recognizing that the regulated community would accept its full responsibility for meeting the performance specification and would be prepared to demonstrate equivalency to any material specification standard anyway.

11. Performance package standards and operations should be introduced and enforced so that the shipper, carrier, or container manufacturer is given the full flexibility under the regulations to meet the criteria that will afford the defined protection for the population at risk under the conditions of transportation for the identified materials.

In summary, what is being suggested is that Title 49 in its present format has served its purpose. Those portions of Title 49 that pertain exclusively to packaging design and manufacture should be supplanted by performance criteria derived from quantifying the conditions normally incident in transportation and for the accident environment. Those portions of the material in engineering specifications should not be lost, but should be retired and viewed as reference materials. The remainder of the hundreds of pages of regulations would be critically examined in a manner so that conditions not normally incident to transportation could also be accommodated by transportation, environmental design, and transportation system operation. It should be further noted that in no way can the task that has been suggested here be accomplished overnight, nor should it be done in a manner to undermine the credible efforts of existing organizations dedicated to assuring the safe transportation of hazardous materials. These purposes and directions for the hazardous materials transportation regulations should be designed as a parallel, non-Federal Register transportation control strategy. It should be developed by the near complete involvement of all levels of government and industry participation. Once completed, or perhaps with significant portions completed, it could then be phased into existing federal and state programs.

PART 2: THE PROCESS OF HAZARDOUS MATERIALS REGULATION (L.W. Bierlein)

The topic is regulation. This includes more than mere issuance of regulations in the Federal Register. It means any government-initiated, implemented, enforced, or inspired action to alter the behavior of people in the hazardous materials transportation community. The regulatory action can take any form, although to date the issuance of regulations has been the primary form used. The following discussion is applicable to all forms of regulatory action, including but not limited to issuance of regulations. It applies to judicial, legislative, educational, and other actions by the regulatory agency.

Many of the recommendations will seem obvious and some people may assume the concepts are already part of the program. They are not.

It Is Important to Define and Publish the Purpose of the Regulatory Agency

There is a strong need for an agency mission statement for the guidance of agency personnel, other regulators, and the public through which the objectives of the agency can be known and measured. No such mission statement exists today. There is no mechanism by which a petition for rulemaking or a specific regulatory project, for example, can be ranked by priority. Since there is no clear state-

ment of the purpose and functions of the agency, there is no way for any person, including federal staff workers, to know whether actions or proposals are appropriate or important. For example, when issues arise involving preemption or the posture of the agency with regard to the growing refusal of common carriers to provide service to hazardous materials shippers, there is no existing mission statement to provide guidance on what to do. This necessarily requires each issue to be examined afresh in a policy vacuum, leading to substantial delay and potential for inconsistency from issue to issue.

Decisionmaking in the absence of an overall policy or mission statement established at higher levels of the agency becomes very subjective and is done in a closed environment without the awareness of higher policy officials. This has several effects. First, selection of goals and priorities at too low an administrative level fails to result in allocation of budgetary and personnel resources necessary to carry out the decision, giving rise to persistent complaints of not enough people to carry out the job. Second, decisionmaking on goals at too low a level perpetuates the view that higher levels are not interested, affecting the general significance of the program both within and without the agency. Third, the low-level, closed determination of goals and priorities leaves no visible record, so there is no measure of whether the decisionmakers have done their job or not, to the detriment of the public interest in the achievement of essential priorities.

The mission statement need not be lengthy to be effective. The following is recommended:

The purpose of the regulating agency is to achieve the greatest level of public and transportation employee safety feasible in the movement of materials in a hazardous quantity and form, while assuring that the flow of regulated materials is not unnecessarily impeded by anyone. In carrying out this function, the agency shall be the lead agency among federal programs and nonfederal programs and shall exercise its authority affirmatively, consistent with that leadership role.

The key points in this recommended mission statement are the following.

1. The safety of people affected by transportation is paramount. Protection of the environment is not the primary or dominant role of the transportation safety agency. It is a subordinate function administered for the sake of convenience by the transportation agency on behalf of the environmental agency, for which it is the primary and dominant role. Any conflict between these functions at the transportation agency must be resolved in favor of the primary safety role of the transportation agency.

3. The quantity and form of materials as related to hazard require assessment of the nature of materials; they assume a greater priority in those posing a greater hazard.

3. Feasibility, i.e., functional and economic practicality, must be considered.

4. The essential flow of materials is recognized as a responsibility of the agency, and unnecessary impediments to the flow of commerce, i.e., those that are not essential to the achievement of feasible safety levels, are to be discouraged by the agency. Agency actions to enhance efficient movement of hazardous materials, through court action or direct intervention in other agency proceedings, are authorized.