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**SYNERGISTIC DEVELOPMENT OF PHAs FOR COMPLIANCE WITH
EPA's RISK MANAGEMENT PROGRAM AND OSHA's PSM RULES**

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ABSTRACT

OSHA's Process Safety Management (PSM) rule and EPA's proposed Risk Management Program rule both require a process hazards analysis and the implementation of the recommendations of the process hazards analysis. However, because of statutory differences, the requirements and interpretation of the process hazards analysis in the two rules are different. This paper examines the statutory differences between the two rules and the expected differences in interpretation and as a result the implementation impacts on covered processes. Approaches are presented in this paper for conducting process hazards analysis under the PSM program in such a way that will make it relatively simpler to comply with the EPA rule when it becomes final.

INTRODUCTION

Section 112(r) of the Clean Air Act Amendments (CAAA) of 1990 requires both OSHA and the EPA to develop regulations for the development and implementation of risk management programs at facilities that manufacture, process, use, store or otherwise handle regulated substances in quantities that exceed specified threshold quantities. The purpose is to prevent or minimize the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. This is achieved through an integrated approach to identifying and managing the hazards posed by hazardous materials.

OSHA fulfilled its regulatory mandate on February 24, 1992 by publishing in the *Federal Register* the final rule for Process Safety Management of Highly Hazardous Chemicals^[1] (29 CFR 1910.119). The impact and application of the OSHA PSM rule have been extensively discussed in other publications^[2,3,4,5,6]. As required by the CAAA, the EPA published in the *Federal Register* on October 20, 1993, the proposed rule for Risk Management Programs for Chemical Accidental Release Prevention^[7]. Public hearings have been held and the final rule is expected to be published in the near future. The EPA rule will be applicable to all stationary sources that have a regulated substance in a process in excess of a threshold quantity. On January 31, 1994, EPA published the final list of covered chemicals which includes a total of 77 toxic substances and 63 flammables^[8]. Other publications have discussed the impact of the proposed EPA rule^[9] and the synergism between the OSHA PSM rule and the EPA Risk Management Program rule^[10].

Paragraph (e) of the PSM rule requires facilities to perform process hazards analysis (PHA) on the covered processes. The PHA must address the hazards of the process, previous hazardous incidents, engineering and administrative controls, the consequences of the failure of engineering and administrative controls, human factors, and an evaluation of effects of failure of controls on employees. The rule suggests a performance oriented requirement with respect to the PHA so that the facility will have the flexibility to choose the type of analysis that will best address a particular process.

Section 68.24 of the proposed EPA rule also requires facilities to perform PHAs on the covered processes. However, because of statutory differences, the PHAs required under the EPA rule would require the facilities to consider offsite consequences instead of worksite consequences. Evaluation of safety and health impacts would focus on public health and environment rather than on employees. While the PHA methodology can essentially be the same for compliance with both the rules, compliance with the EPA requirements would require consideration of offsite consequences. A beneficial approach would be to increase the current PHA effort so that, at the minimum, the scenarios with potential offsite consequences are tagged for future consideration. Thus, when the EPA rule is finalized, compliance would require offsite consequence assessment for only those scenarios. On the other hand, since the offsite consequence evaluation is a statutory requirement and will be a part of the final EPA rule, facilities may choose to complete the offsite consequence assessments currently when the PHAs are conducted to satisfy the PSM schedule. This paper discusses in detail some of the approaches that facilities may wish to adopt during the conduct of the current PHAs to reduce the burden of complying with the EPA rule in a cost-effective manner.

PHA REQUIREMENTS UNDER THE TWO RULES

OSHA's PSM rule is holistic in nature and all 14 elements of the rule must be implemented in their entirety in order to gain full advantage. However, the PHA is the center piece of the PSM program. PHAs and the results of PHAs can and will impact the development, implementation, and practice of other elements of the PSM rule.

EPA's proposed Risk Management Program rule on the other hand consists of, 1) a hazard assessment, consisting of offsite consequence analysis and 5-yr accident history, to establish the extent of the risk; 2) a prevention program, aimed at preventing incidents from the hazards assessed in step 1; and, 3) an emergency response program, aimed at mitigating the consequences of an incident, if it does occur. EPA's prevention program consists of 10 elements and is similar to OSHA's PSM program. One of the elements of EPA's prevention program requires facilities to conduct PHAs on covered processes. However, as discussed earlier, because of statutory requirements, the PHAs under EPA's prevention program would have to consider offsite consequences.

DIFFERENCES IN PHA REQUIREMENTS

The underlying philosophy in conducting the PHAs and using the PHA results is the same for both the OSHA rule and the proposed EPA rule. Like OSHA, EPA recognizes that although each element of the prevention program is important, the PHA is the critical element in developing a risk management program. A PHA would help facilities identify hazards and ways to address them. For example, a 1989 explosion and fire at a facility in Baton Rouge, Louisiana, led to a partial loss of pressure, power, and fire water because the power, steam, and water lines were co-located with the lines carrying flammable gases^[7]. The losses complicated and prolonged the process of responding to the release, thereby increasing the damage caused by the release. Similar problems occurred at a facility in Norco, Louisiana, where an explosion led to the loss of all utilities. A thorough and properly done PHA should identify these types of potential hazards and allow facilities to determine how to mitigate the problems. PHAs also identify situations where major accidents due to control failure (e.g., pressure gauges, overfill alarms) could be prevented by redundant or backup control or by frequent maintenance and inspection practices.

Many other elements of the risk management program should flow from, or at least be revised based on, the results of the PHA. Existing standard operating procedures, training and maintenance programs, and pre-startup safety reviews may need to be revised to reflect changes in either practices or equipment that derive from the PHA. The PHA may help define critical equipment that requires preventive maintenance, inspection, and testing programs. It may also help a facility focus its emergency response programs on the most likely and most serious release scenarios.

As discussed above, the genesis of requiring PHAs is the same for both the rules. However, EPA's PHAs would require the consideration of "offsite consequences" instead of "workplace consequences." EPA has also made editorial changes in the OSHA language to make the rule consistent with the CAAA's statutory language. Specifically, the differences in terminology between the two rules are as follows:

OSHA's PSM rule

Employer
Highly Hazardous Chemical
Facility
Standard

EPA's Risk Management Program rule

Owner or operator
Regulated substance
Stationary source
Rule

The requirements of EPA's PHAs (§ 40 CFR 68.24) when compared with OSHA's requirements (§ 29 CFR 1910.119(e)) indicate differences which are summarized in Table 1.

TABLE 1
DIFFERENCES IN EPA's PHA REQUIREMENTS AS COMPARED
TO OSHA's REQUIREMENTS

Difference in EPA's PHA requirements as compared to OSHA's PHA requirements	Reference paragraph number of EPA proposed rule	Changes needed to PHAs conducted under the OSHA PSM program
1. Introductory paragraph	§ 40 CFR 68.24(a)	None
2. Priority order for conducting PHAs would consider offsite consequences rather than the number of potentially affected employees	§ 40 CFR 68.24(b)	Nominal
3. OSHA's schedule for implementation would not be included because the CAAA requires that facilities comply with EPA's rule within three years of the date of promulgation	§ 40 CFR 68.24(b)	Nominal to Substantial
4. Identification of previous incidents would be limited to those with offsite consequences	§ 40 CFR 68.24(e)(2)	Nominal
5. Evaluation of safety and health impacts would focus on impacts on public health and environment rather than on employees	§ 40 CFR 68.24(e)(7)	Substantial
6. Facilities required to evaluate monitors, detectors, containment or control devices, and mitigation systems	§ 40 CFR 68.24(j)	Substantial

PHA IMPLEMENTATION ISSUES

Most facilities are in the midst of conducting PHAs for compliance with the OSHA PSM program. The promulgation of the final rule for the EPA program will create substantial additional burdens on covered facilities. However, some of these additional burdens can be managed effectively and with relative ease with some pre-planning. Items 1 through 4 in Table 1 do not represent any substantial work. Thus, potentially covered facilities may elect to wait till the promulgation of the final EPA rule to develop response strategies and implementation programs. Even though item 6 is a statutory requirement, it is not clear yet what the final rule will require. Item 5 is a statutory requirement and the final rule will definitely require facilities to address safety and health impacts for offsite consequences. Thus, it would seem that the most prudent approach would be to develop a planned approach for responding to the item 5 requirements. Facilities currently conducting PHAs for compliance with the OSHA PSM rule may elect to take one of the following approaches.

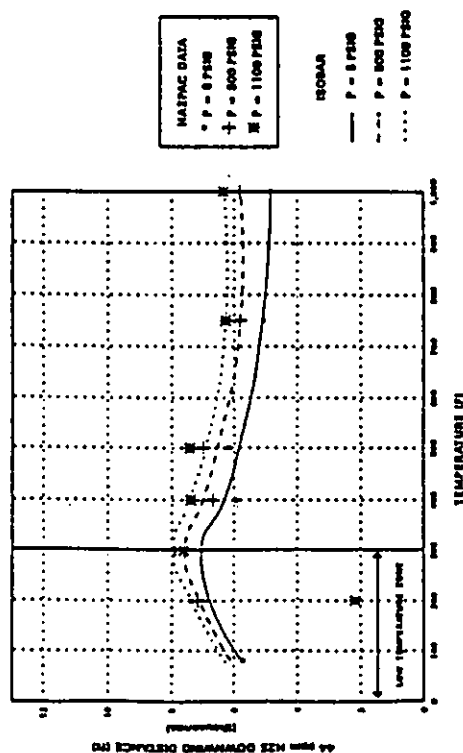
OPTION 1
1 Doing nothing and taking a wait-and-see attitude will most likely result in a significant additional burden on the facility when the final EPA rule is promulgated. At that time, they would have to scramble, because of time limitations, and revise all their PHAs to consider offsite consequences.

2
2 Two of the pragmatic approaches would be to: 1) tag the scenarios with potential offsite consequences during the current PHAs, or, 2) to complete the offsite consequence analysis and the resulting safety and health impacts. In the first approach, the tagged scenarios would be further analyzed when the final EPA rule is promulgated in order to accomplish compliance with the EPA rule. The second approach is proactive based on the assumption that the final EPA rule will require assessment of safety and health impacts from offsite consequences.

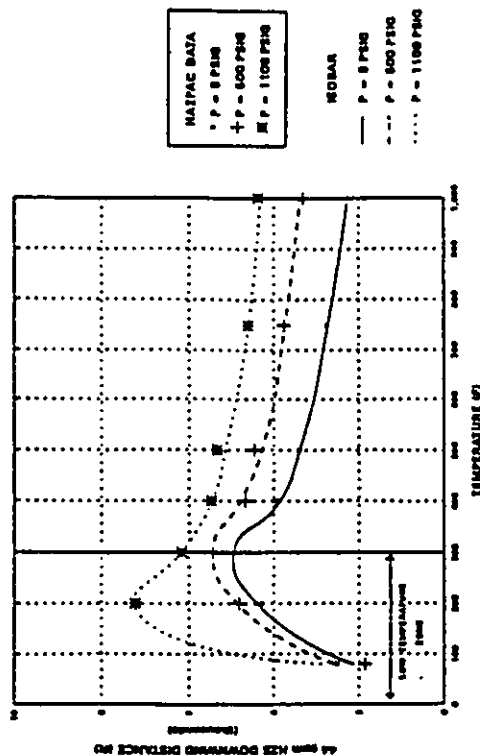
3
3 The requirement to consider offsite consequences during working PHA sessions creates some logistic problems. It is difficult, if not impossible, to assess the offsite consequences from an incident without some computer dispersion modeling. On the other hand, the PHA sessions may get bogged down, if concurrent modeling runs are necessary during the PHAs. An effective way of dealing with this problem is the use of screening tools. Given the operating parameters for the facility (e.g., chemicals used, composition ranges, operating temperature ranges, operating pressure ranges, etc.) dispersion modeling can be done *a priori* to develop screening charts. The objective is to develop sufficient number of graphical representations of the downwind dispersion distances from potential releases, so that the PHA team can very easily read off or interpolate from the graphs if there is a potential offsite consequence for the scenario under consideration. One must remember though to set up the modeling runs with conservative parameters, so that all offsite impacts are captured by the screening tool. An example of such a screening tool for a facility with hydrogen-sulfide as the regulated substance is given in Figure 1. For the sake of brevity only one set of graphs have been produced in this paper. The dispersion modeling results were obtained using RMT/Jones and Neuse's dense gas dispersion model, HAZPAC.

FIGURE 1
EXAMPLE SCREENING TOOL FOR OFFSITE CONSEQUENCE ANALYSIS

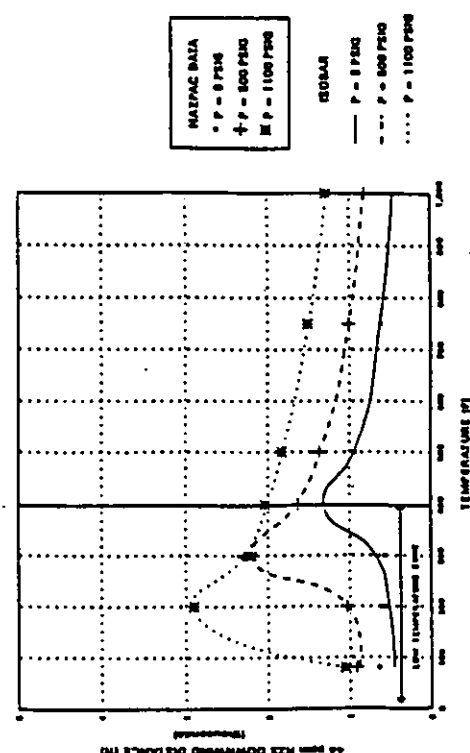
LOW FLOW RATE: 5,000 lbs/hr
H2S CONCENTRATION: 850,000 ppm



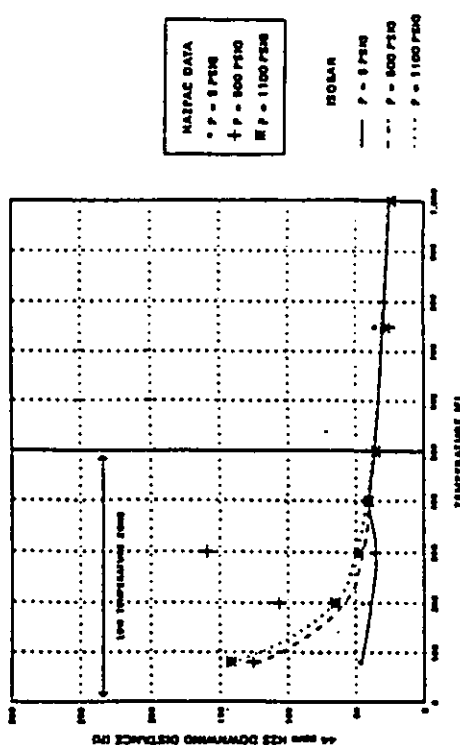
LOW FLOW RATE: 5,000 lbs/hr
H2S CONCENTRATION: 500,000 ppm



LOW FLOW RATE: 5,000 lbs/hr
H2S CONCENTRATION: 100,000 ppm



LOW FLOW RATE: 5,000 lbs/hr
H2S CONCENTRATION: 1,000 ppm



CONCLUSIONS

The implementation of the risk management program rule will create a significant amount of additional burden on covered facilities. Proper planning and development of programmatic approaches are needed to ensure timely compliance and economic use of resources. Facilities that are currently implementing OSHA's PSM program may gain significant advantages by taking into account the synergistic portions of the two rules. The main differences between EPA's prevention program and OSHA's PSM rule are statutory in nature and mandated by the CAAA of 1990. Thus, it would be to a facilities benefit to plan and conduct current PHAs in such a manner that would make compliance with the EPA rule much easier.

ACKNOWLEDGEMENTS

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