Responsible Care:
A Total Commitment

TRANSCAER SEMINAR MANUAL

PREFACE

This manual is designed to support the Canadian Chemical Producers' Association's seminar on TRANSCAER, the program for transportation community awareness and emergency response.

A copy of the manual is given to each seminar participant, and provides background and reference material to accompany the verbal presentations by experts from industry and carrier organizations as they explain the TRANSCAER program. The manual also contains useful examples of policies, procedures and standards which seminar participants can adapt to their needs in accordance with the program instructions.

While much of the material contained herein is self-explanatory, users are cautioned that it is not intended for stand-alone use but only in conjunction with the seminar.

It is the responsibility of the users of the information contained here to ensure that its application is appropriate for their particular conditions. Persons relying on this material do so at their own risk. Neither the CCPA and its employees nor the CCPA member companies or other organizations which supplied the materials accept any responsibility for the accuracy or authenticity of the materials or the uses made of them.

For more information on TRANSCAER, questions should be directed to the Canadian Chemical Producers' Association.

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TRANSCAER

DESCRIPTION

TRANSCAER is a program of activities which supports the implementation of the transportation code of practice.

It focuses on improving the safety of the transport of chemicals and chemical products and contributing to effective emergency response to transportation incidents.

It recognizes the public's right to information regarding the movement of chemical products through their communities, in manner consistent with the association's policy on "Community-Right-to-Know".

It also recognizes the need for the involvement and participation of the transportation industry in the formulation and operation of some program elements.

OBJECTIVES

1. Reduction in the number and severity of transportation incidents and their impact on people and the environment.
2. Reduced public concern about the hazards and risks of transportation incidents.
3. Increased cooperation between the chemical and transportation industries in reducing incidents and concerns.

PROGRAM ELEMENTS

Key elements of the program are:

- the transportation code of practice
- continued operation and development of the association's Transportation Emergency Assistance Plan (TEAP), including seminars, response capability, an auditing process and videos on planning needs, initial response and on-scene relationships.
- development and implementation of a seminar series to teach fundamentals about the code, incident prevention and raising public awareness
- implementation of the motor carrier evaluation process to assist member companies in selecting motor carriers
- measurement of program results of individual member companies and of the collective association through TRANSCAER coordinators appointed by each member company and through incorporation of a TRANSCAER section in the annual safety assessment questionnaire.

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INTRODUCTION

THE CCPA

The Canadian Chemical Producers' Association was originally formed in 1962. Its membership now comprises approximately seventy member companies ranging from the very large to quite small. It has three principal segments — petrochemicals, which is by far the largest — inorganics — and specialty chemicals.

These companies account for nearly ninety percent of the value of chemicals manufactured in this country and employ about 25,000 workers.

RESPONSIBLE CARE

Several years ago the association recognized that in order to have any credibility and, hence, influence in the scheme of things — particularly in matters relating to the development of legislation and regulation — it was necessary to position itself as a key industry economically and one which acted responsibly in the management of its products and processes. It suffices to say it was relatively easy to identify those economic aspects which influenced the policy makers' perception of a key industry sector. It was slightly more difficult but not a particularly formidable task to quantify these factors for the industry and position it opposite other sectors.

The elements of responsible behaviour were considerably more difficult to qualify, let alone quantify. It was not without some considerable effort that the association finally brought before its membership a set of guiding principles which, if translated into the appropriate behaviour, should result in a responsible industry. This document was ultimately formally subscribed to by the full membership on a voluntary basis. Formal endorsement is now a condition of membership in the CCPA.

The policy encompasses the following:

- first, it sets out the span of responsibility from development through introduction, manufacture, transportation, storage, handling, distribution, use and ultimate disposal.

- it sets its aims as the minimization of adverse effects on human health and well-being, and on the environment.

- it contains a commitment to take every practical precaution towards ensuring its products do not present an unacceptable risk to its employees, customers, the public or the environment.

- there is a public acknowledgement that both government regulation and self-initiated actions are the appropriate means to ensure protection of the public and the environment.

- it further states our commitment to developing and implementing plans and programs in order to promote the principle of responsible care.

- the "Guiding Principles" speak to ensuring that our operations do not present an unacceptable risk to our employees, customers, the public or the environment.

- the guiding principles address the question of the provision of hazard information, guidance on the safe use and disposal of our products and make this information available to the public. Making responsible care an early consideration in the planning of new products, products or process is identified as key in ensuring future safety.

- understanding existing products' effects and their uses plus those of new products and their potential hazards prior to and throughout commercial development is also identified as another element of this responsible behaviour.

- lastly, it identifies a responsibility to be responsive to and sensitive to legitimate community concerns.

A number of events have impacted on the industry in recent years, but the one at Bhopal created the greatest shock to the industry in its history. A senior executive of Union Carbide described the event as "unthinkable".

The industry around the world reacted instantly to this tragedy. In Canada, we created a task force with the best people in the industry to design a system for assessing the safety of our plant operations within the context of this type of incident. This safety assessment process included examination of plant emergency response procedures for dealing with incidents whose impacts were not only confined to the plant but which also impact on the community.

While the Canadian industry was taking this more technological approach, the Chemical Manufacturers Association (CMA) in the United States was moving directly into its community awareness and emergency response or CAER program. There was never any doubt that we would implement a similar program in Canada, but we wished to ensure we had a completely accurate assessment of the status of the industry before proceeding.

Coincidentally with these activities Environment Canada was conducting its own evaluation of Canadian industry within the same context.

The Bhopal aftermath review recommended that the association make this process available to others and recommended that Canadian industry adopt a CAER program similar to that of the CMA. By that time we were well underway in developing our own CAER program which was a natural extension of the elements of the safety assessment program dealing with plant emergencies and community emergency response planning.

At the same time as this planning effort the industry had commissioned its first full scale public opinion study as part of a broader problem.

The findings of that study were not terribly comforting as far as the industry was concerned. It was a national study, representative of the Canadian population 18 years and over with a high degree of statistical accuracy.

Some of the findings of the study are:

- at the moment more of the public is favourably disposed to the industry than those who hold an unfavourable impression. The ratio is about 4:3.

- it gives the industry credit for its economic and functional role, but four out of five said the industry did only a fair or poor job at being open and honest with the public and in minimizing risks to the environment and the public's health.

- its social responsibility is seen as more important in the present context than the material benefits related to its activities.
- how it approaches its relationships with governments, the media and the public, how well it considers the future effects of what it does, and how well it assumes responsibility for its activities are all more important in forming people's opinions of the industry.
- just as important as the social responsibility items is how the public feels the industry is doing at minimizing health and environmental issues.
- the evidence is clear that the public wants to see substantive and not just stylistic changes in the way the industry deals with these issues.
- a majority of Canadians believe that the risks associated with chemical industry activities have been increasing a lot. Most people see this as a consequence of government laxity or industry carelessness. Most respondents focussed on the need for the government to be more strict. Fully 95 percent agreed with the statement "I hope governments are going to get a lot tougher in the near future on chemical companies which pollute".
- sixty-eight percent concurred with the concept of jailing executives of chemical companies which pollute. The reliance on the government to act has a great deal to do with how people view the industry's willingness to discuss the risks associated with its activities. Those who did feel the risks were decreasing saw it as a function of a tightening of government regulations — in either case trust in the industry's ability or willingness to self-regulate is not high.
- the greatest risk is thought to be associated with the storage and disposal of chemicals and their transportation, while less risk is associated with the manufacturing process and use.
- the public clearly sees the industry as almost twice as knowledgeable about chemicals as the government and almost twelve times more knowledgeable than the public itself.
- what's even worse is that it believes the industry knows the risks and is unwilling to tell anyone.
- although it is less concerned about manufacturing than other industry activities, almost three out of four people believe that a Bhopal-type of incident is possible. This is entirely consistent with similar data coming out of the U.S.

A SUMMARY OF THE FOREGOING FINDINGS IS:

- first, the public wants to see substantive, not stylistic changes in the way it sees the industry operating.
- secondly, it believes the industry knows the risk and won't tell.
- third, it still – despite three years of elapsed time – believes a Bhopal-type incident can occur in this country.
- fourth, it believes that the industry can't be trusted to clean up its own act, and that governments should get tough and *make* them do it.

INITIATIVES

To make responsible care a reality in the real world of the chemical industry, and to respond to public perceptions, the association has undertaken a program of initiatives. Simply put, an initiative is a new activity required to facilitate full compliance with the responsible care policy and/or respond to public perception.

The important ones are as follows:

CAER

The CAER (Community Awareness and Emergency Response) program is aimed at communities in which member companies have fixed facilities such as plants, terminals, warehouses, disposal sites etc.. Individual member companies catalyze cooperation between community and industry to exchange information and, more importantly, to produce and test an integrated emergency plan for the community. The 70 member companies operate 205 facilities in 115 communities across Canada.

CRC

The CRC (Chemical Referral Centre) will provide the Canadian public with an opportunity to obtain referrals to reliable people who can respond to their questions and anxieties about particular chemicals. The public can access the centre through a toll-free, non-emergency number. The core of the centre's computerized database is a listing of member company products, and referral names and telephone numbers for each product.

CHEMICAL REGISTRY

The intent of the registry is to provide a free-standing service which would make consultants versed in responsible care related subjects available to industrial companies. This will be established in the future when it is clear that sufficient demand exists and that the costs of developing the registry will be shared across industry.

CODES OF PRACTICE

Codes of practice are statements of what is expected and required of member companies with respect to particular activities. They are produced by task forces of member company representatives expert in the activity. The task force leader is responsible for the development of the code through to its final approval by the board of directors. During the process of development and approval, the task force consults widely with others, within and outside of the association.

There will be seven codes of practice:

1. Community Awareness and Emergency Response
2. Transportation
3. Hazardous Waste Management
4. Distribution
5. Manufacturing
6. Research and Development
7. Generation and Transmittal of Hazard Information

The first three have been approved by the board; the remaining four will be developed and approved over the course of 1988.

Following the approval of each code, an implementation program is put into place to assist member companies in the practice of the code. Two elements of the program are the appointment of a coordinator by each member and a seminar series. Some company coordinators are at this TRANSCAER seminar which facilitates the implementation of the transportation code.

DECIMA

The Decima opinion research study of Canadian public attitudes toward the chemical industry has been described in a foregoing section. This study provided a base line from which we can measure the future results of our industry's performance on responsible care, in the eyes of the Canadian public. This major and specific study will be repeated again in a few years time. In the interim, we subscribe to Decima's quarterly review which provides continuing insight into public perception of our industry.

DELBRIDGE PANEL

This is a panel of people representing other groups in Canadian society which is convened for the CCPA by Pat Delbridge Associates Inc. in Toronto every few months. They provide a grass roots view of public attitudes, perspectives and activities in areas germane to responsible care. They also offer forthright and constructive opinion and suggestions about the "fit" of our tangible initiatives with public rights, needs and opinion.

PUBLIC AFFAIRS SUPPORT

A principal strategy of responsible care is proactivity — reaching out to others to achieve mutual understanding and joint action. This required professional public affairs expertise in both receiving and interpreting what others are saying and thinking, and in telling others what we, the industry, are thinking and doing. A dedicated public affairs program, supporting the responsible care activities, is carried out by the association's director of public affairs and the public affairs committee.

SAFETY ASSESSMENT

The CCPA's first response to Bhopal was to have its member companies assess the safety of their plants. This was done with the aid of a questionnaire which posed 10 to 15 different questions in each of 14 different areas relating to plant operations, both internal and external.

The questionnaire was designed primarily to help each member company assess the situation in its own plants. A secondary purpose was to get a general overall assessment from each company so that the CCPA could make a judgement about the situation in the industry.

The findings lent stimulus to the initiation of the CAER program.

Safety assessment will be repeated in 1988.

TRANSCAER

TRANSCAER is the name given to the overall program designed to implement the transportation code; it is also the name applied to this seminar which is part of the overall program.

In this manual and in the seminar presentations, the detailed elements of the code and the order of their presentation are:

- General Provisions
- Accident Prevention
- Emergency Response
- Public Awareness Concerning Transportation

The contents of these sections will not be dealt with here as they will be covered in detail by other speakers at this seminar.

Finally, an important element in TRANSCAER is the measurement of progress. Measurement will be carried out both by the member company and by the association. The association's measurement is of the aggregate of 70 member companies based on what is reported by the company coordinator on behalf of his CEO.

The measurements will be made against the "milestones" shown on page (iii) of this manual.

Responsible Care:
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TRANSPORTATION CODE OF PRACTICE

Purpose

The member companies of the Canadian Chemical Producers' Association are committed, as a condition of membership, to the policy of "Responsible Care". This code governs company actions in meeting the guiding principles of that policy as they relate to the transportation of chemicals and chemical products by all modes from their source to destination.

Practice of this code is intended to result in:

- continuous improvement in safety, and reduction of accidents which result in injury to people and to the environment during the transportation cycle
- effective emergency response to transportation accidents which minimizes injury to people and to the environment
- cooperation with the transportation industry in reducing hazards associated with the carriage of chemicals and chemical products
- reduced public anxiety about the transportation of chemicals and chemical products as a result of the effectiveness of the above.

Guiding Principles

The guiding principles of the Statement of Policy on "Responsible Care" are reflected in the guiding principles of this code. They are:

1. Transport chemicals and chemical products in a manner which minimizes risk of injury to the environment, the general population along transportation routes and persons involved in the transportation cycle.
2. Know the laws and regulations concerning all phases of transportation, including the response to transportation emergencies, and meet them in letter and in spirit.
3. Give relevant information concerning the hazards of chemicals and chemical products and their control in transportation emergencies to transporters, first responders and to people potentially exposed. Such information shall be updated periodically and be readily available in the event of an emergency.
4. Assist the transportation industry to meet this code of practice as it applies to their operations.
5. Make this code of practice an integral part of the planning of new product introduction, the design of new plants and the significant modification of existing plants.

Code

1. *General*

Each member company shall have policies, standards and procedures which deal with all aspects of the transportation of chemicals and chemical products. Responsibilities for generating, implementing, auditing and updating these shall be clearly defined. These policies, standards and procedures shall meet or exceed all applicable laws and regulations. Products will not be shipped unless it can be done in accordance with this code.

2. *Accident Prevention*

Each member company shall have an active program designed to continuously improve safety and to prevent accidents during the transportation cycle which:

- establishes criteria for selecting the mode of transport, the specifications for the transportation equipment and container and inspection and maintenance of these during use
- establishes criteria for selecting carriers which include safety performance and programs, inspection and maintenance procedures for equipment, selection and training of drivers and support staff, and assistance to carriers in meeting these criteria
- identifies alternate transportation modes and routes which minimize the exposure of people and environmentally sensitive areas to the hazards inherent in the transportation mode
- establishes standards for equipment used in loading and unloading containers including containment and emergency response facilities in the event of an accidental release
- provides procedures and training for persons who load or unload the containers
- deals effectively with hazards involved in the return, cleaning, reuse, servicing and disposal of containers
- clearly identifies content of containers.

3. *Emergency Response*

Each member company shall have an up-to-date and operational transportation emergency response plan which:

- identifies the hazards associated with the transportation of the company's chemicals and chemical products
- identifies means for dealing with the hazards whether to people or the environment, and indicates ways of containing and cleaning up the release
- identifies emergency response resources whether in-house, through a mutual-aid plan such as TEAP or from a contractor
- provides technical advisors to handle all informational aspects of an accident involving the company's chemicals or chemical products including media relations
- provides specialized equipment and materials required for responding to an accident
- provides assistance, through the association, in training first responders along the transportation corridors
- provides for cooperation with government or other agencies at the accident scene
- is sensitive to and provides for evaluation with appropriate authorities of the need for immediate and short term assistance for persons who are dislocated by a transportation accident.

4. *Awareness Concerning Transportation*

Each member company shall have a program which enables it to respond to questions from those along transportation corridors.

This program shall include:

- key elements of the policies, standards and procedures which reduce hazards, prevent accidents and provide prompt, effective response in the event of an accident.
- available relevant information on the hazards of chemicals and chemical products moving along the transportation corridors
- identification of those responsible for answering questions
- provision for participation in, and coordination with, a program the association will operate in conjunction with carriers in raising public awareness concerning transportation.

Responsible Care:
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TRANSPORTATION CODE OF PRACTICE

PART 1. GENERAL PROVISIONS

Each member company shall have policies, standards and procedures which deal with all aspects of the transportation of chemicals and chemical products. Responsibilities for generating, implementing, auditing and updating these shall be clearly defined. These policies, standards and procedures shall meet or exceed all applicable laws and regulations. Products will not be shipped unless it can be done in accordance with this code.

TRANSPORTATION CODE OF PRACTICE

PART 1. GENERAL PROVISIONS

1.1 WHY CONTROLS ARE NECESSARY

The activity of transporting chemicals depends on people, and the level of safety in turn depends very much on the decisions which those people make.

Because chemical transportation accidents can pose a serious risk to public safety, many decisions are too important to be left solely to the judgement of those individuals involved in an actual shipment. Even if these are sincerely motivated, they may not have the necessary background knowledge and experience to assess the potential hazards and risks associated with various courses of action. Some decisions can be made safely only by persons with specialized training, such as engineers or technical experts, who cannot be present whenever a shipment is made.

Controls such as well-designed policies, standards and procedures, however, can do more than anything else to prevent faulty decisions and the consequent risk to public safety. They can simplify the process of decision-making, using the advice of experts to limit the ranges of possible choice so that unsafe options are excluded. They can also provide instructions or guidelines which direct the user to safer courses of action, while still permitting some flexibility for individual action. Good policies, standards and procedures are an excellent way to improve safety by forcing an examination of activities to identify potential hazards in the first place, and then by developing sound habits in the users so that good safety practice becomes second nature to them.

This is not as straightforward as it sounds. Almost all companies involved in transporting chemicals have some policies, standards and procedures, and some may even have more than they need. What matters, however, is how well these are designed and – closely related – how well they work in practice.

If these are inconsistent with one another, impossible to follow without bringing business to a standstill, or enforced unevenly or not at all, they are likely to be perceived by employees and others as a sign that management is simply trying to protect itself if something goes wrong, is careless or does not know what it is doing. Even where

instructions have been issued in good faith problems can arise over conflicting priorities, for example between safety, cost and delivery of a rush order, if the order of precedence is not clear to all. The controls which exist may also have been drawn up in *ad hoc* responses as the need became apparent – usually after an incident or near-miss. These may be effective for the intended purpose – yet gaps can easily exist which expose a company to potential disaster, simply because no incident so far has caused an examination of that particular area.

This is why the development of controls should be done systematically, to ensure that they are sufficiently complete to protect adequately for the degree of risk involved, they are consistent, and they are practical for use by all for whom they are designed.

1.2 HOW TO GET STARTED

1. Identify needs

The first step is to identify what policies, standards and procedures are needed. This can be done by examining all operations involved in chemical transportation for potential hazards, which is ultimately the best approach. Unfortunately it is also time-consuming, and needs expert help to avoid overlooking dangers which may not even be realized by untrained investigators. Such an approach may be especially difficult for smaller companies without specialized staff for such work.

A much faster approach is to examine the policies, standards and procedures developed by some of the larger companies shipping high-risk materials, and adopt these tried-and-tested controls as needed. Such companies, which are among the leaders in the field of industrial safety, have examined their operations using techniques such as total job analysis in preparing their own controls. These often apply to shipment of dangerous materials under stringent conditions, and provide a useful reference for others in the industry even where risks are less. As a courtesy some of these companies have supplied a list of typical standards and procedures together with several examples, which are included in this manual.

A note of caution is necessary here. The details of policies, standards and procedures necessary for safe chemical transportation will vary from company to company, since the need depends on a variety of factors such as materials handled, modes available, routes, carriers, customers and employees involved. This is why the CCPA's transportation code does not give a detailed list of what is required. Companies should not attempt to apply blindly a set of guidelines

developed elsewhere, but should examine these carefully and adapt them to each specific situation. As the disclaimer states in the appendices to this manual, it is the responsibility of the users of the information to ensure that its application is appropriate to their particular conditions.

(a) *Laws and Regulations*

At the very minimum a company must ensure that its operations comply with current legal and regulatory requirements. These laws and regulations have generally been written where society through its own experience has decided that it cannot leave certain actions to individual judgement but must exert some control over the way in which these jobs are done. The degree of control desired generally increases as people realize the need through experience, as with the legislation governing transportation of dangerous goods following the Mississauga accident in 1979. This trend is likely to continue, although improved control at the corporate level can minimize the social pressure by avoiding the accidents which trigger public concern.

The first step in compliance with legal and regulatory requirements is to ensure that the appropriate employees know what these are. This in itself is no simple task where employees, job responsibilities and also the legal situation are continually changing.

A list of the most important federal and provincial legislation governing chemical transportation is included in appendix B. This is not complete, since to provide an exhaustive list is beyond the scope of this manual. Regulations governing occupational health and safety, drivers' working hours and operation of motor vehicles are excluded, for example, as are by-laws of individual municipalities. However, the list will serve as a guide to identify legislation which applies so that current copies can be obtained if they are not already on hand. Services are also available which supply loose leaf versions of appropriate legislation with amendments as regulations are changed, thus giving a compendium of legislation which is always up-to-date.

It is then necessary to know the details of the legislation and its intent, in order to ensure that the company is fully in compliance. This may require the advice of the corporate legal department, outside lawyers or regulatory specialists, although often plain language guides and other publications may be available to make this task easier. The body responsible for issuing any regulations is often able to supply such aids or advise where help can be obtained. Transportation managers at other CCPA member companies may also be able to provide a quick reference to sources of assistance.

(b) *Corporate Safety Philosophy*

The regulatory framework provides a starting point for developing the policies, standards and procedures necessary for a company to transport chemicals safely. This framework is imposed from outside, and is a precondition which must be met to conduct such business.

The next step is voluntary. This is the statement of corporate safety philosophy. Despite its name this may be a very simple, short statement, as the example in appendix B shows. The guiding principles of *Responsible Care* can be used here, but in the example the company concerned has developed a very effective statement which leaves employees and others in no doubt about where the company stands when it comes to safety.

Some companies get by without this and still run safely. This is especially true for smaller, compact organizations with a lot of interpersonal contract, where all employees understand top management's concern for safety because they hear it first hand. For larger and more dispersed organizations, however, such a written statement of corporate safety philosophy helps each employee to know not just that the company is concerned about safety but – more important – to know that this concern takes precedence over everything else. It is not a question of sending a load out in an unsafe condition just this once because it's a rush order and there's no time to follow all precautions. It's "do the job safely, or don't do it at all."

This is important at this stage, because such a statement will influence the way in which many subsequent policies, standards and procedures are drafted. To be effective these cannot be vague so that employees are left to guess the safety priority themselves, and those drafting the controls must be sure of this at the outset.

(c) *Policies, Standards and Procedures*

With the regulatory frame work and corporate safety philosophy to provide a base, the process of examining where policies, standards and procedures are needed can be started. It's useful to review the difference between these.

- **Policies** aid in decision-making by providing a reference to state what must, must not and should be done. The last sentence of the general provisions of the transportation code is an example.

  Policies are a set of rules which apply to general situations rather than details. They are usually few in number, and often consist

simply of plain, short statements. They in turn act as the basis from which the more detailed standards and procedures can be derived.

- **Standards** describe a set of conditions which must be met before an item or operation is acceptable. An example is a selection standard for tank truck drivers. This could specify minimum physical requirements, possession of the appropriate licence with a clean accident record, amount of experience, training requirements and minimum score on testing, etc.

  Standards often refer to specific situations. Some may be short and possibly general, though others, such as the requirements for design and construction of rail tank cars for pressurized toxic gases, may be extensive and cover almost every detail.

- **Procedures** describe how an operation is to be performed, stating what must be done and the order in which steps are to occur. An example is the loading procedure given in appendix B.

  Procedures refer to specific operations, and may be simple or very detailed depending on the potential problems which must be avoided. They may state who is responsible for each step, especially where approval of tests against standards is involved to determine whether an operation can proceed to the next step.

2. **Assign Responsibilites**

Apart from identifying the policies, standards and procedures which are needed, it is also necessary to assign responsibilities for the steps involved in each of the four phases of the process – generation, implementation, audit and update – and to indicate the time schedule within which these are to be accomplished.

(a) *Generation*

This should be handled with care since, regardless of the ability of the persons responsible for managing this step, it is essential that those actually generating controls have the knowledge and experience to foresee potential risks. They must then draft controls which will restrict the actual operator enough to avoid these, yet still permit him or her to get the job done with a minimum of encumbrance. This means that the generator must realize the constraints facing the operator under the range of conditions which can be expected to be present when the job is performed – work pressures, distractions, weather, mistakes by others, absence of key people due to sickness or vacation, etc. For this reason the generator should include representatives of all affected groups in the discussions while controls are being drafted. This process is time-consuming, although it helps

those subject to the new controls to understand the reasoning behind them. It is most useful, however, in ensuring that the controls can actually be implemented later, rather than resulting in confusion of operators who are faced with impossible instructions.

(b) *Implementation*

The phase is much easier if those responsible or their representatives were closely involved or consulted during the generation phase. The generators should in any case provide contact and support during the implementation phase, so that additional explanation can be supplied or unforeseen problems can be resolved rather than being ignored or postponed until they become critical.

(c) *Audit*

This phase, whereby operations are examined to find whether they are being performed in compliance with instructions, is actually continual. It should be repeated at intervals determined by management until such time as the control is withdrawn. Its importance is often not realized, and it is frequently overlooked. All too often an accident investigation reveals that controls had been devised in the past to avoid just such a situation, but they were not applied at the time.

Even the best of controls is gradually modified or forgotten as time goes by unless provision is included for audit. Responsibility must be assigned to check at predetermined and specified intervals to ensure compliance. Management cannot avoid responsibility by referring to ancient instructions if it made no provision for auditing the system once these were issued.

Those responsible for auditing need not necessarily possess the same level of knowledge and experience required for updating, providing the audit procedure is devised by those with appropriate skills.

(d) *Update*

This phase is also continual, though its importance is usually recognized more than the audit. An update ideally should include an evaluation, whereby an operation is examined to see whether it is actually effective in achieving the desired result or whether any changes are worthwhile. Updating is also often overlooked, with the consequence that the commitment to the original principles is open to question. Updating of controls requires care, and should be performed by those able to understand the full implications of any changes, since these may not become apparent until some time after they are put into effect.

1.3 RECOMMENDED STANDARD PRACTICES AND PROCEDURES
(Courtesy of DuPont Canada Inc.)

- On going safety program
- Emergency response program
- Mode of transport
- Carrier selection and audit
- Equipment selection, maintenance and replacement programs.
- Loading, unloading, blocking, bracing, vehicle inspection procedures
- Audit mechanism - self assessment
- Personnel selection standards
- Driver manual
- Driver medical review standards
- Driver abstracts
- Accident investigation and recommendations
- Metallurgical inspection of bulk units

For further information, details and examples of some of the above, *see Appendix B*