



Project Summary

Prevention Reference Manual: Overviews on Preventing and Controlling Accidental Releases of Selected Toxic Chemicals

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Section 305 (b) of the Superfund Amendments and Reauthorization Act of 1986 requires that the EPA conduct a "review of emergency systems for monitoring, detecting, and preventing releases of extremely hazardous substances at representative domestic facilities that produce, use, or store extremely hazardous substances." The EPA must also prepare and present to Congress a report with recommendations for initiatives for the development of technologies and systems for monitoring, detecting, and preventing the accidental release of chemical substances, and for public alert systems that warn of imminent releases.

The purpose of this manual is to orient personnel involved in inspecting and otherwise evaluating potential toxic chemical release hazards to the fundamentals of release hazard control for 13 of the specific chemicals chosen for evaluation under Section 305 (b). It also guides the user to other technical literature for additional information.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of

the same title (see Project Report ordering information at back).

Introduction

Following the release of methyl isocyanate in Bhopal, India, on December 3, 1984, there has been a new urgency in efforts to establish national programs to address chemical emergencies. The Chemical Emergency Preparedness Program (CEPP) of the U.S. Environmental Protection Agency (EPA), designed to foster planning and preparation within communities for serious releases of extremely hazardous substances from local chemical facilities, was launched nationally in November 1985. Concurrently, the Chemical Manufacturers Association (CMA) initiated the Community Awareness and Emergency Response Program (CAER) to encourage communication between industry and local communities about chemical hazards. By October 1986, the local planning encouraged on a voluntary basis by CEPP was made mandatory by Congressional enactment of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). Title III of SARA is entitled the "Emergency Planning and Community Right-to-Know Act of 1986.

Emergency Planning/ Right-to-Know

The emergency planning provisions of Title III require communities to prepare

for the possibility of accidents at facilities handling extremely hazardous substances. The "community right-to-know" provisions require industry to share information with communities about toxic chemicals present at local facilities. To enable communities to recognize the potential hazards associated with local chemical production or use, Congress included in (Title III) requirements for facilities to report regularly the presence of hazardous chemicals on site, as well as emissions of such chemicals to any environmental medium: air, water, or land (soil).

The overall thrust of these activities is to reduce the risk of harm to people, while at the same time ensuring that the people are aware of risks so that they may take actions of their own, if necessary, to reduce the risks.

The purpose of this manual is to orient regulatory personnel and others involved in inspecting and otherwise evaluating potential toxic chemical release hazards to the fundamentals of release hazard control for 13 specific chemicals. It also guides the user to other technical literature for additional information. One purpose is to assist EPA evaluation teams in reviewing emergency systems mandated under SARA.

Report to Congress

Section 305(b) of SARA requires that the EPA conduct a "review of emergency systems for monitoring, detecting, and preventing releases of extremely hazardous substances at representative domestic facilities that produce, use, or store extremely hazardous substances." The EPA must also prepare and present to Congress a report with recommendations for initiatives for the development of technologies and systems for monitoring, detecting, and preventing the accidental release of chemical substances, and for public alert systems that warn of imminent releases.

To prepare the report to Congress, the EPA is surveying a sample of domestic facilities which handle one or more of 20 chemicals selected from the SARA Section 302(a) list of "extremely hazardous substances." The 20 chemicals were selected from the list of extremely hazardous substances by the following procedure. First, EPA identified seven chemicals distinguished by their large production volumes, widely recognized hazards, involvement in past plant and transportation accidents, and generally recognized special handling procedures and controls. These chem-

icals -- ammonia, chlorine, hydrocyanic acid (hydrogen cyanide), hydrogen fluoride, methyl isocyanate, sulfur dioxide, and sulfur trioxide -- represent a wide range of toxicity, reactivity, flammability, and corrosivity hazards.

Of the remaining chemicals from the list of 20, the 13 discussed in this manual, were randomly selected by EPA's Office of Solid Waste and Emergency Response from subgroups of certain specified criteria (e.g., vapor pressure, ambient physical state) with the same proportion of chemicals in each physical state as the full list of extremely hazardous substances. Accordingly, two gases, seven liquids, and four solids were chosen. The seven liquids were selected to represent a range of vapor pressures (< 1 to > 100 mm Hg) at 25°C.

A questionnaire has been sent to a sample of domestic facilities which produce, use, or store one or more of the 20 extremely hazardous substances. The questionnaire has two purposes: (1) to gather additional data on available technologies, and procedures and practices for monitoring, detecting, preventing and mitigating accidental releases; and (2) to determine which technologies, operating procedures, and management practices are being used, and why. Trained inspectors will visit a limited number of the surveyed facilities to obtain in-depth information, as well as to corroborate the survey responses.

The Manual

This manual provides information useful to EPA inspection or evaluation teams for release hazards of some of the specific chemicals at facilities they will be visiting and for reviewing survey questionnaires from an even greater number of facilities. In addition to descriptive text, tables on chemical and process specific hazards are provided to provide easy reference for the user. This manual is to be used in conjunction with other manuals whose overall purpose is to summarize the major concepts of release hazard identification and control so that the probability and consequences (risk = probability x consequences) of accidental toxic chemical releases can be reduced.

The PRM-Chemical Specific manual consists of a number of volumes, each for a specific chemical, while this manual provides an overview of hazard control for 13 toxic chemicals: acrylonitrile, benzenearsonic acid, benzotrichloride,

chloroacetic acid, furan, hydrazine hydrogen sulfide, mechlorethamine methiocarb, methyl bromide, sodium azide, tetraethyl tin, and trichloroacetyl chloride.

Since the purpose of the PRM series is to summarize the major concepts of release hazard control, the reader is referred to other information sources for more detailed discussions. Other sources include manufactures and distributors of the various chemicals and technical literature on loss prevention in facilities handling toxic chemicals. Examples of technical literature include the American Institute of Chemical Engineering (AIChE) Loss Prevention Series and AIChE's Center for Chemical Process Safety publications.

This manual contains four sections. Section 1 gives a short introduction and background to the manual. Section 2 discusses release hazard control which begins with hazard identification and is the application of specific measures for pre-release prevention and protection, and post-release mitigation. In general, many of the technological, operational, and managerial aspects of hazard control are applicable to toxic chemicals in general. Section 3 presents an overview of chemical specific hazards that can contribute to a release. Topics discussed are: physical, chemical, and toxicological properties; information on the manufacture and use, including facility descriptions where appropriate; hazards associated with the various processes; and hazard prevention and control information specific to the chemical. Section 4 lists references cited in the report. Appendix A is a glossary of key technical terms that might not be familiar to all users of the manual. Appendix B presents selected conversion factors between metric (SI) and English measurement units.

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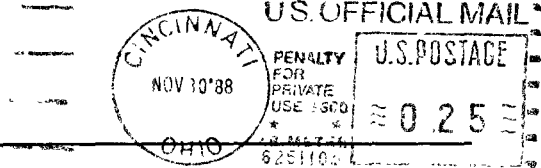
The complete report, entitled "Prevention Reference Manual: Overviews on Preventing and Controlling Accidental Releases of Selected Toxic Chemicals," (Order No. PB 88-213 194/AS; Cost: \$25.95, subject to change) will be available only from:

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