

# The Regulator's Use of Worst-Case Scenario Data

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## Abstract

The requirements of the USEPA's Risk Management Program (RMP) regulations (40 CFR Part 68) to perform worst-case scenario analysis of potential acute accidental releases of listed regulated substances will make mandatory everywhere an effort that has been occurring in various states throughout the country. The USEPA's RMP regulations will require covered facilities to perform worst-case consequence assessments of catastrophic accidental releases. Consequence assessment information will, for the first time, be publicly available. While there has been considerable discussion on the definition of "worst-case" and the high degree of subjectivity in performing such analyses, there has been relatively little discussion on how this information will be used.

For several years, New Jersey, California, and Delaware have required dispersion and consequence analysis as part of their risk management programs. Facilities, both large and small, complex and simple, have been conducting and reporting to state and local agencies the results of off-site consequence assessments. This paper will review activities and programs at these states and evaluate the use of this data regarding risk management, emergency response planning, and public information inquiries. The paper will also address the planned use of the data to be generated by the USEPA's RMP regulation. The paper will also offer recommended uses of this information, as well as potential misuses of the data.

## I Introduction

The results will do nothing more than scare people...  
*This will be a public relations nightmare...*  
*How will we answer their questions...*  
*What will people think about our facility...*  
*The public will not understand the data....*  
*What will the regulators ask for...*

This is just a sampling of what facility managers and supervisors have been saying for the last year. Their concern has increased with the expected finalization of the USEPA's Risk Management Program (RMP) regulation (40 CFR Part 68) in March of 1996.

While most facilities have at least begun to implement the programs and procedures required by OSHA's Process Safety Management (PSM) standard (29 CFR Part 1910.119), only a few facilities, comparatively, have had to deal with dispersion and consequence analysis issues. Over the past several years, we have been developing piping and instrument diagrams, planning and conducting process hazard analyses, developing written operating procedures, and implementing management of change programs. The dispersion and consequence analysis requirements of the RMP regulations will add yet another dimension to a facility's release prevention program.

We can, however, benefit from the experiences of facilities located in New Jersey, California, and Delaware. For several years now facilities in these states have been performing dispersion and consequence analysis. Not only did the approach for conducting such analyses differ among the states, but the conclusions and follow-up required differed from state to state. Most importantly, however, we need to be informed on how the USEPA intends to use the data.

## **II. State Level Consequence Analysis Programs**

### **A. New Jersey - Toxic Catastrophe Prevention Act (TCPA) Regulation**

#### 1. Regulation Summary

The New Jersey Department of Environmental Protection (NJDEP) TCPA rule initially became effective on June 20, 1988. The current version is a revised version of the original and was readopted on June 18, 1993. It requires any facility which handles greater than the registration quantity (RQ) of an Extraordinarily Hazardous Substance (EHS) onsite to register as a TCPA covered facility. Any facility which contains greater than the RQ of a listed chemical must register as a TCPA facility and comply with the TCPA rule. As a registered facility, a risk management plan (RMP) must be developed to assist with identification and evaluation of the potential risk the facility poses to people and the environment.

The RMP requires registered facilities to perform a dispersion and consequence analysis of release scenarios identified during the process hazard analysis portion of the plan. Based on the results of the required modeling, a state-of-the-art review and evaluation of potential risk reduction methods may be needed. It is the dispersion and consequence analysis requirements of the TCPA rule which is the focus of this section.

The modeling information requested can be summarized as follows:

- determination of downwind cloud distances for the maximum identified release scenario, and;
- determination of the specific release quantity which yields the concentration criteria at the property line. We can also view this as the

maximum release quantity which would not have a potential offsite impact as defined by the rule.

This information helps us determine whether there is the potential for a release to have an offsite impact.

Specific modeling requirements are identified in the rule with regard to required input data and model output information. An acute toxicity concentration (ATC) value in parts per million (ppm) is provided for each covered chemical. The duration of a particular release determines the concentration criteria which must be used when modeling. For releases which equal or exceed one hour in duration, the concentration criteria is equal to the ATC. For releases of less than one hour, the concentration criteria must be calculated. The concentration criteria is the ATC divided by the release duration expressed in fractions of an hour.

The relationship between the release point, distance to the closest property line, and the cloud length to the established concentration criteria and five times the concentration criteria points are key to determining if there is the potential for an offsite impact and the follow-up actions required. If the cloud length to the concentration criteria in the downwind direction exceeds the distance to the closest property line, then there is the potential for offsite impact. Based on the results of the dispersion modeling, a state-of-the-art review may be required.

The state-of-the-art review requires identification of risk reduction measures currently incorporated, such as pressure relief valves, sensors, and system interlocks. The review also identifies alternative and or additional risk reduction measures to be considered. For identified risk reduction measures, a quantification of their risk reduction impact on the facility must also be documented.

The purpose for determining cloud lengths to the concentration criteria and five times the concentration criteria points is to determine if a state-of-the-art review is required. When there is an offsite impact as defined by the regulation, the required action depends upon the actual concentration level expected beyond the property line. For releases where the level is less than the concentration criteria, no state-of-the-art review is required. If the concentration level is greater than the concentration criteria but less than five times the concentration criteria, an evaluation of release scenario likelihood becomes a determining factor for the need to perform a state-of-the-art review. For scenarios with a likelihood less than or equal to  $110^{-4}$ /year ("one in ten thousand" or 1:10,000), no state-of-the-art review is required. For scenarios with a likelihood greater than  $110^{-4}$ /year, a state-of-the-art review is required. If the offsite concentration level exceeds five times the concentration criteria, a state-of-the-art review is required regardless of the likelihood.

To complete the dispersion and consequence analysis requirements of the TCPA rule, a report must be prepared, and the risk reduction plan developed from the risk assessment must be administered. The report must summarize the releases identified in the process hazard analysis and the results from the dispersion modeling conducted on those releases.

## 2. NJDEP Use of the Dispersion and Consequence Modeling Data

The NJDEP uses the results of the dispersion and consequence analysis for two main purposes:

- to help determine the level of understanding a facility has for the hazards of the facility, and;
- to help determine the level of risk reduction effort made or considered by the facility.

The overall intent is to encourage facility owners to incorporate risk reduction measures to help reduce the frequency, quantity and/or duration of hazardous material releases.

Risk assessment reports are required to be submitted to the NJDEP only for new facilities. In all other modification cases, the report is subject to review by the NJDEP, usually during routine site inspections. No formal risk assessment report approval letter is provided by the NJDEP. If deficiencies are identified, a letter is sent to the facility. Deficiencies are not typically included in a formal consent agreement.

There is no formal approval process for the risk reduction plan generated under the risk assessment requirement. The NJDEP will review the plan and discuss risk reduction measures with the facility. As a facility owner, you may be asked to consider particular risk reduction measures for the facility. Discussions may continue for some time while the NJDEP determines the overall level of risk the facility poses to the environment. This determination can impact which facilities are closely inspected for overall compliance.

## 3. NJDEP Comments on Use of Dispersion and Consequence Modeling Data: Effectiveness and Limitations

The NJDEP recognizes areas for improvement in the specific requirements of the TCPA rule and in the overall effectiveness of dispersion modeling. A general area of concern identified in recent discussions with NJDEP staff is the emphasis placed on the accuracy of the dispersion model. The results from any one model cannot be relied on as exact. Data indicates that different models provide different results for similar release scenarios. This is due mainly to the type of assumptions made and equations used within the model, and due to inaccuracies in determining input data. For example, determining the exact quantity of material released, which is a key model input parameter,

is particularly difficult. Inaccuracies in atmospheric condition parameters are also common. Recognizing these limitations is important in evaluating the results of dispersion modeling.

It is for these reasons that the emphasis has shifted from evaluating the exact accuracy of model output information to ensuring the overall modeling results are directionally accurate. For instance, there is less concern for determining if the approximate cloud length is say, 3000 feet or 3200 feet, if the overall finding as to whether or not an offsite impact exists appears to be correct.

In general, the NJDEP encourages the use of risk reduction measures, such as ASME, ANSI, or other industry standards. The modeling requirement is used as a way to encourage open review and understanding of the potential hazards posed by the facility. Overall, the NJDEP indicates that the TCPA rule's requirements, and how they are implemented are effective in making real risk reductions, and are an important consideration to facility owners.

## **B. California - Risk Management and Prevention Program (RMPP)**

### 1. California Offsite Consequence Analysis and Dispersion Modeling

California's Risk Management and Prevention Program (RMPP, Reference Health and Safety Code 25534(b),(d)(2)) shall consider offsite consequence analysis for the most likely hazards as identified in the hazard and operability studies. The offsite consequence analysis shall include worst-case release scenario assumptions. These assumptions regard the quantity and rate of release (an acutely hazardous material (AHM)), pessimistic air dispersion and other adverse environmental conditions, toxicity, meteorological conditions, and other important parameters. The offsite consequence analysis includes a map noting the location of the facility, showing sensitive populations (i.e., schools, residential areas, general acute care hospitals, long-term health care facilities, and child day care facilities), and zones of vulnerability, including the levels of expected exposure in each zone.

The California RMPP is administered on the local level, with a designated public agency responsible for administering the program. In general, the county health department or fire departments are the administering agencies (AA). Occasionally, the city fire department may also share jurisdiction. California allows each AA significant flexibility in determining specifics of the RMPP, including the option to use more stringent criteria mandating facility registration/reporting under the RMPP, and request specific parameters be used for dispersion modeling and offsite consequence analysis. The California Governor's Office of Emergency Services has published a *Guidance for the Preparation of a Risk Management and Protection Program*. Approximately 40% of the counties in California have implemented the RMPP to date. Contra Costa County has one of the more specific RMPPs, and is generally considered to establish more stringent requirements. Many of the

other counties expect facilities to use their technical and professional resources to develop a plan, explaining the rationale for the calculations and assumptions incorporated.

## 2. Implementation of RMPP in Contra Costa County

For the last six years, the Health Department has been the administering agency (AA) in Contra Costa County for implementing the RMPP. Dispersion modeling is required for credible releases, with the releases grouped according to "like" sizes of releases. The facility selects one release in each group to model, using three different meteorological conditions - the most pessimistic plus the two most predominant. The worst credible release must be plotted for all three meteorological conditions. Contra Costa County's Health Department prefers a level of concern (LOC) of ERPG-2 and ERPG-3 be used for modeling, with Immediately Dangerous to Life and Health (IDLH) divided by 10 if ERPGs are not available. The Emergency Response Planning Guidelines (ERPG) published by the American Industrial Hygiene Association are the only chemical exposure values developed strictly for community exposure.

Besides identification of sensitive populations in the potential release areas, zone maps are also requested from Contra Costa County facilities. These maps include the facility fence line out to at least one mile around the facility. The AA then uses the facility zone maps to pre-program their telephone ring down system for community notification.

Public notice is provided, with copies of a facility's RMPP made available to the public at the public library nearest the facility as well as the Health Department. All RMPPs are reviewed by the AA. The reviews include an evaluation of the facility HAZOP studies and offsite consequence analyses, mitigation measures, and verification through onsite inspections and interviews. Contra Costa County will subsequently review the RMPP every three years after the initial review is completed.

The AA uses the RMPP for preplanning emergency responses with the Health Services Department HAZMAT Response Team. Copies of the RMPP are also given to Fire Departments in each facility's area. Some Fire Departments (e.g., Richmond FD) use the information, although many do not. The RMPPs are also used by the County Planning Department when reviewing new construction or redevelopment.

## 3. Areas for Improvement to Contra Costa County's RMPP

There are two areas the Contra Costa County Health Services Department would like to see improved in the federal and state regulations. One area is language allowing an AA to review a facility's "inherent safety", and the second is measures to assist the AA in enforcing their recommendations, and revisions that could assist Contra Costa County Health Department in

improving their program. The California Governor's Office of Emergency Services and the Air Quality Management District are also looking at areas in the regulations and RMPP program that could be strengthened.

## **C. Delaware - Risk Management Program**

### 1. Risk Management Program Requirements

The Delaware regulation became effective in 1989 and has not undergone any revisions since that time. It requires any facility which has greater than the registration quantity (RQ) of an Extraordinarily Hazardous Substance (EHS) to comply with the regulation.

Dispersion modeling based on the releases identified in the process hazard analysis is required under this regulation. The modeling requirements are minimal and in many cases, no actual modeling is required. For these cases, Delaware developed "look-up" tables which can be used to determine if your facility must comply with the regulation. With facility property line distances and these tables, a quick assessment can be made for determining the applicability of this regulation.

### 2. Delaware Use of Dispersion and Consequence Modeling Data

The primary purpose of the data generated under this section of the regulation is to improve overall emergency response planning. This is accomplished by bringing the facility's response personnel together with their local emergency planning committee (LEPC). The results from the dispersion modeling provide the basis for the meeting discussions. These results are used to evaluate the adequacy of both the facility's emergency response plan and the LEPC's overall plan. This information sharing ensures that the LEPC understands the hazards present at a facility so that it can accurately incorporate those potential impacts into the overall emergency response plan for the area.

The meetings between facility representatives and their LEPC have been very successful across the state. The LEPC reviews the modeling information and the facility's onsite emergency response plan and provides comments for improvement. This open communication allows for effective emergency response planning.

The small geographic size of the state of Delaware and the knowledge of the state response planners are two reasons for the successful program implementation. Delaware is organized into four LEPCs, allowing the state to stay involved at a local level. There is a close link between this regulation and the "right-to-know" regulations. The distribution of the information generated by this regulation is open to anyone who requests it through right-to-know and is often viewed as part of the right-to-know rules.

### 3. Delaware Comments on Use of Dispersion and Consequence Modeling Data: Effectiveness and Limitations

Delaware state employees have indicated that the emphasis placed on sophisticated modeling is unnecessary and that exact modeling results are not critical to the overall use of the information. The state has acted on this position by developing generic "look-up" tables. These "look-up" tables simplify the dispersion modeling requirements. There are definitions for the types of modeling cases requested. The focus is on more likely releases as opposed to EPA's RMPP defined worst-case.

LEPCs and other emergency response plan developers feel that preparing for an evacuation of an area greater than one mile is difficult. Attempting to obtain more accurate modeling data through use of more sophisticated models is not essential if the results are differences in the cloud length at distances well beyond one mile.

Overall, the program is very effective due to the relationship, interaction, and knowledge of the facility's personnel, LEPCs, and the State of Delaware.

## **III. USEPA-RMP Regulation**

### **A. Overview**

The concept of accident prevention is not new to industry, due to the US Occupational Safety and Health Administrations (OSHA's) Process Safety Management (PSM) regulation which was introduced in 1992 (29 CFR Part 1910.119, February 24, 1992). The US Environmental Protection Agency (EPA) has developed a proposed rule for Risk Management Programs (RMPs) (40 CFR Part 68, October 20, 1993, and supplemental proposal 40 CFR Part 68, March 13, 1995) which is similar to the PSM regulation. EPA's goals in developing this rule include requiring industry to both understand and take responsibility for potential hazards present in their facilities, to upgrade existing systems and address new facilities with prevention and mitigation of potential hazards in mind, and to open dialogue between industry and the community. EPA's focus is on major chemical accidents and how they can affect the environment both on and offsite.

The EPA's proposed rule, 40 CFR Part 68, consists of four major sections: registration, hazard assessment, prevention program, and emergency response. Worst-case scenario analysis will be required as part of the overall facility hazard assessment.

### **B. RMP Requirements**

The proposed RMP regulation has three requirements that differ significantly from the OSHA PSM regulation. These are: the requirements to register your facility with the program administrator, to submit your RMP program to four different organizations, and to perform a hazard assessment.

A hazard assessment is to be conducted for each regulated substance (as defined in "List of Regulated Substances and Thresholds for Accidental Release Prevention and Risk Management Programs for Chemical Accident Release Prevention," 40 CFR Parts 9 and 68, Final Rule, January 31, 1994) present at the facility above the threshold quantity.

Note that the requirements for the hazard assessment are separate from the requirements for a process hazard analysis, which is to be included as part of the facility prevention program. The prevention program includes ten elements:

- management system
- process hazard analysis
- process safety information
- standard operating procedures
- training
- maintenance (mechanical integrity)
- pre-startup review
- management of change
- safety audits
- accident investigation

With the exception of management systems, these requirements are almost identical to OSHA's PSM standard. The hazard assessment requirements, however, are above and beyond any existing requirement of the PSM standard.

The hazard assessment is expected to include:

1. A determination of a worst-case release scenario.
2. Identification of more likely significant accidental releases.
3. Analysis of the offsite consequences of the worst-case release scenario and other more likely significant accidental release scenarios.
4. Development of a five-year history of accidental releases.

The offsite consequence analysis for the worst-case and more likely significant accidental release scenarios shall include:

1. The rate and quantity of substance lost to the air and the duration of the event.
2. Identification of the distance, in all directions, at which exposure to the substance or damage to offsite property or the environment may occur.
3. Descriptions of populations within these distances that could be exposed to release.
4. Assessment of environmental damage that could be expected within the distances, including consideration of sensitive ecosystems, migration routes, vulnerable natural areas, and critical habitats for threatened or endangered species.

The hazard assessment should be reviewed and updated at least once every five years. However, more frequent reviews or a new hazard assessment may be required if changes occur at the facility or the surrounding community that might make the original results inaccurate. Facility changes may include process equipment or technology changes, while changes to the surrounding community may include the construction of new housing developments or improved emergency response services.

Facilities will be required to maintain an extensive record of the hazard assessment. Documentation of the hazard assessment and offsite consequence analysis should include:

- a description of the worst-case scenario
- a description of the other more likely significant accidental release scenarios
- documentation of how the offsite consequences for each scenario were determined, including:
  - ❖ estimated quantity, rate, and duration of substances released
  - ❖ meteorological data used
  - ❖ the concentration used to determine the level of exposure and the data used for that concentration
  - ❖ calculations for determination of the distances downwind to the acute toxicity concentration
  - ❖ data used for estimation of the populations exposed or area damaged

A summary of this information, including tables showing the above data and the five-year accident history should be included in the facility's RMP. The RMP needs to be submitted to the implementing agency, with copies submitted to the State Emergency Planning Commission (SERC), the Local Emergency Planning Committee (LEPC), and the Chemical Safety and Hazard Identification Board.

### **C. Worst Case Scenario Definition**

The definition of worst-case scenario is arguably the most controversial aspect of the proposed RMP regulation, and is still the subject of much debate. In the initial proposed rule (October 20, 1993), facilities were to determine the worst-case scenario by the following:

*"... assume that all the regulated substance in the process is instantaneously released and all mitigation systems fail to minimize the consequences of the release."*

This definition was argued to be unrealistic, as it is normally not feasible to lose all the material in a process instantaneously, and would not provide any useful information to the public.

In the supplemental proposed rule (March 13, 1995), the definition was changed to:

*"... the release of the largest quantity of a regulated substance resulting from a vessel or process piping failure."*

Additionally, the analysis for worst-case would entail a 10 minute release under worst case weather conditions (i.e. F stability and 1.5 meters per second wind speed). The proposed rule is considering the inclusion of the effects of passive mitigation measures for the worst-case scenario. Passive mitigation systems include: dikes, catch basins and drains for liquid, as well as enclosures for liquids and gases. Active mitigation system effects are not to be included when analyzing the worst-case scenario, but are being considered for the other more likely scenarios.

#### **D. Review of Comments**

EPA received over 1,000 comments, written and verbal, on the proposed regulation. These comments reflect over 6,000 separate issues. In addition to the public comment period, EPA hosted four public hearings, and a one-day forum on worst-case scenarios.

The commenters did not object to the need of performing offsite consequence analysis as part of the hazard assessment, but did have many concerns regarding how they should be conducted and the intended use of the results. The following is a summary of some of the main points identified regarding the proposed hazard assessment requirements:

- Commenters questioned the intended use of the worst-case, arguing that EPA failed to provide a clear description of its purpose.
- Commenters questioned whether EPA would require facilities to conduct separate analyses for each hazard for substances that are both flammable and toxic.
- Commenters stated that, although the proposed definition of worst-case as instantaneous loss of the total contents of a process may be possible for sources that have simple systems, instantaneous loss of the total process contents is not technically feasible for complex systems, and therefore would provide no useful information to the public or the facility.
- Commenters stated that failure to account for at least well-designed passive mitigation systems reduces the incentive for installation of such systems.
- Commenters argued that EPA should specify in the final rule certain methodological assumptions that facilities would use to analyze release scenarios.
- Several commenters argued that the worst-case meteorological conditions defined in the proposed rule (F stability and 1.5 meters per second wind speed) were too conservative.

- Commenters expressed concern that the results of the offsite consequence analyses would be difficult to compare between facilities without specification of the assumptions.
- Commenters asked for clarification of what EPA expects sources to do to define offsite populations and environmental impacts.

In a good-faith effort to effectively respond to these comments, EPA chose to issue a supplemental notice of rule making, rather than move to finalize the proposed regulation. Had EPA decided to finalize the proposed regulation, it is not unreasonable to assume that a final regulation would have been in place by late 1994. Instead, EPA issued a supplemental notice of rule making on March 13, 1995, leading to expected finalization of the regulation in March of 1996.

## **IV. Decision-Making Using Worst-Case Data**

### **A. EPA Use of Worst-Case Data**

EPA believes that the structure of the Clean Air Act's accidental release provisions integrates the assessment of potential hazards and the prevention of accidents with response planning to prevent potentially hazardous conditions from resulting in accidents. EPA also hopes to ensure that response measures are adequate in the event of an accidental release. EPA supports an integrated approach to response planning with respect to accidents.

EPA hopes that the results of the worst-case scenario analysis and the more likely release scenario assessments will be used to build a dialogue and a working partnership among the facility and the public, response agencies, workers, and various levels of government for chemical accident prevention, response, and preparedness. They also recognize that the offsite consequence analysis results are sensitive to a wide variety of assumptions. EPA believes that it is less important to know the exact results of the modeling runs (i.e. plume travels 280 ft. versus 291 ft.), than how the data can be used to improve emergency response planning.

Most facilities would not object to improving their working relationship and partnership with local response agencies, the public, and local government. In fact, many facilities complain that they cannot get the cooperation they would like from local response agencies regarding emergency response planning, drills, and exercises. Open access to data describing the potential offsite effects of accidental releases may help to motivate local agencies to more actively participate in planning with local industry. This will likely lead to improved communication and more coordinated response efforts - a common goal for both industry and local agencies.

EPA's experiences with public access to worst-case scenario data has revealed some interesting findings including:

- Lessons learned by industry is that the magnitude of what could go wrong was worse than they thought possible; worst-case scenario analysis required industry to "lay the cards on the table".

- Communities frequently said they had "no idea" of the potential magnitude of the problem, and that they were pleased that industry had taken the initiative to disclose this information. The communities expressed the opinion that they now understood that the risks were possibly serious and that the advice coming from industry is useful.

The EPA's intentions for using the dispersion and consequence analysis data is mostly geared towards opening a dialogue between industry and the community. Industry will obtain a better understanding of what they have that could go wrong, and take responsibility. For example, it may become obvious, as it did in one recent analysis, that a facility's emergency response planning was inadequate in that it did not account for communication to a nearby international airport or major freeways. Although the facility stated that they assumed, due to the close proximity of the airport and freeways, that a potential impact could occur, it was not until accidental release scenarios were plotted onto a local geographical survey map that they truly understood the potential impact, of even small scale accidental releases.

The community on the other hand, may have had no idea what was present, but through the availability of offsite consequence data, will now obtain a better understanding of what potentially could occur, and what their role in emergency response should be. Industry and community representatives are expected to get together, along with representatives from the LEPC, and discuss the potential release scenarios. It is expected that emergency planning would consider the worst-case scenario, but not necessarily design the plan around it. Instead, planning efforts will focus on the other more likely scenarios.

Other examples of information exchange that EPA is expecting include the following:

- Local hospitals receiving information on specific treatment for exposure to those chemicals that are present at the various facilities, particularly if there will be special equipment or medicine needed.
- Communities realizing what "sensitive" populations may be present in the highest exposure areas, and how they can possibly assist in ensuring those people are not exposed.
- All other community response groups (i.e. law enforcement, fire departments, and emergency medical services) receiving information they require to be able to effectively respond to an incident.

EPA, the state agency, or the LEPC could use results of the offsite consequence analysis to require facilities to consider installation of additional risk reduction measures. For example, if the worst case scenario analysis shows that a plume exceeds Emergency Response Planning Guidelines (ERPGs) at significant distances downwind, a facility may be pressured to take action to reduce the footprint of the plume. This could require installation of additional safeguards such as control monitoring and instrumentation, shutoff valves, detectors, or alarms and interlocks. While these additional safeguards may reduce the overall

impact of an accidental release, they will add significant costs to facility operators.

#### B. The Public's Role in Risk Management

There are however, legitimate concerns facilities face regarding use of the data. For example, EPA believes that the public is a key stakeholder in preventing chemical accidents. EPA believes that facilities have the responsibility to make the public aware of the hazards associated with a potential accidental release. In fact, one commenter on the proposed regulation suggested the following as specific areas in which the public may participate:

- the outset of the planning process
- completion of the process hazard analysis
- prior to submittal of the RMP
- prior to RMP revisions
- after an accident
- after an accident investigation
- during response drills involving action outside the plant

Public participation to this extent would, at the very least, be considered intrusive.

#### C. The Kanawha Valley Experience

Perhaps one of the best examples of how EPA expects the results of the offsite consequence analysis to be used, lies in West Virginia's Kanawha Valley. Kanawha Valley is the home of the August 1985 aldicarbe oxime release which occurred at a facility in Institute, WV, that was once owned by Union Carbide. The August 1985 release has been referred to as one of the key watershed events leading to the development of process safety and risk management regulations. Local companies include:

- Arco Chemical Company
- Dupont
- FMC Corporation
- Monsanto Company
- Occidental Chemical Corporation
- Olin Corporation
- Rhône Poulenc
- Union Carbide

In early January 1992, a local resident submitted a request to the Kanawha/Putnam Local Emergency Planning Committee (K/PLEPC) that worst-case scenarios be used in the annual updating of the local emergency response plan. The K/PLEPC agreed and requested the local chemical companies to coordinate their efforts in establishing criteria for selection of worst-case scenarios and conducting the offsite consequence modeling. The effort became known as the Kanawha Valley Hazard Assessment Project.

The Kanawha Valley Hazard Assessment Project involved many groups, including industry and the surrounding communities. It was sponsored by the Kanawha Valley Hazard Assessment Group (KVHAG), which consisted of representatives from the various industries in the valley, local community interest groups, the EPA, the National Institute for Chemical Studies (NICS), and the K/PLEPC. While originally designed purely to address the local resident's request, the project blossomed into a model process which may be useful for other communities in future efforts designed to meet the requirements of both the Clean Air Act and the EPA RMP regulation.

The Kanawha Valley project involved eight chemical companies, with some companies including more than one facility, yielding a total of 14 facilities in the project. Hazard assessments were performed on 20 different chemicals. The hazard assessments addressed both worst-case and more likely scenarios. In addition to the industry modeling, the K/PLEPC also performed its own modeling as a benchmark. The KVHAG defined the parameters for the worst-case and more likely scenarios, in order to standardize those assessments performed by the companies.

The results of the project were shared with the local residents in a public communication event, in June 1994, called *SAFETY STREET, Managing Our Risks Together*. Residents were able to ask various representatives of the plants, including plant managers and technical staff, about the worst-case scenarios, emergency response, or plant safety practices. While many observers thought that public release of the results of offsite consequence analysis would do nothing more than frighten local residents, and alienate industry, instead it had many positive results. Residents were less frightened by the concept of "The Chemical Company" as an entity that they knew nothing about, let alone what they were manufacturing, and began to have an increase in community spirit. Many residents gave the companies credit for being up front with the worst-case information, instead of keeping it shrouded in mystery. People felt that they would be less likely to panic in the event of a release, since they knew up front what to do and what could happen. Most of those involved felt a sense of ownership, having been involved in the entire process. One of the authors of this paper personally attended the *SAFETY STREET* presentation and experienced similar feedback from residents.

## V. Summary

The three states with active programs requiring worst-case scenario data, each use the data for different purposes:

- New Jersey uses the data primarily as a means to require facilities to evaluate more rigorous release prevention technology, through a state-of-the-art review.
- California's Administrating Agencies (AA) vary as to how they utilize dispersion and consequence modeling data. Most AAs use the data for emergency response planning, but some utilize worst-case scenario data to force more stringent accident prevention control technology.

- Delaware recognizes limitations in dispersion and consequence modeling and uses the data primarily for emergency response planning purposes, and to open dialogue with LEPCs and the community.

While EPA's stated use of worst-case scenario data is to encourage dialogue among industry, local planning agencies, and the community, we should fully expect that the data will also be used to force advances in accident prevention technology. It is this use of the data that most concerns facility operators. Facility owners and operators fear that governmental regulators who do not fully understand your particular technology may force unreasonable control measures.

A review of history often provides valuable insight into what we can expect in the future. Just a few short years ago, the Superfund Amendments and Reauthorization Act (SARA) Title III (1986) required facilities to account for hazardous material releases into the air, water, and land. This accounting of releases into the environment (Section 313, Toxic Release Inventory reporting) was to be submitted to the EPA, as well as to local planning agencies. Facilities were extremely concerned that the general public and environmentalists would use the data to mount a negative anti-industry campaign, and worse yet - to shutdown their facilities. After over five years of implementation, industry's concerns were proven to be largely unfounded. In some cases, the data is merely piled into boxes in the far corner of a local fire department emergency manager's office, but in many cases the information has led to improved dialogue among the facility, local agencies, and local government. In fact, many facilities have begun to use the data to project a positive image of active waste minimization, by demonstrating a steady decline in overall emissions, or releases to the atmosphere. It is this positive experience in making information available and in including the public as an active stakeholder in decision-making that EPA hopes to emulate in accident prevention planning.