

EPA's RMP: Lessons Learned from State Risk Management Programs

By

David A. Moore, PE, CSP
President

David M. Garcia, J.D.
Analyst

AcuTech Consulting, Inc.
100 Bush Street, Suite 200
San Francisco, CA 94104
Tel.: (415)772-5972
Fax: (415)772-5975

e-mail: inquire@acutech-consulting.com
www.acutech-consulting.com

Over ten years of experience with state risk management regulations similar to the USEPA's recently enacted Risk Management Plan (RMP) regulation offers lessons which will be useful for national RMP implementation. State risk management programs have been in existence in California, New Jersey, Nevada, Louisiana, and Delaware for up to the past ten years. In particular, efforts to comply with the California Risk Management and Prevention Program (RMPP) provide valuable insight because it regulated the widest variety of facilities, covered the largest number of facilities, and was managed by the greatest number of local administering agencies. This paper discusses some of the lessons learned from experiences implementing and complying with this regulation, and offers advice on how to best work with government regulators and the public on risk management plan submittals. This paper will concentrate on the experiences in implementing the California RMPP and how they might be applied to meeting California's new RMP rule and the USEPA's rule nationwide.

I. Overview of the US EPA RMP Regulation

The US Environmental Protection Agency (EPA) has developed a rule for Risk Management Programs (RMPs) (40 CFR Part 68). Effective August 19, 1996, it requires program implementation and Risk Management Plan (RMPlan) submissions by June 21, 1999. Among EPA's goals in developing this rule are to encourage industry to reduce the probability of accidental releases of substances that have the potential to cause immediate harm to public health and the environment, and to stimulate the dialogue between industry and the public in a way that will improve accident prevention and emergency response practices. EPA estimates that over 66,000 stationary sources may be affected by the rule.

Many of the federal RMP-regulated facilities nationwide do not have existing programs or documents that meet the requirements of the RMP regulation. This is particularly true

for those facilities in Program Levels 2 and 3, which have to create prevention programs, and for nearly all facilities regarding the hazard assessment. As such, the learning curve and workload will be significant for most facilities.

II. State Level Risk Management Regulations

The states of California, New Jersey, Nevada, Delaware, and Louisiana enacted regulations in the period from 1986-1992 to address the risks of accidental release from highly hazardous chemicals in facilities handling these materials. The focus of most of these regulations was protection of the public, and was a direct result of the Bhopal incident.

It is expected that about 2,000-3,000 facilities in these states have prepared risk management plans that are similar in varying degrees to the EPA's requirements. This leaves a substantial balance of facilities that are new to these activities. Even in states where risk management planning has been required for some time, not all covered facilities have taken on these tasks. In California, for example, only about 40-50% of the estimated 5,000 facilities that have been subject to RMPP have submitted a plan; the Administering Agency (AA) has discretion whether to require a plan even if the facility exceeded the Threshold Quantity (TQ) of an extremely hazardous substance. Despite how California's RMPP program covered fewer facilities than RMP, similarities in the chemicals it is concerned with, program requirements, and the way it is administered offer lessons to companies subject to RMP requirements.

II.A California - Risk Management and Prevention Program (RMPP) and California Accidental Release Prevention Program (CalARP)

California's Risk Management and Prevention Program (RMPP) (Health and Safety Code 25534(b),(d)(2)) was enacted in 1986. More recently, California has attempted to merge the RMPP and USEPA RMP programs through AB1889. Enacted in Fall 1996, it substituted a modified federal RMP program effective January 1, 1997. The new regulation, referred to as the California Accidental Release Prevention Program (CalARP) regulation, is in draft form at this time. California has developed a draft RMP rule and is expected to issue a list of regulated substances before June 30, 1997. RMPPs previously submitted have to be implemented and updated until an RMP is presented to replace it (assuming the hazardous chemicals are of concern under both RMP and CalARP regulations).

The RMPP regulation was very similar to the EPA RMP rule. It required facilities that handled, processed, or stored acutely hazardous materials (AHMs) (based on the CERCLA EHS list) in excess of specified threshold quantities to register with the Administering Agency (AA) for their jurisdiction. An RMPP document and Offsite Consequence Analysis were later submitted to the AA for review. The RMPP document contained all information needed to explain the adequacy of the facility's prevention and emergency response programs. AA's certified the RMPP

as "complete" when it determined that the information was comprehensive and met statutory requirements. In practice, most AA's certified completeness based on the thoroughness of the RMPP document more than from an evaluation of the risks posed or a determination of the program's adequacy.

The California RMPP was administered on the local level, with a designated public agency responsible for administering the program. About 135 different AAs, comprised mostly of county and city environmental, hazmat, and health departments or fire departments, manage the regulation. 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 to request specific parameters be used for offsite consequence analysis.

The USEPA RMP regulation may allow for a similar administering structure: local, state, and national coordination and administration depending on the jurisdiction. This will be the case in California, where the Certified Uniform Program Agencies (CUPAs), which are local agencies certified to manage numerous safety and health regulations, will be responsible for the RMP.

Assistance to companies preparing RMPs is available at the state and local level. The California Governor's Office of Emergency Services published guidance to assist companies in meeting the regulation called *Guidance for the Preparation of a Risk Management and Protection Program*. Other Administering Agencies, such as Contra Costa County, Sacramento County, Los Angeles County, and Los Angeles City, have published detailed local guidelines and vigorously enforce the program. Many other counties expect facilities to use their technical and professional resources to develop a plan, explaining the rationale for the calculations and assumptions incorporated. Some AAs requested few or even no RMPPs be conducted despite having registered facilities in their areas of jurisdiction. Approximately 40% of the registered facilities in California have implemented the RMPP to date.

The AAs were responsible for determining the priority order in which facilities in their jurisdiction prepare RMPPs. Those facilities requested to conduct an RMPP were given up to 12 months to comply. Most AAs, however, did not complete all facilities within their areas of jurisdiction. Reasons for the delay included limited resources (including staff and budgets to manage the oversight and review of the RMPPs), and the statutory difficulty of establishing long range schedules.

The USEPA RMP's compliance timetable is different. All regulated stationary sources must comply by June 21, 1999, for the initial RMP. Experience in California showed that the increased workflow will undoubtedly have a serious effect on the administering agency. If most sources wait until the deadline to submit their RMPs, the authorities will have a serious backlog of RMPs to review. In California, even a limited number of RMPPs received caused backlogs which, in some cases, took the AA over a year to review and designate them as

"complete." This often required ongoing discussions between the AAs and the companies submitting RMPPs, and in some cases required significant rework due to lack of communications or understanding of the requirements.

The RMPP-regulated facilities were required to conduct an offsite consequence analysis for the most likely hazards as identified in the hazard and operability studies. The offsite consequence analysis included pessimistic release scenario assumptions. These assumptions are related to the quantity and rate of release of an acutely hazardous material, toxic endpoints, meteorological conditions, and other parameters. It is important to note, however, that not every facility conducted their offsite consequence analysis to the same rules as are required for the worst case analysis for the USEPA RMP. As such, most facilities can only take credit for having conducted a toxic release offsite consequence analysis that may meet the requirements of the alternative cases of the rule. Flammable substances were also not part of the Acutely Hazardous Materials for the RMPP.

The RMPP offsite consequence analysis included a map noting the location of the facility, the position of nearby 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 USEPA RMP, on the other hand, only requires an estimate of the distance to the toxic or flammable endpoints, and a list of public and environmental receptors; mapping the sensitive receptors is not required.

Public notice is provided, and copies of a facility's RMPP are 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.

Some of the AAs use the RMPP for pre-planning emergency responses with the Fire Department HAZMAT Response Teams. Some Fire Departments use the information, although many do not. The RMPPs are also used by the County Planning Department when reviewing new construction or redevelopment. For the RMP, a permit to construct cannot be granted unless the RMP is completed. The RMP also requires that the stationary source coordinate its efforts with the local fire department.

II.B Impact of EPA's Rule

Figure 1 illustrates some of the key differences between the California Accident Release Prevention Program (CalARP) and the federal USEPA RMP regulation.

Figure 1: Comparison of Key USEPA RMP, California RMPP, and CalARP Requirements

Requirement	EPA RMP	California RMPP	California RMP (CalARP)
Registration	Registration by June 21, 1999	Registration previously required or when above TQ	Registration will be required both to AA and OES (by November 1, 1997) and to USEPA (by June 21, 1999)
Program levels	3 program levels to recognize varying degrees of risk	No program levels	Three program levels as EPA RMP
Listed chemicals	77 acutely toxic chemicals, 63 flammable gases and volatile flammable liquids	EPA SARA Title III list of Extremely Hazardous Substances	Federal EPA RMP list and CalARP regulated substances
Threshold quantities	Per the USEPA list of RMP chemicals	EPA SARA Title III list of Extremely Hazardous Substances	Lesser of USEPA list of RMP chemicals and CalARP list
Public Review	No formal public review required	Public review required	Public review required (45 day comment period)

III. Lessons Learned

The lessons learned can be categorized into two primary areas - technical lessons and risk communication lessons. Some of the lessons learned are described below.

III.A The offsite consequence analyses required substantial planning for major process facilities

In order to derive accurate estimates of the concentration of toxic or flammable materials potentially released to the atmosphere, it was necessary to develop process safety information that was detailed enough to serve the needs of the source term and dispersion models. This included significant work developing an inventory of materials handled, calculating process conditions line by line, and summing these values to obtain quantities potentially released. Significant time was spent doing this work, and it is a necessary precursor to determining worst case or alternative case scenarios. If accurate information of this type is not available, it is recommended that companies develop background information like this as soon as possible.

III.B Scenarios selected were important, and were the foundation of the RMPP, but these scenarios were often subjectively developed

The HAZOP studies were intended to define the scenarios that were to be modeled. Even when the studies were comprehensively done, the selection of scenarios was sometimes subjective. In particular, considerable leeway existed in determining mitigation to a release. As such, a wide variety of cases were documented by the facilities. There was little substantiation besides the HAZOP study as to the basis for the scenarios selected.

For most AAs, the RMPP rules on which scenarios should be included were not clearly defined. The onus was on the company to substantiate the claim that the scenarios were representative of the hazards posed by the facility. Alternative scenarios under RMP are also subjectively defined; well documented assumptions for and a good scenario selection process is recommended for the alternative cases.

III.C Practical approaches to risk estimation should be taken rather than overly sophisticated quantitative methods that attempt to prove safety through likelihood explanation

RMPP, RMP, and CalARP do not require estimates of the risk, only a description of the hazard. While Companies and the public probably would have understood the scenarios selected for the OCA more readily if it considered the likelihood of an occurrence, attempts to use likelihood as a reason to avoid risk reduction were not successful.

One or more companies that attempted to consider likelihood in a full scale quantitative risk assessment failed in the effort, particularly with their attempt to convince the public that the level of risk was acceptable. The most likely reason for this is that the company appeared to justify their view that the risk was low

and that further risk reduction was not necessary, instead of using quantitative risk assessment as a tool to help them understand the risks and to make decisions internally. The public seemed to reject the QRA as an invalid attempt to impose the risk on them, and distrusted the company's presentation as insincere.

The lesson learned was that for this regulation and for the RMP, it is better to view the risk from a practical, qualitative risk analysis and risk reduction methodology, at least until the state of the practice is improved in QRA. The public is more willing to listen to what practical steps are being taken to address the risk, then they are willing to listen to esoteric presentations on how unlikely they are to be injured.

III.D Companies approach hazard assessment differently, possibly resulting in varying presentations of risk for what is the same hazard

At a public hearing, two companies presented their RMPP scenarios. Without guidance for what constituted a worst case, they presented very different results for the similar processes. This posed significant credibility problems to both companies.

To illustrate this point, Figure 2 shows two similar processes for two hypothetical chemical plants. Company A estimated a 2.0 mile distance to a toxic endpoint, and Company B estimated 2.8 miles to the same endpoint for a similar process. This could be a function of different dispersion models, different atmospheric assumptions, different source terms, or other factors independent of any difference in the two processes or their operating conditions. The obvious problem is that Company A reports that their zone of vulnerability is 12.5 square miles in area, whereas Company B claims they are 24.6 square miles in area - a 100% increase! It may not seem to matter, but if there are public receptors interested in this information, either sincerely or insincerely, there could be considerable ramifications from the increased area. A question arises of fairness to the company that reported a larger zone of vulnerability.

This situation could occur with the RMP for the worst case, but is more likely to be a problem with the alternative cases. Recommendations to manage this include attempting to coordinate assumptions between neighboring companies, following industry guidance documents, clearing certain assumptions with the regulating authority in advance, and helping to develop regional guidelines for hazard assessments. In general, it is important to get industry and regulators to gain common ground on these issues.

III.E RMPPs became more interesting following incidents

RMPPs were required to be available to the public and were often put in public libraries for review. Most RMPPs were not very popular reading, with one exception - following an incident. The lesson learned is that careful consideration

should be given to the longevity of the document, the wide readership it might get, particularly following an incident, and the integrity that the document must have to stand up to this scrutiny in the end.

III.F Many companies treated the RMPPs as a report, and not a program

It was difficult for some companies to maintain the level of safety management that they claimed in the RMPPs because the RMPP effort was often looked upon as a regulatory document rather than an ongoing program. Companies that had invested thousands of dollars in preparing RMPPs but not in instituting all of the necessary programs to manage risk according to the plan, lost credibility with the public and regulators, particularly if an accident occurred which highlighted the weaknesses of the program. The lesson learned is that management commitment to the program is required in order to achieve the benefits of the RMP, and make the entire process more likely to succeed.

III.G The regulators were often inadequately prepared to manage the RMPP programs and to evaluate the quality of the Risk Management programs of the companies

Most regulators were admittedly ill-prepared to deal with the RMPP. It took a considerable time until even the leading regulators were fully qualified and equipped to manage the regulation. With this in mind, it is expected that other states and federal regulators will need to be educated and better prepared than they currently are to properly handle their responsibilities for RMP. The lesson learned is that companies can assist in this area, including educating the regulators, providing cooperative information ahead of the compliance deadlines, and generally understanding the regulator's needs and helping to meet them. All of these efforts to educate regulators improve the probability that the company and regulators will share similar views of risk and risk management programs.

III.H The offsite consequence analyses provided valuable insights to the magnitude of what could go wrong and assisted in improving emergency preparedness

Offsite Consequence Analysis required industry to "lay the cards on the table." Many companies showed impacts on the communities that were more significant than they thought. This was particularly true since this type of study had not been done before at many companies. 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 consequence analysis data is mostly geared toward 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 will consider the worst-case scenario, but not necessarily design the plan around it. Instead, planning efforts will focus on the alternative 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.
- AAs or CUPAs through the Area Plan requirement will also address the potential threat to communities.
- 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.

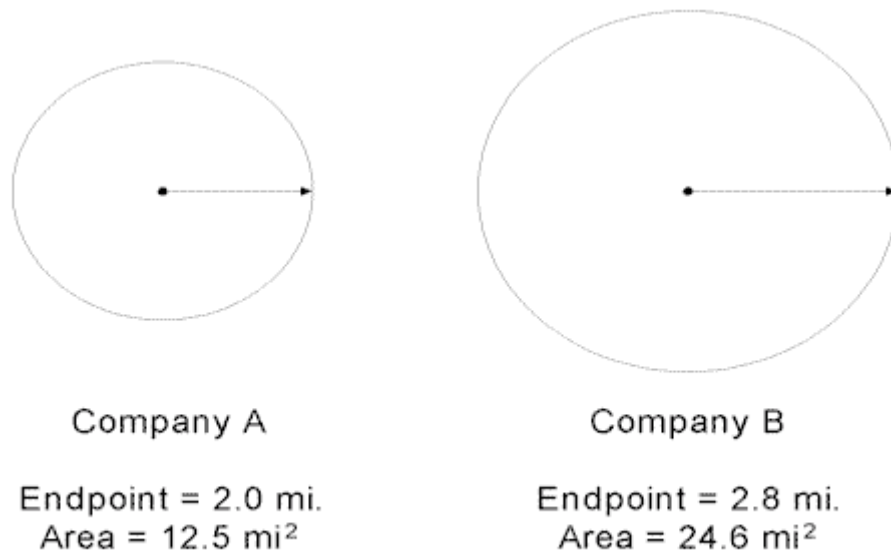
III.I The OCAs illustrated the value of technologies for detection and mitigation of offsite releases

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.

Fear that the regulation would impose great financial burden proved accurate for some facilities that were required to invest in new technology. For many facilities, however, existing safeguards were adequate; in other facilities minor additions to these systems sufficed. These improvements reaped major technical and "political" benefits. Examples of these improvements included fence-line monitoring systems, inventory transfer and isolation systems, detection systems, emergency response incident command system software, and community sirens.

Figure 2: A Comparison of the Areas Affected for Two Toxic Endpoint Distances



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