Model Risk Management Plan Guidance for Petroleum Refineries

Guidance in Complying with EPA's RMP Rule (40 Code of Federal Regulations, Part 68)

API Publication 760
Third Edition, February 2001

American Petroleum Institute

Helping You Get The Job Done Right.SM

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Regulatory and Scientific Affairs Department
Safety and Fire Protection Subcommittee

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SPECIAL NOTES

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PREFACE

Section 112(r) of the Clean Air Act (CAA) required the Environmental Protection Agency (EPA) to promulgate regulations to address the prevention of accidental releases from facilities handling extremely hazardous substances.[1] On June 20, 1996, EPA published its risk management program (RMP) rule entitled *Accidental Release Prevention Requirements: Risk Management Programs Under Clean Air Act Section 112(r)(7)*, (40 *CFR* Part 68).[2] This rule requires affected facilities to develop RMPs and to submit risk management plans (RMPlans) to a central point by June 21, 1999. The RMPlans summarize the accident prevention efforts of a facility's RMP and are provided to regulators and local emergency planners and made available to the public.

The RMP rule places a new and substantial regulatory compliance burden on industry. It should be noted, however, that RMPlans will aid Local Emergency Planning Committees (LEPCs) in planning appropriate responses to accidental releases. Anticipating this in the CAA, Congress also required EPA to develop model RMPlans to help companies comply with the rule. EPA has completed several model RMPlan development efforts with affected industry groups and other interested parties.

American Petroleum Institute (API) member companies have a long history of promoting accident prevention activities. API member facilities have been involved in related process safety management (PSM) activities for many years. In 1989, API released *Management of Process Hazards*, API Recommended Practice 750.[3] API has also published *Safety and Environmental Management Programs for Outer Continental Shelf (OCS) Operations and Facilities*, API Recommended Practice 75.[4] Additional process safety-related API publications are listed at the end of this Guide.

In 1992, the Occupational Safety and Health Administration (OSHA) adopted its PSM standard (29 *CFR* 1910.119), which affects some exploration and production (E&P) facilities and petroleum refineries5 Based on this experience and through its participation in the RMP rulemaking process, API investigated the relative compliance burden for its member companies and decided to prepare model RMPlan guidance to aid its member companies that operate refineries and E&P facilities.

The purpose of this document is to provide a model RMPlan and guidance that refineries may choose to use to prepare site-specific RMPlans, thus reducing the compliance burden associated with the RMP rule. A companion document entitled *Model Risk Management Plan Guidance for Exploration and Production (E&P) Facilities* provides guidance to E&P facilities. [6]

The first edition of this Guide was issued in August 1997, and the second edition was issued in June 1998. The second edition of this Guide addressed RMP rule developments through April 1998. The third edition of this Guide reflects the following:

- revisions and proposed revisions that EPA has made to the RMP rule from April 1998 to August 2000[7-12]
- revisions made by the U.S. Congress to Section 112(r) of the CAA in August 1999[13]
- interpretations from EPA's Question and Answer Database, maintained by the Chemical Emergency Preparedness and Prevention Office (CEPPO)[14]
- interpretations from EPA's *General Guidance on Risk Management Programs (40 CFR 68)*[15]

- new information from EPA's *Risk Management Program Guidance for Offsite Consequence Analysis*[16]
- additional guidance for compiling process quantity information, resubmitting RMPlans, and preparing for an RMP audit

Substantive changes to the second edition of this Guide are indicated by a vertical line in the right-hand margin adjacent to the revised or added text.

TABLE OF CONTENTS

TABLE OF CONTENTS (cont'd)

LIST OF TABLES

LIST OF TABLES (cont'd)

LIST OF FIGURES

EXECUTIVE SUMMARY

The EPA RMP rule affects petroleum refineries. The RMP rule covers refinery processes that handle greater than threshold quantity (TQ) amounts of regulated toxic or flammable substances. Some aspects of refining operations are excluded from coverage (e.g., transportation pipelines, storage incident to transportation, transportation containers that remain connected to the motive power that delivered them to the site, and regulated flammable substances in gasoline used in internal combustion engines).

Refining processes and pressurized storage tanks that handle large amounts of lighter flammable substances (i.e., pentane and light hydrocarbons) are the most likely operations to be covered. Refineries also typically handle a variety of regulated toxic substances. Depending upon the types of refining processes used, refineries could have the following toxics on site:

***Ammonia*—**waste treatment, corrosion control, and maintenance activities
Chlorine—water and waste treatment
Hydrogen fluoride—alkylation process
***Hydrogen sulfide*—**various refining, amine treatment, and sulfur recovery processes

Of all of the toxic materials that are typically found at a refinery, hydrogen sulfide presents the most challenging RMP applicability situation. Hydrogen sulfide is not usually stored in a refinery; rather it is generated, extracted, concentrated, and destroyed or converted to sulfur. Determining where a TQ of hydrogen sulfide exists at any one time can be a complicated analysis. Many refineries may determine that they do not possess a TQ of hydrogen sulfide in a single process.

Refineries may have other regulated toxic substances on site during special maintenance, turnaround, or construction activities. These temporary situations are also covered by the RMP rule.

Although EPA has published its final RMP rule, the U.S. Department of Transportation (DOT) is undertaking rulemaking that may affect how EPA interprets the definition of stationary source and the coverage of transport vehicles containing regulated substances. API intends to revise this Guide whenever conditions warrant, but users should independently verify the current status of the RMP rule and related rulemakings.

Most covered refining processes must implement RMPs containing three major components:

- Hazard assessments consisting of offsite consequence analyses (OCAs) of worst-case and alternative release scenarios and a 5-year history of accidental releases of covered substances
- Prevention programs consisting of ways to prevent, control, and mitigate the effects of accidental releases from covered processes (i.e., a program nearly identical to the OSHA PSM rule)
- Emergency response programs consisting of an emergency response plan and means of notifying the public in the event of an accidental release

EPA has also defined three RMP program levels with different compliance requirements for the above components to address the range of hazards and complexity of covered processes. Program 1 is called the "no impact" level; refining processes that are relatively distant from the public could qualify for this level's reduced compliance requirements. Program 2 is the "streamlined" level incorporating a 7-element, "mini-PSM" program for the prevention program. Refining processes not already covered by OSHA PSM may qualify for this level and its reduced compliance burden. Refining processes that do not qualify for Program 1 and are subject to OSHA PSM must comply with the full requirements of the RMP rule (Program 3). Refining processes that do **not** qualify for Program 1 must comply with either Program 2 or Program 3 requirements.

Facilities with Program 2 and 3 processes must implement a management system to integrate the components of the RMP. This Guide gives some suggestions targeted at refineries on how to determine coverage, assess program levels, and organize and conduct a hazard assessment.

The Guide does not address how to implement prevention programs (i.e., PSM) because most refineries subject to the RMP rule are already covered by OSHA's PSM regulation and are presumed to understand the PSM regulatory obligations. The Guide also does not address emergency response programs (ERPs) because they are already required by 29 *CFR* §§1910.38(a) and 1910.120(a), (p), and (q). Rather, the Guide gives a template for preparing the prevention program and ERP portions of an RMPlan.

Operators of covered refining processes must prepare and submit RMPlans, in a format and manner to be specified by EPA, to a central location from which the plans will be made available to regulators, the states, local emergency planners, and the public. The purpose of this Guide is to demonstrate how a site-specific RMPlan could be created using a generic template for an RMPlan.

For facilities with Program 2 or 3 processes subject to the RMP rule on or before June 21, 1999, modifications made to Section 112(r) of the Clean Air Act (CAA) by the U.S. Congress (in August 1999) required facilities to "convene a public meeting . . . to describe and discuss the local implications of the [RMPlan] . . . including a summary of the OCA portion of the [RMPlan]." API member companies had to conduct such a meeting by no later than February 1, 2000, and notify the Federal Bureau of Investigation (FBI) by no later than June 5, 2000, that such a meeting was held. The public meeting requirement did not apply to sources that have only Program 1 processes. For facilities subject to the RMP rule after June 21, 1999, public meetings were not required. Access to the OCA information in the RMPlan is now governed by recent requirements promulgated by the Department of Justice and EPA.[12]

API member facilities may participate in voluntary RMP communication activities. Some of the guidance in this document is focused on helping facilities communicate RMP information to key stakeholders in their communities.

API hopes that this Guide will significantly reduce the compliance cost of preparing an RMPlan and help improve consistency in the way that the plans are created and communicated. However, even with using this Guide, refineries will still have many tasks to complete to achieve compliance (e.g., OCAs of site-specific scenarios, compilation of 5-year accident history data, preparation of the RMPlan).

HOW TO USE THIS GUIDE

This Guide is primarily intended for use by refinery personnel who will be performing RMP compliance activities. It presumes that such personnel have a basic familiarity with the OSHA PSM and EPA RMP rules. However, this Guide may also be of interest to management personnel who need to know the basic contents of an RMPlan and the type of effort required to achieve compliance.

Section 1 is an introduction that outlines the purpose of the Guide, provides an overview of the RMP rule, and briefly describes typical refining operations. Readers familiar with this type of information may decide to skip this section. Section 2 gives examples for determining whether typical refining processes are covered by the RMP rule. Appendix A presents a simplified approach for determining the quantity of regulated flammable substances in distillation columns/towers. Assessing the appropriate program level for each covered refining process is described in Section 3.

Section 4 deals with performing an OCA and compiling a 5-year history of accidental releases. Detailed suggestions focused on refining processes is provided regarding how to organize and perform the analyses of worst-case and alternative release scenarios. Appendix B describes an approach suggested by EPA for performing OCAs for worst-case releases of regulated flammable substances. These sections would be important for anyone performing such RMP compliance work. Section 5 describes the information needed in the prevention program portion of the RMPlan, and Section 6 describes the information needed in the ERP portion of the plan. Section 7 provides suggestions on how to use the model RMPlan executive summary contained in Appendix C. Section 7 also discusses the current version of EPA's RMPlan submission forms (presented in Appendix D). Section 8 provides suggestions for preparing for an RMP compliance audit that may be conducted by implementing agencies.

Appendix E presents a glossary of RMP-related terminology. Appendix F presents a consolidated version of the RMP rule, including all rule amendments and proposed amendments as of August 4, 2000. Appendix G provides several worksheets for facilitating compliance with the RMP rule. Appendix H provides EPA's RMP audit checklist. Finally, Appendix I provides a checklist of onsite documentation to support RMP compliance.

Because (1) the RMP rule is a performance-based rule, (2) the rule has been under litigation, and (3) EPA, DOT, and OSHA are undertaking rulemakings that could affect some of the RMP rule's provisions, some of the suggestions in this Guide may change. To help users recognize the variety of types of advice, all suggestions are placed in the text using the following format conventions:

Notes	are simply expanded explanations of the rule's provisions or are performance-based interpretations that may be helpful to some companies. However, each company must assess its own site-specific needs to determine how or whether to apply a specific suggestion.

Issues	are used to indicate an interpretation that API believes is correct, but may not be explicitly endorsed by EPA, or is associated with an issue that is under litigation or further rulemaking.

Refinery operators may also consider obtaining a copy of the CMA/API *A Compliance Guideline for EPA's Risk Management Program Rule* (hereinafter referred to as the *RMP Compliance Guideline*).[17] The *RMP Compliance Guideline* provides greater detail and more examples on RMP compliance activities, complete with compliance decision logic flow charts.

ACRONYMS

AEGL	Acute exposure guideline limit
AIChE	American Institute of Chemical Engineers
AIHA	American Industrial Hygiene Association
API	American Petroleum Institute
ARS	Alternative release scenario
ASME	American Society of Mechanical Engineers
BLEVE	Boiling liquid expanding vapor explosion
BTX	Benzene, Toluene, and Xylene
CAA	Clean Air Act
CAS	Chemical Abstract Service
CBI	Confidential business information
CCPS	Center for Chemical Process Safety
CEC	Center for Environmental Communication
CEPPO	Chemical Emergency Preparedness and Prevention Office
CMA	Chemical Manufacturers Association
DOT	U.S. Department of Transportation
E&P	Exploration and production
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Emergency response program
ERPG	Emergency Response Planning Guideline
ETBE	Ethyl tertiary-butyl ether
FBI	Federal Bureau of Investigation
FR	*Federal Register*
HAZCOM	Hazard communication
HAZOP	Hazard and operability
HAZWOPER	Hazardous waste and emergency operations
HPHOS	High Pressure Hot Oil Separator
IDLH	Immediately dangerous to life and health
LEPC	Local emergency planning committee
LFL	Lower flammability limit
LNG	Liquefied natural gas
LOC	Level of concern
LPG	Liquefied petroleum gas
MOC	Management of change
MRWG	Model RMP Working Group
MSDS	Material safety data sheet
MTBE	Methyl tertiary-butyl ether
NAICS	North American Industry Classification System
NCDC	National Climatic Data Center
NIOSH	National Institute for Occupational Safety and Health
NFPA	National Fire Protection Association
NWS	National Weather Service
OAQPS	Office of Air Quality and Planning Standards
OCA	Offsite consequence analysis
OCS	Outer Continental Shelf
OPA 90	Oil Pollution Act of 1990
OSHA	Occupational Safety and Health Administration
PHA	Process hazard analysis
PL	Public Law

ACRONYMS (cont'd)

PPE	Personal protective equipment
PSSR	Pre-startup safety review
PSM	Process safety management
RMP	Risk management program
RMPlan	Risk management plan
SCRAM	Support Center for Regulatory Air Modeling
SERC	State Emergency Response Commission
SPCC	Spill prevention, containment, and control
STEP	Strategies for Today's Environmental Partnership
TAME	Tertiary-amyl-methyl ether
TNO	The Netherlands Organization
TNT	Trinitrotoluene explosive
TQ	Threshold quantity
TTN	Technology Transfer Network
UFL	Upper flammability limit
USGS	U.S. Geological Survey
VCE	Vapor cloud explosion
WCS	Worst-case scenario

1 Introduction

1.1 PURPOSE AND SCOPE

The Environmental Protection Agency's (EPA's) risk management program (RMP) rule (40 *CFR* Part 68) requires affected facilities to implement an RMP and develop a risk management plan (RMPlan). An RMP consists of three components: hazard assessment, prevention program, and emergency response program. Implementing these activities requires a facility to establish management systems to execute the necessary work to comply with the rule.

The RMPlan, on the other hand, is simply a description of the RMP activities carried out in the facility. A facility must submit its RMPlan to a central location from which the RMPlan will be available to regulators, local emergency planners, and the public.

The purpose of this Guide is to provide some information on how a petroleum refinery can prepare an RMPlan. A "model" or template of an RMPlan executive summary is provided in Appendix C. The main sections of the Guide provide suggestions on how refineries can perform some of the underlying work necessary to comply with the RMP rule; some of this information must be summarized in the RMPlan.

This Guide presumes that refineries are aware of relevant codes, standards, and regulations which preceded the RMP rule. Thus, the Guide focuses on areas of work required by the RMP rule that extend beyond existing compliance activities. For example, the Guide provides detailed suggestions on how to perform hazard assessments. On the other hand, the Guide does not go into great detail on how to implement a process safety management (PSM) program. Rather, it focuses on strategies for summarizing the results of the prevention program activities for use in the RMPlan.

Finally, this Guide is not a standard that must be followed by everyone. Site-specific needs may demand an RMPlan development approach that differs from that provided in this Guide.

Note: Section 112(r)(1) of the CAA entitled "Purpose and General Duty" (often referred to as the general duty clause) states the following:

> It shall be the objective of the regulations and programs authorized under this subsection to prevent the accidental release and to minimize the consequences of any such release of any substance listed... [in Subpart F of 40 *CFR* 68]..or any other extremely hazardous substance. The owners and operators of stationary sources producing, processing, handling, or storing such substances have a general duty in the same manner and to the same extent as Section 654 of Title 29 to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur.

This "general duty clause" has been in effect since the 1990 CAA Amendments were enacted. This Guide discusses compliance with the RMP rule only, and not the general duty clause of the CAA. Section 113(b) of the CAA allows EPA to assess penalties of up to $27,500 per day for each violation.

1.2 OVERVIEW OF THE RMP RULE

The RMP rule was published on June 20, 1996, in the *Federal Register* (FR).[2] It consists of the preamble language that explains EPA's reasoning behind the rule, and the regulatory text. Previously, EPA published its RMP list rule on January 31, 1994.[19] This contained the list of RMP regulated substances and the basis for determining if a facility is subject to the RMP rule requirements. Several amendments have been made to both the RMP rule and the RMP list rule in the past several years; these include the following:

- *RMP rule amendments* — January 6 and May 26, 1999 [7-10]
- *RMP list rule amendments* — August 25, 1997, January 6, 1998, and March 13, 2000 [20,21,11]

EPA has published the following guidance documents to assist facilities in complying with the RMP rule requirements:

- *General Guidance for Risk Management Programs*[15]
- *Risk Management Program Guidance for Wastewater Treatment Plants*[22]
- *Risk Management Program Guidance for Propane Storage Facilities*[23]
- *Risk Management Program Guidance for Ammonia Refrigeration*[24]
- *Risk Management Program Guidance for Warehouses*[25]
- *Risk Management Program Guidance for Chemical Distributors*[26]
- *Risk Management Program Guidance for Offsite Consequence Analysis*[16]

All of the above documents may be downloaded from EPA's Internet web site at the following address: http://www.epa.gov/ceppo/.

The American Petroleum Institute (API) and the Chemical Manufacturers Association (CMA) have collaborated on an overall RMP compliance guide that focuses on all provisions of the RMP rule.[17] Refinery operators should consider all of these documents as important resources while developing initial and ongoing compliance strategies and implementation plans. The following is a brief summary of the RMP rule.

The RMP rule has eight subparts and an appendix that lists the toxic endpoints to be used in hazard assessments:

- Subpart A—General
- Subpart B—Hazard Assessment
- Subpart C—Program 2 Prevention Program
- Subpart D—Program 3 Prevention Program
- Subpart E—Emergency Response
- Subpart F—Regulated Substances
- Subpart G—Risk Management Plan
- Subpart H—Other Requirements

Subpart A addresses the applicability requirements of the RMP rule. It establishes the 3-year compliance deadline; defines three RMP program levels, including eligibility criteria and necessary work; and specifies that facilities have a management system to oversee the implementation of the RMP. Program 1 is a minimal RMP for "lower hazard" processes. A process can qualify for Program 1 if (a) it has not had an accident with an offsite effect in the past 5 years, (b) the worst-case scenario (WCS) endpoint distance does not reach the nearest public receptor of concern, and (c) emergency response activities have been coordinated with local agencies.

A process is in Program 3 if it does not qualify for Program 1 and it is either (a) covered by the Occupational Safety and Health Administration's (OSHA's) PSM standard or (b) associated with one of ten "targeted" North American Industry Classification System (NAICS) codes. (Note: The NAICS code for refineries, 32411, is one of the specified NAICS codes.) If a covered process is not in Program 1 or Program 3, then it is eligible for Program 2.

Issue: OSHA is considering a proposal to add the toxic chemicals that are subject to the RMP rule to the list of toxic chemicals subject to the PSM standard. Since this would expand the scope of toxic substances subject to the PSM standard, this could impact the program level assigned to a process (i.e., could change the program level for a process from Program 2 to Program 3). As of August 31, 1999, OSHA had not yet published any formal proposed rulemaking on this issue. To track progress of this issue, consult OSHA's Internet web site at the following address: http://www.osha.gov/index.html.

Subpart B divides the hazard assessment requirements into two main parts: performance of an offsite consequence analysis (OCA) of potential accidental releases and compilation of a 5-year history of accidental releases. The OCA focuses on estimating the distance that toxic vapor cloud or fire/explosion effects could be experienced off site from WCSs and alternative release scenarios (ARSs). Definitions of WCS release conditions and modeling parameters are prescribed. Analysts have more flexibility in the parameters and assumptions used to prepare ARSs.

A facility must estimate the residential population (i.e., using U.S. census data) within a circle that is defined by the distance calculated to the appropriate hazard endpoint centered at the assumed point of release. The presence of institutions, parks, recreational areas, major commercial areas, and sensitive environmental receptors must also be noted. The OCA must be updated every 5 years, or more often if facility changes could potentially change the endpoint distance by a factor of 2 or more.

Subpart C specifies the prevention program requirements for Program 2 processes:

- Safety information
- Hazard review
- Operating procedures
- Training
- Maintenance
- Compliance audits
- Incident investigation

Each of these elements has specific requirements; however, they are generally less detailed than the associated OSHA PSM counterparts.

Subpart D specifies the prevention program requirements for Program 3 processes, including twelve elements:

- Process safety information
- Process hazard analysis
- Operating procedures
- Training
- Mechanical integrity
- Management of change
- Pre-startup review
- Compliance audits
- Incident investigation
- Employee participation
- Hot work permits
- Contractors

The specific requirements are, in almost all cases, the same as the OSHA PSM counterparts; however, EPA has made some terminology changes to ensure that facilities understand that they expect the prevention program to protect the public and the environment as well as workers. EPA states that any modifications to PSM work products that are necessary to account for protection of the public and environment may be made during the natural updating cycle under the OSHA PSM standard.

Subpart E contains emergency response requirements. Facilities whose employees plan to respond to accidental releases of regulated substances must develop an emergency response plan for protecting the public and the environment and must coordinate their activities with the community emergency planners/responders. Facilities whose employees will not respond to accidental releases do not have to prepare an emergency response plan; however, they must have an appropriate mechanism in place for notifying emergency responders in case of an accident. In all cases, covered facilities must respond to requests from local emergency planners or responders for more information to support preparation of the community emergency response plan.

Subpart F contains the EPA list of regulated substances, threshold quantities, and exemptions. The EPA list contains 77 toxic substances and 63 flammable substances. Most of the EPA threshold quantities are greater than the respective OSHA PSM thresholds. EPA specifies a technical approach for evaluating whether mixtures of regulated and nonregulated substances are covered. EPA has provided several exemptions that are important to some refinery operators. First, the RMP rule applies only to "stationary sources"; transportation activities such as pipelines (subject to DOT oversight or regulation) and storage incident to transportation are not covered by the RMP rule. Moreover, EPA's amendments to the Subpart F list rule[21] contain several additional exclusions that are important for refineries and exploration and production (E&P) facilities:

1. A stationary source does not include transportation activities or storage incident to transportation, including storage fields for natural gas where natural gas taken from pipelines is stored during nonpeak periods. Such storage fields include, but are not

limited to, depleted oil and gas reservoirs, aquifers, mines, and caverns (e.g., salt caverns)
2. A stationary source does not include transportation containers that remain connected to the motive power that delivered them to the site (e.g., tanker trucks)
3. A stationary source does not include E&P facilities on the Outer Continental Shelf (OCS)
4. A stationary source does not include naturally occurring hydrocarbon reservoirs
5. A railroad right-of-way does not cause properties to be considered contiguous and thus constitute a single stationary source
6. The threshold quantity determination for regulated flammable substances present at a stationary source does not include the following:

   — naturally occurring hydrocarbon mixtures, prior to initial processing in a natural gas processing plant or a petroleum refining process unit
   — gasoline used in internal combustion engines
   — mixtures that are not NFPA 4 mixtures

The August 25, 1997, amendment to the RMP list rule[20] increased the threshold concentration for hydrochloric acid from 30 to 37 wt%.

On August 5, 1999, Public Law (PL) 106-40 called the Chemical Safety Information, Site Security and Fuels Regulatory Relief Act,[13] passed by the U.S. Congress, was signed into law by President Clinton. This law modified Section 112(r) of the CAA. One of the main provisions of PL 106-40 prohibits EPA from listing a flammable substance used as a fuel or held for sale as a fuel at a retail facility as an RMP-regulated substance, unless exposure to the substance or its combustion byproducts will result in acute health effects, exclusive of the effects resulting from fires or explosions. EPA amended the RMP rule list rule on March 13, 2000,[12] to be consistent with PL 106-40.

Subpart G specifies the submission, updating, and content requirements of a RMPlan. The RMPlan must contain an executive summary; a certification that the information is true, accurate, and complete; and a detailed list of almost 100 data elements broken down into these five categories:

- Registration information
- Offsite consequence analysis
- Five-year accident history
- Prevention program
- Emergency response program

The first RMPlan for a facility must be submitted by the latest of the following dates: June 21, 1999; 3 years after the date on which a new regulated substance is listed and is present in threshold quantity amounts; or the date on which a process is first covered.

The RMPlan must be updated at least every 5 years or within 6 months if certain changes occur that affect the basis of the RMP. Facilities must submit the RMPlan to EPA for access by regulators, local emergency planners, and the public. The RMPlan must be submitted to EPA as an electronic file on a diskette in a special format. EPA has developed a free software program called RMP*Submit for compiling the RMPlan information and producing the appropriately formatted electronic file. Facilities that do not have access to sufficient computer resources may submit a paper copy of the RMPlan using official forms available from EPA.

The Chemical Safety Information, Site Security and Fuels Regulatory Relief Act[13] (August 1999) modified Section 112(r) of the CAA and provided temporary restrictions on the distribution of OCA data in the RMPlans. The provisions of the Act:

- Required the President (on or before August 5, 2000) to (1) assess the increased risk of terrorist and other criminal activity associated with posting OCA information on the Internet and the incentives created by public disclosure of OCA information for reduction in the risk of accidental releases and 2) promulgate regulations governing the distribution of OCA information to officials and members of the public;
- Prohibited (until August 5, 2000) distribution of OCA information and any ranking of stationary sources derived from OCA information under a Freedom of Information Act request;
- Permited EPA (until August 5, 2000) to provide OCA information to (1) state and local authorities for official use only and (2) members of the public, provided the identity and location of the stationary source are not specified;
- Prohibited federal, state, and local authorities from disclosing OCA information to the public in any form or any statewide or national ranking of stationary sources based on the OCA information;
- Established fines for violating the provisions of the Act (up to $1,000,000 per year);
- Required owners/operators of stationary sources to notify EPA if they make OCA information available to the public without restrictions;
- Required EPA to maintain and make publicly available a list of all stationary sources that have notified EPA of their public disclosure of OCA information;
- Required EPA (on or before February 1, 2000) to develop and implement a system for providing OCA information, including facility identification, to any qualified researcher (including qualified researchers from industry or public interest groups);
- Prohibited qualified researchers from disseminating, or making available on the Internet, OCA information;
- Required EPA, in consultation with the Attorney General and the heads of other appropriate federal agencies, to establish a central database under control of the federal government that provides the public with access to OCA information that they may read, but prevents electronic or mechanical reproduction of the information;
- Required the Attorney General (by August 5, 2002) to study current industry security practices and make appropriate recommendations to Congress to enhance site security and to provide (by August 5, 2000) to certain congressional committees an interim report on its findings; and
- Required owners/operators of stationary sources with Program Level 2 or 3 processes subject to the RMP rule on or before June 21, 1999, to convene a public meeting (between August 5, 1998, and February 1, 2000) to (1) describe and discuss the local implications of their RMPlans and present a summary of their OCA information and (2) provide (on or before June 5, 2000) a certification to the director of the FBI that such a meeting was held or, for small businesses, that the OCA information has been publicly posted. **Note:** The public meeting requirement did not apply to sources that have only Program 1 processes and did not apply to processes subject to the RMP rule after June 21, 1999.

On August 4, 2000,[12] EPA and the Department of Justice issued regulations

governing access to, and dissemination of, the OCA information in RMPlans. The main provisions of the rule are:

- Provides read-only public access, with proper identification, to OCA information through the establishment of at least 50 reading rooms geographically distributed across the United States and its territories;
- Allows the public to view the OCA information in the reading rooms for up to 10 facilities per calendar month located anywhere in the country, without geographical restriction;
- Allows any person to view OCA information for facilities located in the jurisdiction of the LEPC where the person lives or works and for any additional facilities with a vulnerable zone extending into that LEPC's jurisdiction;
- Requires EPA to provide Internet access to a computer-based indicator that shall inform any person located in any state whether an address specified by that person might be within the vulnerable zone of one or more stationary sources;
- Restricts the OCA information that may be accessed through the Internet to a subset of data that ***excludes*** the distance to the toxic or flammable endpoint for the worst-case and alternative release scenarios;
- Allows members of LEPCs, State Emergency Response Committees (SERCs), and any other state or local government official to convey to the public OCA data elements orally or in writing, as long as the data elements are not conveyed in the format of sections 2 through 5 of an RMPlan or any electronic database developed by EPA from those sections;
- Allows LEPCs, and related local government agencies to provide read-only public access to a paper copy of the OCA sections of RMPlans (with no limits on the number of stationary sources) for stationary sources within the jurisdiction of the LEPC and for any other stationary source that has a vulnerable zone that extends into that jurisdiction;
- Allows SERCs and related state government agencies to provide read-only public access to the OCA sections of RMPlans for the same stationary sources as the LEPC in whose jurisdiction a person lives a works;
- Allows EPA to provide OCA information, upon request, to federal government officials, and state and local government officials;
- Allows state or local government officials to provide OCA information for stationary sources within their state to other state or local government officials within their state or to officials in a contiguous state;
- Allows EPA to provide OCA information, including facility identification, to qualified researchers;
- Prohibits, with the exceptions noted above, federal, state, and local government officials and qualified researchers from disseminating OCA information and OCA rankings to the public or to state and local government officials; and
- Allows EPA to establish an information technology system, under the control of the federal government, that makes OCA information available to the public via a read-only format.

Subpart H specifies the EPA requirements for recordkeeping, availability of information to the public, the relationship of the RMP to air permits, and audits. Facilities must keep RMP records for at least 5 years. The RMPlan is to be made available to the public; however, government classified information is protected under law. For facilities with a Title V Parts 70 or 71 air permit, the RMP rule may be an "applicable requirement" under the air permit. However, coverage under the RMP rule does not necessarily mean that you must obtain an air permit. Moreover, the RMPlan is not a part

of the air permit itself. Facilities with air permits must revise them to include either (1) a certification that a complete RMPlan has been submitted or (2) a schedule for complying with RMP rule requirements.

Note: Confidential business information is protected under CAA §114(c) and 40 *CFR* Part 2. EPA has published amendments to the RMP rule[7] that discuss how confidential business information should be addressed in the RMPlan. See Appendix F of this Guide, §§68.151 and 68.152.

Note: Under CAA Section 112(l) and 40 *CFR* Part 63 Subpart E, a state or local agency may seek and be granted delegation as the implementing agency for the RMP rule. The implementing agency will review the RMPlans, select some RMPlans for audits, conduct onsite inspections, and initiate enforcement activities. The implementing agency may also promulgate requirements that are more stringent than the federal RMP rule requirements. If your state has been granted delegation, it is important that you contact them to determine if the state has requirements other than those presented in 40 *CFR* Part 68. As of February 10, 2000, the following states/local agencies have indicated that they are seeking delegation:

California; Delaware; District of Columbia; Hawaii; Kentucky; Louisiana; Nevada; New Jersey;
North Carolina; Rhode Island; North Carolina; and Allegheny County, PA

The following states/local agencies have been granted delegation of the RMP rule:

Florida (except propane); Georgia; Mississippi; Ohio; South Carolina; Puerto Rico; U.S. Virgin Islands; Jefferson County, KY; and Forsyth County, NC

Check with your EPA Regional contacts for a current list of states granted or seeking delegation.

Note: CAA Section 113 specifies the penalties for noncompliance with and inaccurate reporting of information required by the RMP rule (40 *CFR* Part 68). Section 113 provides for both civil and criminal actions. EPA may assess civil penalties of up to $27,500 per day per violation. Anyone who knowingly violates the RMP rule may also be subject to no more than 5 years in prison; anyone who knowingly files false information may be subject to no more than 2 years in prison. Additional civil and criminal penalties are discussed in the statute.

1.3 DESCRIPTION OF COMMON REFINERY PROCESSES/ACTIVITIES

The following is a brief description of the processes and activities found in many petroleum refineries. This is not meant to be an exhaustive compilation of refining technology and operating configurations. Rather, the various classes of processes and uses of toxic and flammable substances are simply used to form the basis for the compliance examples and suggestions found in the remaining chapters.

Refineries process crude oil to produce high quality products. Processing units separate, react, and upgrade raw crude oil into gasoline, distillate, and asphalt products, as well as important by-products such as propane (or other light ends products), sulfur, and fuel products (e.g., coke). The products are transported using a variety of means. Commonplace refinery processes and support systems include:

- Raw Material Receiving and Feedstock Storage and Transfer
- Atmospheric and Vacuum Crude Oil Distillation
- Fluidized Catalytic Cracking
- Catalytic Reforming
- Catalytic Hydrocracking or Hydrorefining
- Catalytic Hydrotreating

- Thermal Processes
- Alkylation, Polymerization, and Dimerization
- Aromatics and Isomerization
- Oxygenates
- Light Ends Recovery
- Product Treating
- Sulfur Recovery
- Process Water Treatment
- Corrosion Inhibitors or Chemical Additives
- Cooling Water Systems and Towers
- Hydrogen Recovery or Production
- Fuel Systems
- Other Utilities (steam, nitrogen, etc.)
- Finished Product Storage and Transfer

A variety of crude oils are received from pipelines, ground transportation containers (e.g., tank trucks), and marine transportation containers (e.g., tankers) into dedicated tankage in the tank farm.

Note:	Remember that transportation and storage incident to transportation are not covered by the RMP rule. Refineries must decide where to draw the boundary between refining processes (stationary source) and transportation (i.e., regulated by the U.S. Department of Transportation [DOT]).

Crude oils are blended to provide the desired product quality and yields, and the crude oil blend is pumped to the Atmospheric and Vacuum Crude Oil Distillation Unit as feed.

Intermediate products (products from one process that are feedstocks to another process) are also stored in the tank farm. Intermediate products range from a mixture of propane/propylene/butane/butylene to residuum. These intermediate streams are generally processed at units in the refinery; however, these streams can be sold and moved out of the refinery using pipelines, ground transportation, or marine transportation. In addition, intermediates can be purchased and received from pipelines, ground transport containers, or marine transport containers.

Other chemicals and process unit feedstocks (e.g., caustic, methanol) can be stored within specific process unit boundaries or in the tank farm, depending on the quantity needed in inventory and the number of users. These chemicals and feedstocks are generally received by ground transport containers; in certain instances the chemicals and feedstocks are received into the refinery via pipelines. In addition, some support streams (e.g., fuel gas, hydrogen) or utilities (e.g., nitrogen) may be received into or exported from the refinery via pipelines.

These refining process descriptions and activities are used in the remaining chapters of this Guide.

2 Determining RMP Coverage at a Refinery

The EPA RMP rule affects refineries engaged in the processing of naturally occurring hydrocarbons. The RMP rule covers facilities that have more than a threshold quantity (TQ) of regulated toxic and flammable substances present. Regulated flammable substances as heavy as pentane and several regulated toxic substances (e.g., ammonia, chlorine, hydrogen fluoride, hydrogen sulfide [H_2S]) can be present in typical refining processes or associated with utility systems. A refinery may find that few processes are exempt from coverage. Transportation and storage incident to transportation are exempt from the RMP rule.

Note: EPA has specifically exempted transportation containers that remain connected to the motive power that delivered them to the plant site. For example, a tanker truck delivering hydrogen fluoride to the plant site is exempt from the RMP rule, provided that the truck remains connected to the tank trailer while at the plant site. However, railcars are typically disconnected from the train engine following delivery and may be subject to the TQ determination.

Note: Transportation containers that have been unhooked from the motive power that delivered them to the site (e.g., truck or locomotive) and left on the site for temporary storage may or may not be considered as part of the stationary source. Owners/operators should make a reasonable determination based on site-specific circumstances. For example, if the railcars are parked on a private siding where they are used as storage tanks until they are connected to a process, then the railcars should be considered part of the stationary source. On the other hand, if your site is serving as a short-term way station for railcars that are never connected to a process, then the railcars should probably not be considered part of the stationary source.

The rule does not say that you *must* consider all transportation containers unhooked from motive power to be part of the stationary source. It actually says the converse: transportation containers still hooked to motive power are not considered part of the stationary source. This does not necessarily imply that all transportation containers unhooked from motive power automatically become part of the source. Note that the preamble to the January 6, 1998, rule amendment states: "EPA believes that a railroad tank car containing a regulated substance *could* be considered a stationary source or part of a stationary source, even though the tank car is 'suitable for transportation'." Since the statement uses the word *could*, instead of *shall, must, or should*, it implies that in some circumstances, a railroad tank car (not hooked to motive power), and therefore other transportation containers, may or may not be considered part of the stationary source. If it is hooked to motive power, the answer is clear - it is not part of the source. If it is *not* hooked to motive power, then the owner/operator of the facility must make a reasonable determination as to whether or not it is part of the stationary source.

Note: API intends to work with EPA to determine how the RMP prevention program requirements may be implemented on transportation containers (i.e., railcars disconnected from motive power) that may be subject to the RMP rule.

Issue: On May 26, 1999, EPA published in the *Federal Register* (64 *FR* 28705) a notice of a proposed settlement agreement reached with the Chlorine Institute.[10] The settlement agreement clarifies EPA's interpretation of CAA 112(l) and 112(r)(11) as they relate to DOT requirements under the Federal Hazardous Materials Transportation Act. States that take implementation of 112(r) will be prohibited from passing laws that are more stringent than DOT regulations in relation to the RMP rule. Therefore, states may not require more stringent standards for tank cars. This settlement agreement is awaiting finalization pursuant to Section 113(g) of the CAA.

The first step to determining RMP coverage at a refinery is to determine whether the subject refinery operations constitute a stationary source. Next, the owner/operator should determine whether the facility processes contain any RMP-regulated substances. Then, the facility should estimate the inventory of regulated substances in each potentially covered process. Some substances/uses in a facility are exempted by EPA from TQ

determination. Finally, the process inventory of regulated substances should be compared to the TQ for the substance to establish which processes are covered by the RMP rule.

The following sections outline each of these steps. For more information on RMP coverage assessment, consult the CMA/API *RMP Compliance Guideline*.[17]

Note: EPA has previously made several changes to the regulatory language concerning exemptions and certain definitions that may affect coverage assessment at refineries and gas plants. Before finalizing your assessment of RMP coverage, check to make sure that you have the latest information on the EPA RMP list rule and other regulatory developments that could affect refining processes. API intends to revise this Guide as conditions warrant.

2.1 IDENTIFYING CANDIDATE REFINING OPERATIONS SUBJECT TO RMP RULE COVERAGE

Refining operations begin at the feed storage tanks or pipelines on the refinery property. Some of these facilities and operations may be exempt from the RMP rule because of two types of exemptions: (1) exemptions from consideration as a stationary source covered under the RMP rule and (2) exemptions from considering regulated flammable substances in TQ calculations. Operations at a refinery involving regulated flammable substances in naturally occurring hydrocarbon streams prior to processing in refining units are exempt from the RMP rule (e.g., crude oil and condensate storage tanks).

Note: Transportation and storage incident to transportation are not covered by the RMP rule. However, DOT is presently undertaking rulemaking to clarify what activities it considers to be "in the transportation process."

2.2 IDENTIFYING REGULATED SUBSTANCES IN REFINING PROCESSES

Once candidate refining operations that comprise the stationary source are determined, the next step is to identify regulated substances in the refining processes. Refineries operate a variety of processes involving flammables and some regulated toxic substances. The refinery should develop a list of regulated substances used in each process area and determine a rough estimate of the inventory of the substance in the process. If the refinery documented its technical basis for coverage under OSHA's PSM regulation, this information may already exist. Then, the refinery should examine the regulated substances it has and compare the process inventory estimates to the EPA TQs. Table 2-1 contains examples of common refining processes and support systems and the types of regulated substances that may be present.

Table 2-1
Common Refining Processes, Possible Regulated Substances, and RMP Coverage Issues

REFINERY PROCESS OR SYSTEM CATEGORY	POSSIBLE REGULATED SUBSTANCES HANDLED	COVERAGE/APPLICABILITY ISSUES
Raw Material, Receiving Feedstock, and Storage and Transfer Examples include: • Crude oil tankage • Intermediate product tankage • Methanol • Other chemicals (toxics)	Potential to have H_2S in sour crude. Many atmospheric storage tanks could contain listed flammables in excess of 1 wt%; however, the mixture would also have to meet National Fire Protection Association (NFPA) 4 criteria	Regulated flammable substances in crude oil are exempt prior to processing in the refinery. Only mixtures containing greater than 1 wt% of a regulated flammable substance that meets NFPA 4 criteria are considered in determining whether a threshold quantity of a flammable is present

Table 2-1 (cont'd)
Common Refining Processes, Possible Regulated Substances, and RMP Coverage Issues

REFINERY PROCESS OR SYSTEM CATEGORY	POSSIBLE REGULATED SUBSTANCES HANDLED	COVERAGE/APPLICABILITY ISSUES
Atmospheric and Vacuum Crude Oil Distillation Example processes include: • Crude unit • Vacuum units • Asphalt production	Potential to have H_2S in gas streams. Light hydrocarbons (methane, ethane, propane, etc.) and hydrogen in gas streams	Light hydrocarbons may be recovered in other processes and the quantity of light hydrocarbons in these units may not meet the threshold quantity requirements. H_2S will likely not exceed the threshold quantity
Fluidized Catalytic Cracking	Potential to have H_2S in gas streams. Light hydrocarbons (methane, ethane, propane, butane, pentane, etc.) in gas streams and/or recovered as separate products or feedstocks	If a vapor recovery unit is part of this process, a threshold quantity of flammables will likely be present. H_2S will likely not exceed the threshold quantity
Catalytic Reforming Example types of processes include: • Semiregenerative • Cyclic • Continuous regeneration	Could have some light hydrocarbons in the feed (butane, pentane). Hydrogen is used as a feed material. May produce light hydrocarbon products such as methane and ethane in streams that go to the fuel gas system. Also, may produce propane and/or butane as separate products or feedstocks	Could have a threshold quantity of light hydrocarbons if propane and butane are products
Catalytic Hydrocracking and Hydrorefining Example types of processes include: • Distillate upgrading • Residuum upgrading • Lube-oil manufacturing • Distillate desulfurization • Gas oil desulfurization • Residuum desulfurization	H_2S in gas streams. May produce hydrogen and light hydrocarbon products such as methane and ethane in streams that go to the fuel gas system. Also, some units may have vapor recovery equipment that separates propane and butane into products or feedstocks	If a vapor recovery unit (saturate gas plant) is part of this process, a threshold quantity of flammables will likely be present. H_2S may exceed the threshold quantity if operating pressures are high
Catalytic Hydrotreating Example process units include: • Naphtha desulfurization • Aromatics saturation • Reforming or catalytic cracking feed pretreatment	H_2S in gas streams. Hydrogen is used as a feed material. May produce some light hydrocarbons such as methane and ethane	H_2S will likely not exceed the threshold quantity because of fairly low operating pressure
Thermal Processes Example process units include: • Thermal cracking • Fluid coking • Delayed coking • Visbreaking	Potential to have H_2S in gas streams. Light hydrocarbons (methane, ethane, propane, etc.) in various streams, possibly separated or recovered as individual products	H_2S will likely not exceed the threshold quantity because of fairly low operating pressure. If a vapor recovery unit (saturate gas plant) is part of this process, a threshold quantity of flammables will likely be present

Table 2-1 (cont'd)
Common Refining Processes, Possible Regulated Substances, and RMP Coverage Issues

REFINERY PROCESS OR SYSTEM CATEGORY	POSSIBLE REGULATED SUBSTANCES HANDLED	COVERAGE/APPLICABILITY ISSUES
Alkylation, Polymerization, Dimerization Example process units include: • Sulfuric acid • Hydrofluoric acid • Polymerization • Dimerization	Hydrofluoric acid. Light hydrocarbons (propylene, butane, butylene, isobutane, etc.) processed in these units	Sulfuric acid is not a listed substance for the EPA RMP rule. A threshold quantity of flammables will almost certainly be present
Aromatics, Isomerization Example process units include: • BTX • Hydrodealkylation • Cyclohexane • Cumene • Isomerization	Listed flammables (butane, pentane) in isomerization processes	A threshold quantity of flammables will likely be present in the isomerization processes
Oxygenates Example process units include: • MTBE • ET • BETAME	Listed flammables (isobutylene, other butanes or butylenes) in MTBE or ETBE feed. Potential for listed flammables (butane, pentane) in TAME feed	Ethanol and methanol are not listed flammables, and ETBE, MTBE, and TAME are not classified as NFPA 4 fire hazards. A threshold quantity of hydrocarbons (isobutylene, other butanes or butylenes) will likely be present
Light Ends Recovery Example process units include: • Vapor recovery units • Cryogenic units • Gas condensation units	Light hydrocarbons (propane, butane, etc.) recovered as products in these units	A threshold quantity of flammables will almost certainly be present
Product Treating Examples process units include: • Jet fuel • Aromatic gasoline • Kerosene • Diesel • Propane • Butane	Light hydrocarbons (propane, butane, etc.) processed in specific treaters	Distillate treaters (kerosene, diesel, etc.) are not likely to meet NFPA 4 criteria and may qualify for exclusion. For example, light distillates are unlikely to contain greater than 1% by weight of a regulated flammable substance
Sulfur Recovery Example process units include: • Lean and rich amine • Thermal reactor • Tail gas units • Sour water strippers	H_2S in the amine regenerator off-gas. H_2S in sulfur recovery units (thermal reactors, tail gas units, etc.)	Ammonia and H_2S may be contained in the strippers, but may not be present in a sufficient concentration to invoke coverage by the RMP rule. **Note:** H_2S that is absorbed in rich amine is not counted in the TQ determination (see Section 2.3 of this Guide)
Process Water Treatment	Possibility of ammonia for biological purposes	Anhydrous and aqueous ammonia are listed in the RMP rule

Table 2-1 (cont'd)
Typical Refining Processes, Possible Regulated Substances, and RMP Coverage Issues

REFINERY PROCESS OR SYSTEM CATEGORY	POSSIBLE REGULATED SUBSTANCES HANDLED	COVERAGE/APPLICABILITY ISSUES
Corrosion Inhibitors or Chemical Additives	Possibility of aqueous ammonia for a corrosion inhibitor. Possibility of various chemicals (toxics) used in cleaning or neutralizing equipment	Review toxics list and the corresponding threshold quantities
Cooling Water Systems and Towers	Possibility of chlorine used to control biological growth in the cooling water system	A single 1-ton cylinder is subject to OSHA PSM. The RMP threshold quantity is 2,500 pounds; two cylinders would be necessary to be covered
Hydrogen Recovery or Production Example processes include: • Steam methane reforming • Steam naphtha reforming • Pressure swing adsorption • Cryogenic • Membrane	These units are likely to have light hydrocarbons (methane, ethane, etc.) as part of the feed. Hydrogen is produced or recovered as a product	Hydrogen is a listed flammable
Fuel Gas Systems • Self-produced • Purchased	Light hydrocarbons (methane, ethane, propane, etc.) in fuel gas; H_2S in sour fuel gas streams	May be covered if not used solely as a fuel in processes not otherwise RMP-covered (see Issue box below). A threshold quantity of listed flammables may be present in the fuel system
Other Utilities • Steam • Electricity • Nitrogen • Air	These systems should not contain a listed toxic or flammable	Consider whether to include equipment connected to covered processes (e.g., boilers, nitrogen used for inert blanketing). Where is the process boundary?
Finished Product Storage and Transfer • Storage of products • Pipeline movements • Barge or ship loading/unloading • Railcar loading/unloading • Tank truck loading/unloading	Light hydrocarbons (propane, butane, pentane, etc.) stored and transferred. Transportation modes may include pipeline, liquefied natural gas (LNG) vessels, rail cars, and tank trucks	Gasoline ready for use in internal combustion engines is exempt. Individual gasoline component tanks may be exempt based on not meeting NFPA 4 criteria

Note: Some facilities may also use regulated materials (e.g., ammonia or propane) as refrigerants in refrigeration systems associated with other processing units (e.g., hydrogen or CO_2 plants). The quantity of regulated materials in the refrigeration systems may need to be considered in the TQ determination.

2.3 DETERMINING PROCESS INVENTORY OF REGULATED SUBSTANCES

Based on the information regarding which regulated substances exist in refining processes at stationary sources, the next step is to estimate the process inventory for each regulated substance. In most cases, refineries may use the definition for processes that they used in determining coverage under OSHA's PSM regulation as a starting point.

Note: EPA and OSHA both interpret the definition of process to mean that separate vessels that are not interconnected and that are located sufficiently far from each other and other covered processes, such that a failure in one vessel is unlikely to affect the other(s), may be treated as separate processes. In the preamble to the RMP rule, EPA clearly stated its intent to be consistent with OSHA's interpretation of "process" as that term is used in OSHA's PSM rule. Therefore, if your facility is subject to the PSM rule, the limits of your process(es) for purposes of OSHA PSM will be the limits of your process(es) for purposes of RMP (except in cases involving atmospheric storage tanks that contain flammable regulated substances, which are exempt from PSM but not RMP).

Note: Determining interconnection of vessels is not necessarily straightforward and will often depend on site-specific factors. The rule is driven by a concern for the potential to release at least a threshold quantity of a regulated substance. For a large refinery or multiunit chemical plant, determining whether an interconnection exists and defining the boundaries of a process will require engineering judgment. For example, if vessels containing regulated substances are connected by only utility lines (e.g., piping carrying cooling water), you will have to determine whether the vessels could be involved in a single release.

In cases where you have a series of collocated vessels, some with regulated substances and others without regulated substances, the question you will need to answer is whether there is a credible scenario involving any of the vessels or piping that do not hold a regulated substance that could result in a release of the regulated substances from vessels containing them. If an explosion of a vessel without regulated substances could lead to such a release, then the entire series of vessels is considered a single process. If a fire or explosion of the vessels without regulated substances would not lead to a release from all the vessels with regulated substances (e.g., because they are widely separated), then the vessels with the regulated substance may be considered separate processes. Again, you should use engineering judgment to make a reasonable determination of the boundaries of such processes.

Issue: In many instances, refineries have adopted their OSHA PSM process boundaries as their process boundaries under the RMP rule. These refineries then submitted their process quantity information in the RMPlan for each of their process units, as opposed to treating the interconnected units as a single process. This approach may cause problems during an RMP audit if the refinery has:

- excluded certain process units from RMP rule coverage, particularly if the units contain RMP-regulated substances and the units are interconnected with process units that are claimed by the refinery to be subject to the RMP rule or
- applied reduced program level requirements (Program 1 or 2) to certain process units that are interconnected with process units that are claimed by the refinery as being subject to a higher program level (Program 3).

It is also possible that EPA (or the agency responsible for the enforcement of the RMP rule in your state or area) may indicate during an RMP audit that your refinery should be considered a single process, even though you have not excluded any process units from RMP coverage or applied different program level requirements to interconnected process units. In these instances, you may be requested by the enforcement agency to resubmit your RMPlan as if your refinery is a single process. In these circumstances, you would still have the option of presenting the prevention program information in the RMPlan on a unit-by-unit basis (see Section 7.2 of this Guide for further guidance on completing the prevention program section of the RMPlan).

The RMP rule requires that the maximum intended inventory of each regulated toxic material, flammable material, or flammable mixture in each RMP-covered process be reported in the RMPlan. Table 2-2 summarizes the process inventory information that must be included in the registration section of the RMPlan for each RMP-covered process.

Table 2-2
Process Inventory Information Required to Be in the RMPlan for Each Covered Process

Chemical Information for Regulated Toxic Materials/Mixtures or Pure Flammable Materials	Chemical	CAS Number	Quantity (lb)
Chemical Information for Regulated Flammable Mixtures	RMP Flammable Chemicals in the Mixture		Total Quantity of the Flammable Mixture (lb)

As illustrated in Table 2-2, for regulated toxic materials/mixtures and pure flammable materials, the chemical name, the Chemical Abstract Service (CAS) number, and the maximum intended inventory of the pure substance should be entered in the RMPlan. For regulated flammable mixtures, the names of the RMP-regulated flammable materials in the mixture and the ***total mixture mass (including regulated and nonregulated material masses in the mixture)*** should be entered in the RMPlan. The total quantity of the regulated toxic materials, flammable materials, or flammable mixtures in the process must only be specified to two significant figures (e.g., 5,200,000 lb, not 5,153,200 lb).

The RMPlan does not require a specification of mass fractions for the toxic materials or the individual RMP-regulated flammable materials in a flammable mixture. However, a crude estimate of the mass fractions of RMP-regulated materials ***and*** the nonregulated materials is needed for the offsite OCA (see Section 4 of this Guide). In addition, the OCA will require estimates of the maximum inventories of RMP-regulated and nonregulated materials ***in the single largest vessels*** within the covered processes, accounting for applicable administrative controls.

In summary, the two types of inventory information required to be determined for RMP compliance are (1) process inventories (for the RMPlan) and (2) vessel inventories (for the OCA). Appendix G presents a worksheet that, if properly completed for each process, will contain enough information to satisfy process inventory and OCA information requirements for the RMP rule.

Many refining processes will likely contain greater than a TQ of a regulated flammable substance or mixture of substances. The basis for any exemption involving toxic or flammable mixtures must be documented. The following is a thought process that refinery personnel can use to quickly evaluate whether a process contains a TQ of a regulated substance.

Regulated Flammable Liquids in Vessels

1. Look at the largest liquid-filled vessel in the process. If it involves a pure substance, skip steps 2 and 3.
2. Determine if the mixture contains a regulated flammable substance at greater than 1% by weight. If not, then the mixture does not count toward the TQ determination.
3. Determine whether the mixture meets NFPA 4 criteria. If it does, proceed to step 4. If it does not meet the NFPA 4 criteria, then the mixture does not count toward the TQ determination. (Note: Listed regulated flammable substances meet the NFPA 4 criteria. See Section 2.4 of this Guide for a discussion of the NFPA 4 criteria.)
4. Determine the quantity of regulated flammables in the vessel. As a first cut, assume the vessel is 100% full. Or, determine the level based on administrative controls.
5. Compare to the TQ (i.e., 10,000 lb).
6. If the amount of mixture in the vessel is greater than 10,000 lb and the mixture meets NFPA 4 criteria, the process is covered. If the vessel contains less than 10,000 lb, record the amount of the NFPA 4 mixture and proceed to the next largest vessel containing the regulated substance.
7. Repeat these steps for all vessels containing flammable liquids in the process. If the total amount in the vessels is less than the TQ, consider adding in the amount in pipes if thought to be significant. Consider using a rule of thumb for the incremental amount contained in piping without having to do detailed calculations (e.g., add 20% of the total vessel inventory). Tables 2-3 and 2-4 give examples of the length of piping that will contain 10,000 lb of methane gas and liquid propane at various pressures. An example illustrating the calculation procedure follows the tables. This procedure can be adapted for use with other substances and other types of equipment (e.g., drums, tanks).
8. Repeat the approach for all of the regulated flammables in the process. (See Appendix A for the procedure for estimating the quantity of regulated flammable materials in columns/towers.)

Table 2-3
Pipe Length to Contain a Threshold Quantity (10,000 lb) of Methane Gas

		Nominal Pipe Size (Inside Diameter)						
Pressure	Density	1 inch 1.05 inch	2 inch 2.07 inch	3 inch 3.07 inch	6 inch 6.07 inch	12 inch 12.00 inch	24 inch 22.62 inch	36 inch 34.50 inch
100 psig	0.33 lb/ft^3	5,100,000 ft 960 miles	1,300,000 ft 250 miles	590,000 ft 110 miles	150,000 ft 29 miles	39,000 ft 7.3 miles	11,000 ft 2.1 miles	4,700 ft 0.89 mile
500 psig	1.55 lb/ft^3	1,100,000 ft 200 miles	280,000 ft 52 miles	130,000 ft 24 miles	32,000 ft 6.1 miles	8,200 ft 1.6 miles	2,300 ft 0.44 mile	990 ft 0.19 mile
1,000 psig	3.30 lb/ft^3	500,000 ft 96 miles	130,000 ft 25 miles	59,000 ft 11 miles	15,000 ft 2.9 miles	3,900 ft 0.73 mile	1,100 ft 0.21 mile	470 ft 0.09 mile

Table 2-4
Pipe Length to Contain a Threshold Quantity (10,000 lb) of Liquid Propane

		Nominal Pipe Size (Inside Diameter)						
Pressure	Density	1 inch 1.05 inch	2 inch 2.07 inch	3 inch 3.07 inch	6 inch 6.07 inch	12 inch 12.00 inch	24 inch 22.62 inch	36 inch 34.50 inch
200 psig	31.3 lb/ft^3	53,000 ft 10 miles	14,000 ft 2.6 miles	6,200 ft 1.2 miles	1,600 ft 0.30 mile	410 ft 0.077 mile	110 ft 0.022 mile	49 ft 0.0093 mile
500 psig	31.6 lb/ft^3	53,000 ft 10 miles	14,000 ft 2.6 miles	6,200 ft 1.2 miles	1,600 ft 0.30 mile	400 ft 0.076 mile	110 ft 0.021 mile	49 ft 0.0092 mile
1,000 psig	32.2 lb/ft^3	52,000 ft 9.8 miles	13,000 ft 2.5 miles	6,100 ft 1.1 miles	1,500 ft 0.29 mile	400 ft 0.075 mile	110 ft 0.021 mile	48 ft 0.0091 mile

Continue the coverage determination process until you determine whether the process contains a TQ amount for each regulated substance. If the process contains a TQ, consider continuing the calculation procedure to determine an appropriate total process inventory (i.e., to two significant figures) of the regulated substance. This value is a required item in the RMP data elements.

Note: For regulated flammable substances in an NFPA 4 mixture, the RMP data elements will require an owner/operator to specify the total quantity (in lb) of the NFPA 4 mixture in the process and the specific regulated flammable materials that are in the mixture. However, the mass fractions of the regulated materials in the mixture will not be required in the RMP data elements.

Note: The inventories of regulated flammable materials or mixtures and toxic substances in each vessel will be needed when determining the worst-case scenarios for the offsite consequence analyses for the covered processes (see Section 4 of this Guide).

For situations involving gases, consider using an ideal gas law approximation assuming the lowest temperature and highest pressure that exist in the process.

Example: Given 10,000 lb of pure methane at 68°F and 1000 psig, determine the length of 1-in. piping (nominal diameter) required to contain the threshold quantity of 10,000 lb.

Methane Calculations

Threshold Quantity (TQ) 10,000 lb

Molecular Weight (MW)

$$16.043 \frac{\text{lb}}{\text{lb - mole}}$$

Compressibility (Z)

Pressure / Temperature	986.1 psig	1319.7 psig
55.9°F	0.8700	0.8342
227.7°F	0.9010	0.8752

$Z = 0.8707$ at 68°F and 1000 psig (by interpolation)

Density (ρ)

$$\rho = \frac{MW \cdot P}{10.73 \cdot Z \cdot T}$$

$$= \frac{16.043 \frac{\text{lb}}{\text{lb - mole}} \cdot (1000 + 14.7)\text{psia}}{10.73 \frac{\text{ft}^3 \cdot \text{psia}}{\text{lb - mole} \cdot {}^{\text{o}}\text{R}} \cdot 0.8707 \cdot (68 + 459.7)\,{}^{\text{o}}\text{R}}$$

$$= 3.30 \frac{\text{lb}}{\text{ft}^3}$$

Volume to TQ (V)

$$V = \frac{TQ}{\rho} = \frac{10{,}000 \text{ lb}}{3.30 \frac{\text{lb}}{\text{ft}^3}} = 3{,}030 \text{ft}^3$$

Piping Calculations

Internal Diameter (*ID*) 1.05 in.

Cross-sectional Area (*A*)

$$A = \frac{\pi \cdot D^2}{4} = \frac{3.14 \cdot \left(\frac{1.05 \text{ in}}{12 \frac{\text{in}}{\text{ft}}} \right)^2}{4} = 0.006013 \text{ ft}^2$$

Length to TQ (*L*)

$$L = \frac{V}{A} = \frac{3{,}030 \text{ ft}^3}{0.00601 \text{ ft}^2} = 504{,}000 \text{ ft}$$

$L = 500{,}000$ ft (two significant digits)

Note: Gas-blanketed tanks such as coker feed, asphalt, vapor-recovered crude, and sour water tanks may contain enough flammable gas to trigger coverage by the RMP rule. Big crude units or cokers during air freeing activities may also trigger RMP coverage because of regulated flammable materials.

Note: In EPA's Question and Answer Database,[14] EPA has stated that if a stationary source contains two interconnected vessels, one containing 6,000 lb of pure butane and another containing 6,000 lb of pure propane, then the process comprising only the two vessels is not covered by the RMP rule. The amounts of different regulated substances present in a single process need not be aggregated to determine if the 10,000-lb TQ is exceeded.

However, if butane and propane are present in a mixture in the process, then the TQ determination must be calculated differently. Because a mixture of propane and butane would meet the NFPA 4 flammability criteria, the entire weight of the mixture needs to be treated as the regulated substance and added up to account for the TQ determination. If there are additional vessels in the process that contain pure butane and/or propane, the weight of the mixture should be added to both the weight of the remaining butane and the weight of the remaining propane to determine whether either the threshold for propane or butane has been exceeded [see §68.115(b)(2) of the RMP rule].

For example, if 1,000 lb of the 6,000 lb of propane are mixed with the 6,000 lb of butane to make a 7,000-lb mixture, then that 7,000-lb mixture would be treated as the regulated substance (both butane and propane) for threshold calculations. The 7,000-lb mixture would have to be added to the remaining 5,000 lb of pure propane, and the threshold for propane would be exceeded.

Regulated Toxic Substances

Refining processes involving regulated toxic substances should be examined in a similar manner. For many regulated toxic substances, determining if the process is covered is straightforward. If the substance is in a mixture, then some analysis will be necessary to determine if the mixture containing the substance meets EPA mixture rule criteria (i.e., 10-mm Hg partial pressure evaluated at operating conditions). In contrast to regulated flammables, the TQs for regulated toxics range from 500 lb to 20,000 lb.

For toxics that are not stored anywhere in the refinery, but that are present in many refinery process streams (e.g., H_2S), the TQ evaluation is more difficult. Refinery operators should look for TQ amounts of H_2S in the following process areas: amine treating units, sulfur units, high pressure hydroprocessing units, fluidized catalytic cracking units, and cokers. It is possible that no refinery process has enough H_2S in process equipment to be covered.

Refineries typically use amine solutions (MEA, DEA, MDEA, etc.) to absorb acid gases, including H_2S and carbon dioxide (CO_2) from various processes. H_2S and CO_2 are acid gases because when dissolved in an aqueous medium, they dissociate to form a weak acid. The amines are weak organic bases. The acid gas and the amine base will combine chemically to form an acid-base salt complex, thus removing the acid gas from the process stream. The amine containing the acid gases is called rich or fat amine. Since the salts formed are easily dissociated in a thermal regeneration process, the rich amine is typically sent to a regenerator to remove H_2S and CO_2. H_2S and CO_2 that are liberated after the addition of heat in the regenerator are sent for further processing. The lean amine (essentially free of acid gas) is returned to the process.

The oil and gas industry has traditionally characterized the H_2S (acid gas) loading in an amine stream as a weight percentage of the total stream mass (e.g., 2.5% H_2S in MEA). However, this does not mean that the amine stream contains 2.5 wt% of molecular H_2S. The weight percentage refers to the amount of molecular H_2S gas relative to the amine in the feed stream prior to contact and chemical absorption by the amine. The H_2S absorbed by the amine stream is no longer molecular H_2S, but rather forms an acid-base salt complex. The acid-base salt complex is not included in the TQ determination for H_2S.

Note: The first edition of this Guide suggested that amine streams contain molecular H_2S. Since the first edition of this Guide was published, numerous sources of literature[27-30] have been identified that indicate that molecular H_2S is not present in amine solutions, since the acid gas (H_2S) and the amine base combine chemically to form an acid-base salt complex. However, any unabsorbed molecular H_2S gas that may be present in the vapor spaces of vessels or pipes in amine treatment and regeneration systems should be included in the TQ determination. Other locations in a refinery where gaseous H_2S may be present include process streams upstream of the amine contactors, depropanizing equipment, flare systems, and sulfur recovery units.

H_2S dissolves in water by disassociating into ions. Therefore, molecular H_2S is not present in sour water. However, any unabsorbed H_2S gas that may be present in the vapor spaces of vessels or pipes in sour water systems should be included in the TQ determination.

Question II.36 in EPA's Question and Answer Database[14] indicates that RMP-regulated substances that are chemically bound in non-RMP-regulated substances (the example given by EPA is chlorine in sodium hypochlorite) and that are not present in elemental form are exempt from the TQ determination. This same reasoning should apply to H_2S chemically bound in amine and sour water solutions.

Table 2-5 gives examples of piping lengths at different operating pressures and line sizes that would contain a TQ (i.e., 10,000 lb) of H_2S in a propane stream containing 2.5% H_2S. This table can be used as a rule of thumb in determining whether a process is covered because of H_2S.

Table 2-5
Pipe Length to Contain a Threshold Quantity (10,000 lb) of Hydrogen Sulfide Gas (2.5 wt%) in a Propane Stream

		Nominal Pipe Size (Inside Diameter)						
Pressure	Density	1 inch 1.05 inch	2 inch 2.07 inch	3 inch 3.07 inch	6 inch 6.07 inch	12 inch 12.00 inch	24 inch 22.62 inch	36 inch 34.50 inch
100 psig	0.887 lb/ft^3	75,000,000 ft 14,000 miles	19,000,000 ft 3,700 miles	8,800,000 ft 1,700 miles	2,200,000 ft 430 miles	570,000 ft 110 miles	160,000 ft 31 miles	69,000 ft 13 miles
500 psig	3.979 lb/ft^3	17,000,000 ft 3,200 miles	4,300,000 ft 820 miles	2,000,000 ft 370 miles	500,000 ft 95 miles	130,000 ft 24 miles	36,000 ft 7 miles	15,000 ft 3 miles
1,000 psig	7.845 lb/ft^3	8,500,000 ft 1,600 miles	2,200,000 ft 410 miles	990,000 ft 190 miles	250,000 ft 48 miles	65,000 ft 12 miles	18,000 ft 4 miles	7,900 ft 2 miles

Note: Facilities should consider the piping from the time it enters the property and is no longer a transportation activity all the way through the battery limits for each process to determine whether a TQ of H_2S exists. This estimate should be based on an "at any one time" analysis, and not on total throughput.

Refineries should not forget to consider other utility systems that could contain regulated toxics such as anhydrous ammonia or chlorine.

2.4 CONSIDERING OTHER EXEMPTIONS

In addition to the RMP list rule contained in Subpart F of the RMP rule, other sections of the RMP rule offer a number of exemptions dealing with the form/use of the regulated substance. Most of these uses are not relevant to refining operations (e.g., janitorial service items, structural components, laboratory activities under qualified supervision). See the CMA/API *RMP Compliance Guideline*[17] for a detailed discussion of all of the RMP exemptions.

One type of exemption that is relevant to refineries is the way EPA addresses flammable mixtures. EPA's mixture rule for flammables states that processes containing a mixture with at least 1 wt% of a regulated substance may be covered if the entire mixture meets all of the criteria for NFPA 4 flammables. The definition for an NFPA 4 flammable material given in NFPA publication 704[31] is:

> *Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and that will burn readily. This includes:*
> - *Flammable gases*
> - *Flammable cryogenic materials*
> - *Any liquid or gaseous material that is liquid while under pressure and has a flash point below 73°F (22.8°C) and a boiling point below 100°F (37.8°C) (i.e., Class IA flammable liquids)*
> - *Materials that will ignite spontaneously when exposed to air.*

Note: EPA states in an amendment to the RMP list rule[21] that the boiling point and flash point should be defined and determined in accordance with NFPA 30 *Flammable and Combustible Liquids Code*.[32] In NFPA 30, the boiling point is defined as the 20% evaporated point of a distillation performed in accordance with ASTM D 86.

Note: Material safety data sheets (MSDSs) generally list the NFPA flammability category for a hazardous material and can, therefore, be useful in determining if a flammable substance meets the NFPA 4 criteria. However, it is possible that some MSDSs may not be up-to-date in their NFPA categorization of a flammable mixture. The previous version of NFPA 30 defined the boiling point as the 10% evaporated point of a distillation performed in accordance with ASTM D 86, as opposed to the newer revision that uses the 20% evaporated distillation point. It is possible that NFPA categorizations based on the old definition of boiling point may indicate that a flammable mixture is NFPA 4 when in fact it is NFPA 3 based on the newer boiling point definition. For flammable mixtures that have MSDS boiling points that are close to 100 °F, facilities may consider reviewing the basis for the reported boiling point to determine if the 20% evaporated distillation point would be greater than or equal to 100 °F. This may lead to some flammable mixtures (e.g., gasoline blending components or intermediates) being exempt from the TQ determination.

Another exemption of possible significance to refineries is the exemption for substances in gasoline ready for use in internal combustion engines (finished gasoline).

2.5 ESTABLISHING COVERED PROCESSES

Once stationary source processes have been identified, process inventories of regulated substances have been estimated, and substance- and use-specific exemptions have been considered, refineries should compare the process inventory of the regulated substance to the TQ for each substance. Processes that exceed the TQ for a regulated substance at any time are subject to the RMP rule.

Note: Although not required by the rule, consider documenting the technical basis for all covered processes. In addition, consider documenting (1) the process inventory estimates that show that a process does not exceed the TQ for RMP-regulated substances and (2) all of the reasons that a process/activity is exempt from the rule.

Note: Refinery operators should be aware that TQs of regulated substances can exist during maintenance and shutdown activities in otherwise uncovered process equipment. For example, a contractor could bring into a refinery a regulated toxic for use in cleaning or maintaining equipment (e.g., use of anhydrous ammonia in hydrocrackers and use of chlorine for conditioning of catalytic reformers during startup). If a TQ exists during these times, then the process equipment is covered under the RMP rule.

3 RMP Program Levels and Management System

The RMP rule requires facilities to assign covered processes to one of three RMP program levels (§68.10). EPA specifies eligibility criteria and compliance requirements for each Program Level. EPA also requires, for Program 2 and 3 processes, that the facility establish a management system to oversee the implementation of the RMP. The following sections discuss EPA's RMP Program Level and management system requirements. However, since refinery processes are covered by the OSHA PSM regulation, this section does not go into depth regarding Program 2. Readers desiring more detailed information about Program 2 requirements should review the CMA/API *RMP Compliance Guideline*.[17]

3.1 PROGRAM LEVEL ELIGIBILITY CRITERIA

EPA has established three RMP program levels. Each covered process in the refinery should be assigned to a particular program level. Program 1 is a less detailed RMP for those processes that have a low potential for offsite effects. Program 3 is the "full RMP" level for processes that are not eligible for Program 1 but that are (1) covered by OSHA's PSM regulation or (2) associated with one of ten "targeted" NAICS codes. Program 2 is a "streamlined" RMP for all other processes not assigned to Program 1 or 3.

Program 1 eligibility criteria are as follows:

- The process has not had an accident in the past 5 years involving a regulated substance that resulted in an offsite death or injury or involved an offsite environmental response or restoration activity of an environmental receptor

Note:	Only accidents with qualifying effects involving the regulated substance that caused the process to be covered must be considered for Program 1 eligibility.

Note:	The RMP rule defines an "environmental receptor" as a natural area such as a national or state park, forest, or monument; an officially designated wildlife sanctuary, preserve, refuge, or area; and a Federal wilderness area. All of these areas can be identified on U.S. Geological Survey maps.

Note:	According to EPA's general RMP guidance document,[15] response or restoration activities may include the following: — collection and disposal of dead animals and contaminated plant life — collection, treatment, and disposal of soil — shutoff of drinking water — replacement of damaged vegetation — isolation of a natural area due to contamination associated with an accidental release

Note:	The accident history criteria for satisfying the Program 1 requirements are a subset of the criteria for reporting accidents in the 5-year accident history. The Program 1 criteria are limited to accidents resulting in offsite deaths or injuries or response or restoration of an environmental receptor. The 5-year accident history reporting requirements include a broader spectrum of events (see Section 4.7 of this Guide). Therefore, a Program 1 process may have incidents that satisfy the 5-year accident history reporting criteria.

- The WCS endpoint distance for the process does not reach the nearest public receptor

Note: For most facilities, the meaning of the definition of public receptor is straightforward. If you restrict access to your property at all times, public receptors are any occupied buildings or public gathering areas beyond your boundaries. Access restrictions include precautions such as a fully fenced site, security guards on duty at a reception area, or ID badges necessary to gain entry. If you have unrestricted sections of your site that are predictively used as a public gathering area (e.g. ball fields or picnic areas), then these would also be considered public receptors. Neighboring businesses, whether commercial or industrial, are considered public receptors, as are marinas and airport terminals, public and private parking lots, golf courses, transit stations, and toll booth plazas for roads and bridges

Just because an area is off site does not necessarily mean it is automatically a public receptor. Some offsite areas such as public roads and bridges are definitely not considered public receptors. For other areas, you need to make a reasonable determination as to whether the public is known or likely to inhabit or occupy an offsite area. For example, a facility located in a remote mountainous area surrounded by unimproved forest might reasonably determine that the surrounding land is not a public receptor, even if it is infrequently traversed by hunters or fishermen. On the other hand, if your remote facility borders a state or national park, public gathering areas on that park such as the campground, picnic area, or pavilion would be considered public receptors. If you are in doubt about whether or not to consider certain areas around your facility as public receptors, you may want to consult with local emergency planning officials, local or state authorities, or your implementing agency for guidance on whether or not such areas should be considered as public receptors.

- The facility must have coordinated emergency response procedures with the local emergency planning and response organizations

Processes that are not eligible for Program 1 are placed either in Program 2 or Program 3. A covered process that does not qualify for Program 1 is in Program 3 if it is covered by OSHA's PSM regulation or if it is associated with one of ten "targeted" NAICS codes.

Note: EPA has established NAICS Code 32411 - Petroleum Refineries as one of the high hazard codes. It is unlikely that a refinery will have a process that is Program 2 because most refining processes are covered by OSHA's PSM.

Issue: OSHA is considering a proposal to add the toxic chemicals that are subject to the RMP rule to the list of toxic chemicals subject to the PSM standard. Since this would expand the scope of toxic substances subject to the PSM standard, this could impact the program level assigned to a process (i.e., could change the program level for a process from Program 2 to Program 3). As of August 31, 1999, OSHA had not yet published any formal proposed rulemaking on this issue. To track progress of this issue, consult OSHA's Internet web site at the following address: http://www.osha.gov/index.html.

3.2 ASSESSING PROGRAM LEVEL STATUS FOR REFINERY PROCESSES

Based on an assessment of RMP coverage at a refinery, the company should assign each RMP-covered process to an RMP program level. Some refining processes may be eligible for Program 1 status. Most other RMP-covered processes in a refinery will likely be Program 3 since these processes are typically already covered under OSHA's PSM regulation.

Refinery processes covered under OSHA's PSM standard will already have a prevention program in place. Others not covered by OSHA PSM adhere to consensus codes and standards and have many, if not all, of the Program 2 requirements already in place. Therefore, refinery operators should carefully evaluate the advantages and costs of achieving Program 1 for eligible processes. Table 3-1 compares the advantages and disadvantages of Program 1 versus Program 2 or 3.

Table 3-1
Program Level Considerations

Applying Program 1	Applying Program 2 or 3
– Must submit a worst-case release scenario	+ May not require a worst-case release scenario for this process because of scenarios for other processes
+ Does not require alternative release scenarios	– May require an alternative release scenario
+ No additional prevention program requirement beyond a general duty to operate safely	+ If covered by OSHA PSM, no additional prevention program requirements
+ No management system requirements	+ If there are other Program 2 or 3 processes, additional management system burden is minimal
+ Decreased data element requirements in the RMPlan	– Increased data element requirements in the RMPlan
– Requires certification that no additional measures are necessary to prevent offsite impacts from accidental releases	+ No additional certification required
– Must revise and update the RMPlan if changes make the process ineligible for Program 1	+ No requirement to revise and update the RMPlan if Program 1 eligibility changes
+ No additional state requirements associated with higher program levels	– Increased state requirements in some states (e.g., required seismic impact study for Program 2 or 3 processes in California)
+ Decreased regulatory liability (liable only for Program 1 requirements)	– Increased regulatory liability (fines related to Program 2 or 3 requirements could be imposed)

Positive factors are indicated by a "+" sign, and negative factors are indicated by a "–"sign.

Note: One effective strategy is to classify and register processes in the lowest program level for which they are eligible. However, because a facility may have processes under different program levels, administration of multiple RMPs may be difficult. To facilitate administration, the facility may choose to implement and manage all processes under the most stringent program level for internal purposes only. Applying consistent policies and procedures to all covered processes may reduce the administrative burden as well as enhance the effectiveness of these programs. Registering processes under the lowest eligible program level limits the regulatory compliance burden for the facility.

Refineries that determine that the benefits of Program 1 status outweigh the costs may be able to minimize their regulatory compliance exposure, and they may decide to pursue Program 1 status for qualifying processes. The following are some screening steps that should be considered when assessing program level status:

1. Look at the accident history for the covered process. If the process has had an offsite-effect accident in the last 5 years and waiting until the 5-year period elapses before submitting the RMPlan is not an option, then the process cannot qualify for Program 1 status for the initial submission of the RMPlan.

2. Examine the largest vessel and piping inventories in the process unit. If the process uses only regulated flammable substances, the WCS endpoint distance may not extend far beyond the property boundary and may not affect a public receptor. However, if a refinery has more than a TQ of a regulated toxic in a covered process, the WCS endpoint distance is likely to extend beyond the property boundary and reach public receptors unless the refinery is distant from the community.

Note: Refineries that do not have the more volatile toxics or that have relatively small quantities above the TQ should consider performing a WCS analysis to verify Program 1 status. If the process does not qualify for Program 1 (i.e., the endpoint distance reaches the nearest public receptor), the WCS results can be retained for use in complying with the hazard assessment requirements.

3. Finally, as required by Program 1, the refinery should ensure that response actions have been coordinated with local emergency planning and response personnel.

Note: Even if a refinery determines that a particular process qualifies for Program 1, if the process is already PSM-covered, it may not be efficient to establish and maintain the Program 1 status. In some cases, local issues may influence a refinery to address all RMP-covered processes as Program 3 processes for convenience.

Refineries should monitor the RMP program level status of covered processes. If a change occurs that alters the program level of the process, then the refinery must update and resubmit its RMPlan within 6 months (see Section 7 for additional requirements).

Note: Refineries with RMP-covered processes should consider modifying their management of change and capital project review systems to identify potential refinery changes that could affect the RMP program levels of existing covered processes.

Refineries should also consider modifying their accidental release accounting system to include a "flag" that indicates if a specific accidental release affects the RMP program level of an existing covered process.

3.3 ESTABLISHING AN RMP MANAGEMENT SYSTEM

EPA requires the owner or operator of a stationary source with processes subject to Program 2 or Program 3 to develop a management system to oversee the implementation of the RMP elements (§68.15). Specifically, a facility must assign a qualified person or position that has the overall responsibility for the development, implementation, and integration of the RMP. When responsibility for implementing individual requirements of this part is assigned to more than one person, then the facility must document the names or positions of these people and the lines of authority through an organization chart or similar document.

Note: EPA does not specify the level of detail of the RMP management system. Refineries should consider the essential features of management systems as outlined in appropriate industry guidelines (e.g., Center for Chemical Process Safety's [CCPS's] *Plant Guidelines for Technical Management of Chemical Process Safety*[33]). Another option is for companies to consider using the system already in place for OSHA PSM implementation. In any case, EPA allows facilities to base the specific details of their RMP management systems on site-specific conditions.

Note: EPA does not specify criteria for what a "qualified" person is who could be in charge of the RMP management system. Each refinery should decide who the best individual is for the job.

Note: EPA does not require facilities to have a management system for Program 1 processes. However, if a refinery has both Program 1 and Program 2 or 3 processes, then the refinery may want to consider including the Program 1 process under its RMP management system. This could be an efficient way to "manage" and ensure that the process continues to meet the Program Level 1 eligibility criteria.

4 RMP Rule—Hazard Assessment

This section focuses on the process of performing a hazard assessment (as required in Subpart B of the RMP rule) for covered processes at a typical refinery and the hazard assessment information that must be provided in the RMPlan. A hazard assessment consists of (1) performing an offsite consequence analysis (OCA) and (2) compiling a 5-year accident history.

Performing an OCA involves selecting candidate accident scenarios (i.e., toxic releases, fires, and/or explosions) and using consequence analysis methods or models to estimate the potential impact on the public. The methods or models used to perform the OCA can vary from simple, inexpensive approaches (e.g., EPA's *Risk Management Program Guidance for Offsite Consequence Analysis,*[16] hereafter referred to as EPA's OCA Guidance) to refined, more costly commercially available software. Owners/ operators have the flexibility to select the consequence analysis methods or models that will help them most effectively comply with the RMP rule.

The process of performing a hazard assessment is illustrated in Figure 4-1. The major steps illustrated in Figure 4-1 are discussed in more detail in the following sections. The hazard assessment requirements of the RMP rule are discussed, and an example hazard assessment for a typical refinery is also presented.

4.1 IDENTIFYING THE OBJECTIVES OF THE HAZARD ASSESSMENT

The objectives of the hazard assessment will influence the candidate accident scenarios that are analyzed in the OCA, the modeling parameters that are used in the OCA, the format of the OCA results, and the level of effort required to perform the OCA. In this model RMPlan document, the objectives of the hazard assessment are (1) to satisfy the requirements of the RMP rule and (2) to provide OCA information that will help the local emergency planning committee (LEPC) improve the community emergency response plan.

Note:	Owners/operators of refineries may have objectives other than RMP rule compliance, such as enhancing public risk communication, reducing process risk, illustrating the effectiveness of mitigation systems, or compliance with other regulatory initiatives. These objectives may increase the number and type of accident scenarios considered.

The process of performing a hazard assessment can be an iterative process, particularly in the selection of the scenarios for the OCA. For some community environments, early involvement of the stakeholders (e.g., LEPC members or other emergency responders) who will be using the results of the hazard assessment (i.e., the OCA and the release history) may help minimize the effort necessary to perform the analysis and compile the appropriate information.

4.2 SELECTING CANDIDATE WORST-CASE RELEASE SCENARIOS

The RMP rule requires that the WCS for each class of regulated substances (i.e., toxic and/or flammable) at the refinery be reported in the RMPlan for all of the Program 2 and 3 processes [§68.25(a)(2)(i) and (ii)]. Additional WCSs must be reported for Program 2 and 3 processes if the scenarios would affect different public receptors [§68.25(a)(2)(iii)]. A WCS must also be reported for each Program 1 process at the refinery to support the process's eligibility for Program 1 [§68.25(a)(1)].

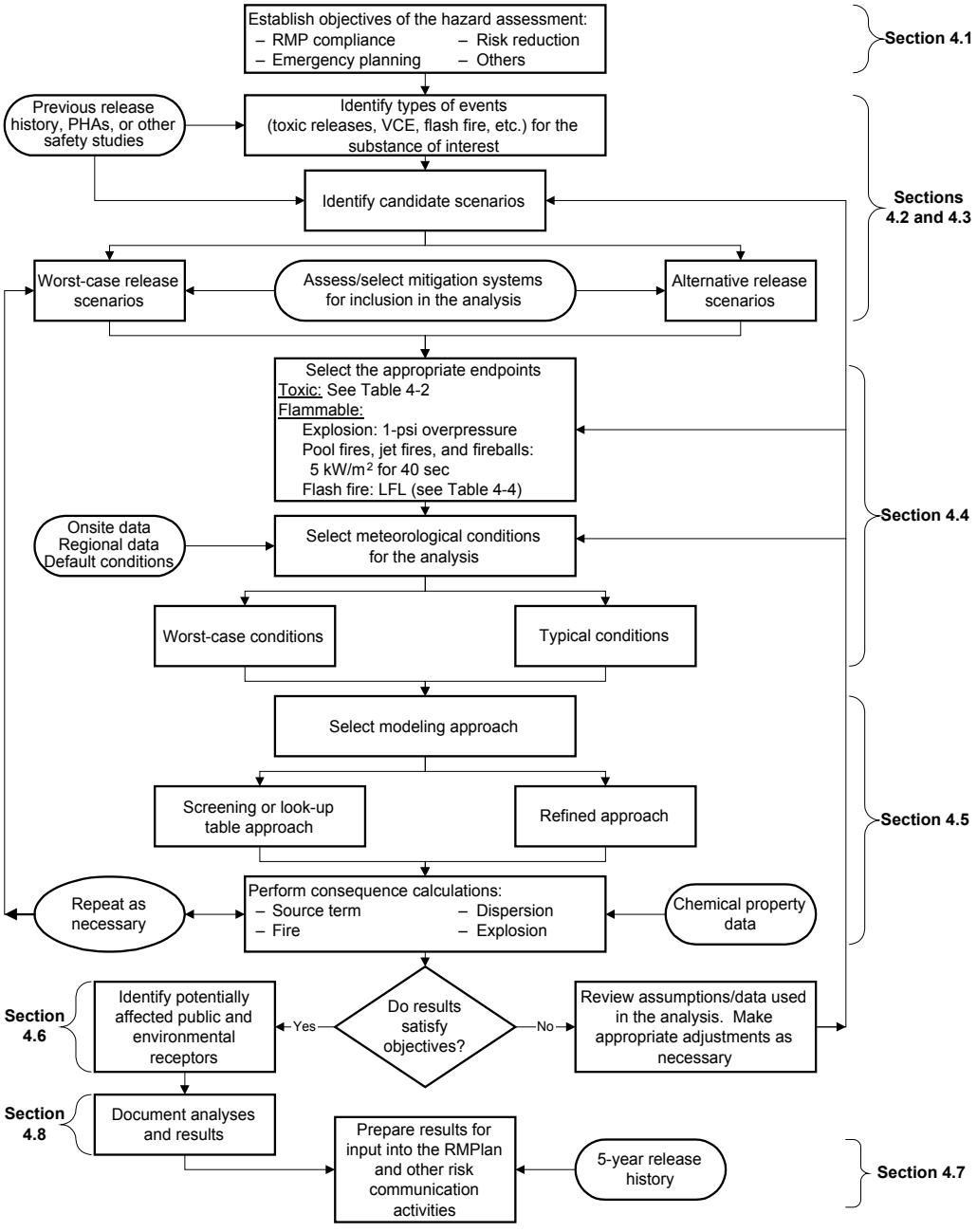

Figure 4-1
Major Steps in Performing a Hazard Assessment

The RMP rule requires that the quantity of a regulated substance released in a WCS be the largest inventory contained in a vessel or in piping between vessels that gives the greatest distance to an endpoint, accounting for administrative controls that may limit the maximum quantity released [§68.25(b)]. An administrative control is a ***written*** procedural mechanism for controlling the substance inventory. For regulated flammable substances, the RMP rule states that the WCS must be assumed to be a vapor cloud explosion (VCE) involving the quantity released from the largest vessel or pipe [§68.25(e) and 68.25(f)].

Note: During the 1996 RMP Workshops,[34] EPA gave, as an example of an administrative control, a written operating procedure that requires an operator to check the level of a tank every 2 hours and record the level in a logbook. In this example, an administrative control is a written procedure for controlling level that is supported by records.

The WCS associated with the largest vessel or pipe inventory at the refinery may not actually result in the longest distance to an endpoint. The WCS associated with a smaller quantity of a regulated substance at a higher process temperature or pressure [§68.25(i)(1)] or located closer to the refinery boundary [§68.25(i)(2)] may potentially affect public receptors at longer distances beyond the refinery fenceline. In these cases, the release of the smaller quantity would be considered the WCS.

The RMP rule allows credit for passive mitigation systems (e.g., a containment dike) in analyzing the WCS, provided that (1) these systems are capable of withstanding the event that causes the release and (2) the systems would still function as designed [§68.25(h)].

Note: In the preamble to the RMP rule, EPA states that reservoirs or vessels sufficiently buried underground are passively mitigated and are, thus, prevented from failing catastrophically. The WCS for underground storage may be evaluated by (1) assuming the failure of the piping connected to the underground reservoir or vessel, (2) estimating the release rate from the pipe, and (3) assuming a release duration of 10 minutes.

In light of the above RMP rule requirements, the identification of candidate WCSs for the refinery should begin by collecting the following information:

- A site plot plan or aerial photograph of the refinery that shows the locations of the largest process vessels and pipes
- The maximum inventory of regulated substances or mixtures (in pounds) in the largest process vessels and piping segments associated with (1) **EACH** candidate Program 1 process and (2) all of the Program 2 and 3 processes as a group
- A list of administrative controls, if any, that would limit the quantity of the regulated substance in the identified process vessels and pipes to some quantity less than the maximum; if such controls exist, determine the limiting quantity (in pounds)
- The maximum pressure and temperature conditions for the identified process vessels and pipes in covered processes
- A list of passive mitigation systems (e.g., containment dikes) associated with the identified process vessels and pipes in covered processes, including the characteristics of the mitigation systems (e.g., earthen containment berm that is 4 feet deep with a surface area of 2,500 ft^2)

In collecting the above information, keep in mind that a WCS event must be identified for **EACH** Program 1 process. For all of the Program 2 and 3 processes, only the WCS

events that result in the greatest distance to the endpoints for the regulated toxics (as a class) and flammables (as a class) need to be identified.

4.2.1 Candidate Toxic Substance Release Scenarios

The largest inventories of regulated toxic substances at a refinery are often found in the catalytic hydrocracking units, hydrorefining units, and amine treatment/sulfur recovery processes (i.e., H_2S); alkylation units (i.e., hydrogen fluoride); and process water or waste treatment systems (i.e., ammonia and chlorine). Particular attention should be focused on (1) high pressure and high temperature processes and (2) processes located near the refinery boundary, even though they may not contain the largest vessels. Smaller inventories at higher pressures or temperatures may actually result in greater distances to the toxic endpoint. For example, a railcar connected to a covered process during unloading/loading operations (e.g., hydrogen fluoride unloading) may be located closer to the refinery boundary than the bulk storage tanks.

Note:	Regulated toxic substances, such as hydrogen fluoride and ammonia, may be contained in mixtures within covered processes and should be considered when determining the WCS events.
Note:	Determining appropriate candidates for H_2S releases may present a challenge. H_2S is not normally stored in a vessel; rather, it is created in process equipment and exists in piping networks that span the refinery. Thus, the appropriate release quantity may be the greatest amount in a piping segment between vessels. This scenario will likely be different in every refinery.

4.2.2 Candidate Flammable Substance Release Scenarios

The largest inventories of regulated flammable substances at the refinery will generally be areas in which liquefied products (e.g., propane, pentane, butane) are stored. For product storage areas that have several storage tanks close together, a VCE involving the largest tank will, in most cases, result in the WCS event. Analysis of the remaining tanks may not be necessary. Railcars or onsite pipelines (e.g., liquefied petroleum gas [LPG] and/or LNG loading/unloading areas) that are connected to a covered process may be located closer to the refinery boundary than other equipment and may consequently result in longer distances to the flammable endpoint than the bulk storage tanks.

Note:	According to the January 6, 1998, amendments to the RMP list rule,[21] transportation containers that remain connected to the motive power that delivered them to the facility are not covered by the RMP rule. Railcars, however, are typically disconnected from the train engine following delivery and may be subject to the RMP rule (i.e., may be considered part of a covered process).

4.2.3 Candidate Flammable Mixture Release Scenarios

In most cases, regulated flammable substances will not be processed or stored as pure substances, but rather as mixtures of regulated substances (e.g., propane, propylene). In some cases, process vessels (e.g., flash drums) may contain a mixture of regulated and nonregulated flammable substances (e.g., propane and butane mixed with heavier hydrocarbons such as hexane). Process vessels in fractionation systems in various refining processes (e.g., crude units, cracking units) may have mixtures of regulated and nonregulated flammable substances. These processes may also be eligible for Program 1 status if the WCS VCE does not reach an offsite public receptor.

Note: In covered processes *containing mixtures involving only regulated flammable substances*, the total mixture flammable mass in the vessel or pipe must be included in the scenario release quantity for the OCA. (See the procedures in Section 2.3 and Appendix A of this Guide for estimating the quantity of regulated flammable substances in vessels and columns.)

Note: In covered processes *containing mixtures involving regulated and nonregulated flammable substances*, if the nonregulated flammable substance would contribute to a WCS VCE (i.e., will ignite and burn), then the total mixture flammable mass in the largest vessel or pipe should be included in the scenario release quantity for the OCA.

Note: On May 26, 1999, EPA published in the *Federal Register* (64 *FR* 28695) a direct final rule amendment of the RMP rule[8-10] based on a settlement agreement between API, the Chlorine Institute, and EPA. The amendment allows facilities to account for pooling of refrigerated flammables or flammable liquids when evaluating the worst-case scenario for the RMPlan:

- For flammable gases handled as refrigerated liquids at ambient pressure, if the released substance is contained by a passive mitigation system such that the pool depth is greater than 1 centimeter, then (1) the released material may be assumed to instantaneously spill and form a liquid pool, (2) the volatilization rate of the pool is calculated at the boiling point of the material, and (3) the quantity that becomes vapor during the first 10 min is assumed to be involved in the vapor cloud explosion. If the pool that forms has a depth of 1 centimeter or less, then the total quantity released is assumed to be involved in a vapor cloud explosion.

- For flammable substances that are normally liquids at ambient temperature, then (1) the released material may be assumed to instantaneously spill and form a liquid pool, (2) the volatilization rate of the pool is calculated at the maximum release temperature or the maximum ambient temperature (whichever is higher), and (3) the quantity that becomes vapor during the first 10 min is assumed to be involved in the vapor cloud explosion.

For facilities that currently have WCSs based on vessels containing refrigerated flammables or flammable liquids, the endpoint distances for a vapor cloud explosion may be significantly reduced under the new amendment. Example 3 in Appendix B of this Guide illustrates that using this revised approach would reduce the WCS for a release of 5,000,000 lb of refrigerated pentane from 1.4 miles to 0.27 mile. The flammable mass is reduced from 5,000,000 lb to only 39,200 lb.

Facilities that have already submitted their RMPlan may choose to use this revised approach, but are not required to do so. If the revised analysis leads to a different WCS for inclusion in the RMPlan, then the facility should determine if it is advantageous to resubmit an RMPlan with the revised analysis results or keep the existing WCS results in the RMPlan already submitted by the facility.

When taking credit for administrative controls in limiting the maximum quantity released from a vessel or pipe, the owner/operator should be sure that the administrative control is reliable. According to the preamble of the RMP rule, failure to maintain an administrative control such that it could lead to a larger inventory being released in a WCS event would be considered a violation of the RMP rule. The preamble further indicates that the facility would remain in violation of the rule until (1) the administrative control is revised to reflect the new maximum inventory, (2) the WCS OCA is updated to reflect the revised practice, and (3) a revised RMPlan is submitted to EPA or the implementing agency.

Note: For *releases of regulated toxic substances*, the passive mitigation systems that may be of benefit in evaluating the WCS events are (1) buildings, if the release of the substance occurs inside a building (gases or liquids), or (2) dikes or containment berms (liquids only).

For *releases of regulated flammable substances*, the passive mitigation systems that may be of benefit in evaluating the WCS events are dikes or containment berms (for liquids or refrigerated liquids). For VCE events inside of buildings, the overpressures are often greatly enhanced by the confinement provided by the structure. Therefore, in most cases, no passive mitigation credit is assumed for VCEs for WCS events inside of buildings.

Note: *For underground propane caverns*, the WCS may be a failure of the protective dome for the feed lines to the underground cavern, as opposed to a failure of transfer piping. In many cases the shaft beneath the protective dome is several feet in diameter and extends downward to the liquid surface of the cavern, whereas the transfer lines are often only a few inches in diameter. Catastrophic failure of the protective dome may lead to a much greater quantity of flammable material being released in 10 min than failure of a transfer line.

For underground salt dome storage, the WCS may be a failure of a transfer line from the cavern to the surface. The liquid transfer line for salt dome storage often consists of a pipe within a pipe. The inner pipe contains a brine solution and the flammable material (e.g., butane) flows through the annular space outside of the inner pipe. The maximum quantity of flammable material released in 10 min will often occur if it is assumed that the outer pipe is ruptured while the inner pipe remains intact. This maintains the brine pressure within the salt dome during the event, resulting in a higher flow rate of flammable material than failure of both the inner and outer pipes.

The process of determining the WCS events that will be reported in the RMPlan may involve performing several OCA calculations for the inventory information collected during this hazard assessment task. This may require that additional candidate scenarios be explored, based on a review of preliminary modeling results. Modeling parameters and approaches for performing the OCA for the WCS events are discussed in Sections 4.4 and 4.5, respectively.

4.3 SELECTING CANDIDATE ALTERNATIVE RELEASE SCENARIOS

For Program 2 and 3 processes, the RMP rule requires that one ARS be reported in the RMPlan for each regulated toxic substance and one ARS be reported for regulated flammable substances as a class [§68.28(a)]. No ARS is required for a Program 1 process.

The RMP rule requires that an ARS (1) be more likely to occur than the WCS and (2) reach an endpoint (toxic or flammable, as applicable to the substance released) off site, unless no such scenario exists [§68.28(b)(1)]. The 5-year accident history and failure scenarios identified in the process hazard analysis (PHA) (Program 3 process) or hazard review (Program 2 process) are factors that should be considered when selecting ARSs [§68.28(e)].

Note: EPA states in the preamble to the RMP rule, that sources should have flexibility to select the alternative release scenarios that are the most useful for communication with the public and first responders and for emergency response preparedness and planning.

Note: If the distance to an endpoint for the WCS for a Program 2 or 3 process just barely extends beyond the refinery boundary, identifying an ARS that reaches an endpoint off site may be impossible; nonetheless, the RMP rule requires submittal of an ARS, even if it does not reach an endpoint off site.

The RMP rule allows credit for both passive and active mitigation systems in analyzing the ARSs, provided that (1) these systems are capable of withstanding the event that causes the release and (2) the systems would still function as designed [§68.28(d)]. Therefore, active mitigation systems, such as automatic shutoff valves, manual isolation valves, and remote interlocks, may be assumed to function to limit the duration of the releases. However, if the limited duration yields results that would not affect an offsite public receptor, the release scenario may not qualify as a useful ARS.

Note: For ARS events involving releases of regulated flammable substances, particularly substances that may form liquid pools upon release (e.g., pentane or refrigerated propane), passive mitigation systems such as dikes can strongly influence the flammable mass for a VCE. However, dikes or berms will generally not influence the flammable mass associated with releases of pressurized, liquefied flammable substances (e.g., butane and propane) because these substances tend to flash and quickly evaporate upon release.

In light of the above RMP rule requirements, the identification of candidate ARSs for the refinery should begin by reviewing the results of the analyses of the WCS events. Then, analysts should consider "smaller," more likely equipment failures that are typical of certain types of processing, storing, and handling situations (e.g., propane loading line failure). Several examples of ARS events are provided in Table 4-1, including those presented in the RMP rule [§68.28(b)(2)] and additional examples for regulated toxic and flammable substances at a typical refinery.

Note: No ARS events are required for Program 1 processes. Therefore, only the Program 2 and 3 processes need to be considered when identifying candidate ARS events.

Note: According to EPA's OCA Guidance,[16] for regulated flammable substances, an ARS may be a VCE, flash fire, boiling liquid expanding vapor explosion (BLEVE), fireball, jet fire, or pool fire. Additional information on these events may be found in *Guidelines for Evaluating the Characteristics of Vapor Cloud Explosions, Flash Fires, and BLEVEs* published by CCPS.[35]

Note: A BLEVE and/or a fireball resulting from a BLEVE may be appropriate ARS events to consider for regulated flammable substances such as LPGs (e.g., propane, propylene, butane) in storage tanks that could be subjected to direct flame contact under accident conditions.

Note: The distances to the flammable endpoints for VCE, flash fire, or fireball events are generally greater than the distances associated with BLEVE, jet fire, or pool fire events. In many cases, overpressures generated from a BLEVE or thermal exposures from a jet fire or pool fire event will not exceed the flammable endpoints at offsite locations and may, therefore, not be considered useful ARS events. BLEVEs may, however, generate large vessel fragments that may be propelled away from the facility. A quantitative evaluation of missile hazards is NOT required by the RMP rule. However, EPA's OCA Guidance[16] states that you "may also want to consider models or calculation methods to estimate effects of vessel fragmentation" for BLEVE events.

A *qualitative* discussion of missile hazards may be useful if communicating with the local stakeholders to show that you have considered all of the potential consequences of a BLEVE. A qualitative discussion of missile hazards from BLEVEs can be found in *Guidelines for Evaluating the Characteristics of Vapor Cloud Explosions, Flash Fires, and BLEVEs* published by CCPS.[35]

Issue: The RMP rule requires that a VCE be considered the WCS event for a regulated flammable substance. However, other fire or explosion mechanisms (e.g., thermal radiation from a BLEVE fireball) may result in greater distances to the endpoint of concern. Owners/operators may choose, but are not required, to evaluate additional scenarios that consider other fire and/or explosion mechanisms (such as a fireball event), as appropriate, if preparing information for presentation to local stakeholders (e.g., emergency planners or the public).

The data that must be collected to perform an OCA of an ARS event depend upon the specific type of event selected for analysis and the specific model or method used to evaluate the consequences of the event. For example, the input data requirements for analyzing a leaking hose will differ from the input data requirements associated with a relief valve discharge. The data requirements for a simple modeling approach will be different from those for a refined model. Owners/operators will need to review the input data requirements for the specific model or method that they will use in evaluating the selected ARS event to know what information is needed.

Table 4-1
Examples of Alternative Release Scenario (ARS) Events

Example ARS Events from the RMP Rule [§68.28(b)(2)]	Example ARS Events for Regulated Toxic Substances at a Refinery	Example ARS Events for Regulated Flammable Substances at a Refinery
• Releases from transfer hoses resulting from splits or uncoupling events • Releases from process piping flanges, joints, welds, valves, valve seals, or drains or bleeds • Releases from vessels or pumps resulting from cracks, seal failure, or drain, bleed, or plug failure • Releases from vessels resulting from overfilling, overpressurization, or relief valve or rupture disk venting • Releases from shipping container mishandling, breakage, or puncturing	• Hose failure during unloading of hydrogen fluoride into a storage tank from a tank truck or railcar • Leak in an acid gas line to the sulfur recovery unit resulting in a release of H_2S • Leak in a cylinder valve, feed line, or manifold from a 1-ton chlorine cylinder to a water treatment system • Release of unignited H_2S through a flare	• Failure of a propane transfer line (with subsequent ignition), resulting in a VCE or flash fire • Storage tank leak that releases pentane (with subsequent ignition), resulting in a pool fire • Relief valve discharge on a butane storage tank (with subsequent ignition), resulting in a jet fire • BLEVE/fireball of a butane storage tank engulfed in flames

4.4 MODELING PARAMETERS

The RMP rule contains several mandatory assumptions and modeling parameters that must be used when performing the hazard assessments. These requirements can be classified into one of the following categories:

- Endpoints
- Release parameters
- Meteorological/surface data

These requirements are discussed briefly in the following paragraphs.

4.4.1 Endpoints

Appendix A of the RMP rule presents the endpoints that must be used when performing a hazard assessment for toxic releases. These endpoints generally represent a level of exposure to a toxic concentration that may cause serious injury to members of the public. Table 4-2 presents the endpoints for the toxic regulated substances that may be present at refineries. According to the preamble to the RMP rule, EPA is currently working with other agencies to develop acute exposure guideline limits (AEGLs) that will eventually be adopted as the toxic endpoints for the regulated substances subject to the RMP rule. Proposed AEGLs will undergo a public comment period as part of the rulemaking process.

Table 4-2
Toxic Endpoints for RMP-regulated Toxic Substances that May Be Present at Refineries

Regulated Substance[1]	CAS Number	Molecular Weight[2]	Toxic Endpoint[3]	
			mg/liter	ppm
Ammonia (≥ 20% by weight)	7664-41-7	17.03	0.14	200
Ammonia (anhydrous)	7664-41-7	17.03	0.14	200
Carbon disulfide	75-15-0	76.14	0.16	50
Chlorine	7782-50-5	70.91	0.0087	3
Epichlorohydrin	106-89-8	92.53	0.076	20
Ethylenediamine	107-15-3	60.1	0.49	199
Hydrazine	302-01-2	32.05	0.011	8.4
Hydrogen chloride (≥ 37% by weight)	7647-01-0	36.46	0.03	20
Hydrogen flouride (≥ 50% by weight)	7664-39-3	20.01	0.016	20
H_2S	7783-06-4	34.08	0.042	30

Table 4-2 (cont'd)
Toxic Endpoints for RMP-regulated Toxic Substances that May Be Present at Refineries

Regulated Substance[1]	CAS Number	Molecular Weight[2]	Toxic Endpoint[3]	
			mg/liter	ppm
Methyl mercaptan	74-93-1	48.11	0.049	25
Sulfur dioxide (anhydrous)	7446-09-5	64.07	0.0078	3

[1] These toxic substances may not be present at all refineries.
[2] These values were taken from EPA's OCA Guidance.[16]
[3] These mg/liter values were taken from Appendix A of the RMP rule (40 *CFR* 68). The conversion from mg/liter to ppm assumes ideal gas behavior, a 25°C ambient temperature, and a standard atmospheric pressure of 101,325 N/m^2. Under these assumptions, the following equation was used: C(ppm) = [24,464xC(mg/liter)]÷Molecular Weight.

The endpoints required by the RMP rule for regulated flammable substances depend upon the type of event. Table 4-3 presents the endpoints that must be used for the various types of events associated with releases of regulated flammable substances. Table 4-4 provides lower flammability limit (LFL) data for regulated flammable substances that may be present at refineries.

Table 4-3
Endpoints for Events Involving Regulated Flammable Substances

Event Type	Endpoint
VCE and BLEVE	Overpressure of 1 psi [§68.22(a)(2)(i)]. This can knock individuals off their feet, shatter window panes, and damage houses
Fireball, pool fire, and jet fire	Thermal radiation of 5 kW/m^2 for an exposure time of 40 seconds [§68.22(a)(2)(ii)]. This exposure may cause second-degree burns to exposed individuals
Flash fire	Lower flammability limit (LFL) [§68.22(a)(2)(iii)]. The LFL represents the minimum concentration at which a flammable vapor cloud will ignite and burn in ambient air. Individuals located within a flammable vapor cloud that subsequently ignites may suffer serious injuries from burns. Table 4-4 provides LFL data for regulated flammable substances that may be present at refineries

Table 4-4
LFL Endpoints for RMP-regulated Flammable Substances that May Be Present at Refineries

		Lower Flammability Limit (LFL)[2]	
Regulated Substance[1]	**CAS Number**	**mg/liter**	**vol%**
Acetylene	74-86-2	27	2.5
1,3-Butadiene	106-99-0	44	2
i-Butane	75-28-5	43	1.8
n-Butane	106-97-8	36	1.5
Butene	25167-67-3	39	1.7
Ethane	74-84-0	36	2.9
Hydrogen	1333-74-0	3.3	4
Methane	74-82-8	33	5
i-Pentane	78-78-4	41	1.4
n-Pentane	109-66-0	38	1.3
Propane	74-98-6	36	2
Propylene	115-07-1	34	2

[1] These flammable substances may not be present at all refineries.
[2] These values were taken from EPA's OCA Guidance.[16]

Note: Fireball events usually have durations that are significantly less than 40 seconds. For shorter duration exposures, the thermal flux that would result in the same effect (i.e., second-degree burns) would have to be greater than 5 kW/m^2. The equivalent thermal exposure endpoint (i.e., to cause second-degree burns) for a fireball event that has a duration of less than 40 seconds can be estimated from the following relationship:

$$\text{Fireball Thermal Endpoint (kW/m}^2\text{)} = \frac{79.53}{(t_{\text{fireball}})^{0.75}}$$

where t_{fireball} is the duration of the fireball (in seconds). As an example, the appropriate thermal endpoint for a fireball with a duration of 10 seconds is given by the following:

$$\text{Fireball Thermal Endpoint (kW/m}^2\text{)} = \frac{79.53}{(10\ \text{seconds})^{0.75}} = 14\ \text{kW / m}^2$$

The above relationships are used in EPA's OCA Guidance.[16]

4.4.2 Release Parameters

The RMP rule has specific requirements for release height and release temperature for modeling WCS and ARS events. For WCS events, the following assumptions must be made:

- The release is assumed to occur at ground level [§68.22(d)]
- For toxic or flammable liquids that are not gases liquefied by refrigeration, the release temperature is the higher of (1) the highest daily maximum temperature in the past 3 years or (2) the process temperature [§68.22 (g)]
- For toxic or flammable liquids that are gases liquefied by refrigeration, the release temperature is the normal boiling point of the substance [§68.25(c)(2)(ii) and 68.25(e)(2)(ii)]

For ARS events, the release height may be selected based on the actual release location [§68.22(d)], and the release temperature may be based on the typical process or ambient temperature, whichever is most appropriate [§68.22(g)].

Note: Flare, relief valve, and piping releases are examples of ARS events that occur at elevated locations. Discharges from columns or separators are examples of high temperature releases that also occur at elevated locations.

4.4.3 Meteorological/Surface Data

The RMP rule specifies the meteorological conditions (i.e., atmospheric stability, wind speed, ambient temperature, and relative humidity) that must be used when performing the OCA [§68.22(b) and (c)]. These conditions are summarized in Table 4-5 for both WCS and ARS events.

Table 4-5
Meteorological Conditions Specified by the RMP Rule

Parameter	WCS Required Value	ARS Required Value
Atmospheric stability	F stability, unless it can be shown that the atmosphere was less stable at all times during the previous 3 years	The typical or average stability at the stationary source. (D stability is assumed if using EPA's OCA Guidance[16] approach)
Wind speed	1.5 m/sec, unless it can be shown that the local wind speed was higher at all times during the previous 3 years	The typical or average wind speed at the stationary source. (A value of 3 m/sec is assumed if using EPA's OCA Guidance[16] approach)
Ambient temperature	The highest daily maximum temperature that occurred at the stationary source in the last 3 years. (A value of 25°C is assumed if using EPA's OCA Guidance[16] approach)	The typical or average ambient temperature at the stationary source. (A value of 25 °C is assumed if using EPA's OCA Guidance[16] approach)
Relative humidity	The typical relative humidity at the stationary source. (A value of 50% is assumed if using EPA's OCA Guidance[16] approach)	The typical relative humidity at the stationary source. (A value of 50% is assumed if using EPA's OCA Guidance[16] approach)

Note: Most refinery locations in the continental United States will experience an F stability condition and a wind speed ≤ 1.5 m/sec at least once in a 3-year period.

Note: The typical meteorological conditions at a given refinery may be quite different from the default D stability and 3 m/sec wind speed conditions assumed in EPA's OCA Guidance.[16] Owners/operators may want to consider analyzing onsite or regional data to determine the most appropriate typical meteorological conditions for the refinery.

Note: The National Climatic Data Center (NCDC) in Asheville, NC, collects and maintains a database of meteorological data for all National Weather Service (NWS) meteorological stations in the United States. Information on the available meteorological data may be obtained by contacting NCDC at (704) 271-4800 or accessing its Internet web site at the following address: http://www.ncdc.noaa.gov/. Meteorological data and software for processing the data may also be obtained through the Support Center for Regulatory Air Modeling (SCRAM) area on EPA's Office of Air Quality and Planning Standards Technology Transfer Network (OAQPS TTN) electronic bulletin board: Modem - (919) 541-5742, System Operator - (919) 541-5384. The TTN and SCRAM may also be accessed through the Internet at the following address: http://www. epa.gov/ttn/.

For both WCS and ARS events, the surrounding terrain must be characterized in the dispersion calculations as urban or rural [§68.22(e)]. ***Urban*** terrain means that many obstacles are located in the immediate area, such as buildings or trees. ***Rural*** terrain means that no buildings or trees are located in the immediate area and that the terrain is generally flat and unobstructed. Many refinery locations can typically be characterized as urban terrain, particularly when other industrial facilities (e.g., other refineries) or urban structures (e.g., office complexes) are located nearby.

Note: Consider selecting meteorological conditions and surface roughness values in consultation with neighboring industrial facilities that are also subject to the RMP rule. This will help ensure consistency in the OCAs that are performed by facilities in the same location.

4.5 PERFORMING MODELING CALCULATIONS

The RMP rule imposes several mandatory modeling assumptions that analysts must adhere to when performing the OCA of the WCS events. The mandatory assumptions for regulated toxic and flammable substances are presented in Table 4-6.

For ***ARS events*** involving regulated toxic or ***flammable substances,*** no mandatory modeling assumptions are specified in the RMP rule, which gives the owner/operator the maximum flexibility in selecting a modeling approach that is most applicable for a specific ARS.

Table 4-6
Mandatory Modeling Assumptions for WCS Events as Specified in the RMP Rule

Regulated Toxic Substances	Regulated Flammable Substances
• **Toxic gases or pressurized liquefied gases:** The WCS inventory is assumed to be released as a gas over a 10-minute period, unless passive mitigation systems (e.g., a building) would result in a lower release rate to the environment [§68.25(c)(1)]	• **Flammable gases or pressurized liquefied gases:** The WCS inventory is assumed to be involved in a VCE [§68.25(e)(1)]
• **Toxic refrigerated liquefied gases:** The WCS inventory is assumed to be released instantaneously to form a liquid pool at the normal boiling point of the released substance. If the resulting pool spreads to a minimum depth of ≤1 cm, then the liquid must be assumed to be released as a gas over a 10-minute period. If the resulting pool depth is >1 cm because of passive mitigation or the surrounding surface contours, then the evaporation rate and release duration may be calculated using an appropriate modeling technique that accounts for the underlying surface characteristics (soil, concrete, etc.) [§68.25(c)(2)]	• **Flammable refrigerated liquefied gases at ambient pressure:** The WCS inventory is assumed to be released instantaneously to form a liquid pool at the normal boiling point of the released substance. If the resulting pool spreads to a minimum depth of ≤1 cm, then the total quantity released is assumed to be involved in a VCE. If the resulting pool depth is >1 cm because of passive mitigation or the surrounding surface contours, then the quantity evaporated from the pool in 10 min is assumed to be involved in a VCE. The evaporation rate may be calculated using an appropriate modeling technique that accounts for the underlying surface characteristics [§68.25(e)(2)]
• **Toxic liquids:** The WCS inventory is assumed to be released instantaneously to form a liquid pool at the higher of (1) the highest daily maximum temperature in the past 3 years or (2) the storage/process temperature. The resulting pool is assumed to spread to a 1-cm depth unless passive mitigation or the surrounding surface contours would limit the spread to a smaller area. The evaporation rate and release duration may be calculated using an appropriate modeling technique that accounts for the underlying surface characteristics [§68.25(d)].	• **Flammable liquids:** The WCS inventory is assumed to be released instantaneously to form a liquid pool at the higher of (1) the highest daily maximum temperature in the past 3 years or (2) the storage/process temperature. The resulting pool is assumed to spread to a 1-cm depth unless passive mitigation or the surrounding surface contours would limit the spread to a smaller area. The quantity evaporated from the pool in 10 min is assumed to be involved in a VCE. The evaporation rate may be calculated using an appropriate modeling technique that accounts for the underlying surface characteristics [§68.25(f)]
	• A 10% yield factor must be used in conjunction with the release quantity if the TNT equivalency model is used to determine the distance to a 1-psi overpressure

Note: The 10% yield factor requirement applies only to TNT equivalency methods. The RMP rule does not specifically prohibit the use of other VCE methodologies in evaluating the WCS events.

With the exceptions noted above, the RMP rule [§68.25(g) and §68.28(c)] allows the use of a variety of modeling approaches for performing the OCA for WCS and ARS events. Analysts may use any of the following methods:

- The lookup table approach presented in EPA's OCA Guidance[16]
- Any other publicly available techniques that account for the mandatory modeling conditions in the rule and that are recognized by industry as part of current practices

- Proprietary models that account for the mandatory modeling conditions in the rule, provided the owner/operator (1) allows the implementing agency access to the model and (2) describes the model features and differences from publicly available models to local emergency planners upon request

According to the RMP rule, the method selected must appropriately account for the density (neutrally buoyant or dense behavior) of the released vapor cloud (for releases of gases and evaporating liquid pools) and the mandatory modeling parameters specified in the RMP rule (see Section 4.4) [§68.22(f)].

The methods or models used to perform the OCA can vary from simple, inexpensive approaches (e.g., EPA's OCA Guidance[16]) to refined, expensive commercially available software. Owners/operators have the flexibility to select the consequence analysis methods or models that will help them most cost-effectively comply with the RMP rule.

Use of the simplified, step-by-step modeling approach presented in EPA's OCA Guidance[16] provides a convenient method for performing program level screening of WCS events, particularly for covered processes containing regulated flammable substances. Appendix B presents the methodology in EPA's OCA guidance document for evaluating WCS events for regulated flammable substances and provides examples of how to apply the methodology. Appendix B also provides a look-up table for estimating the distance to a 1-psi overpressure for a VCE involving various quantities of regulated flammable substances at a refinery. EPA's OCA guidance approach may also be useful as a screening tool to identify the WCS among a number of candidate WCS events when several different inventories of regulated toxic or flammable substances exist at a facility, such as a refinery. If EPA's simple OCA methodology provides results for WCS and/or ARS events that meet a refinery's objectives, more detailed modeling may not be necessary.

Note: On April 19, 1999, EPA posted on its web site the final OCA guidance document entitled *Risk Management Program Guidance for Offsite Consequence Analysis*,[16] EPA 550-B-99-009. This document replaces the draft OCA guidance issued in May 1996. The new OCA guidance contains revised atmospheric dispersion look-up tables for ammonia, chlorine, and sulfur dioxide. These new look-up tables give much shorter toxic endpoint distances than the draft OCA guidance. For RMPlans prepared and submitted on or before June 21, 1999, EPA stated on its web site that "Although [the April 1999 final OCA guidance] replaces the previous [May 1996] Offsite Consequence Analysis Guidance, if you have prepared your [risk management plan] using the previous guidance, you do not need to revise it based on this new guidance." However, for new RMP-covered processes or revised OCAs for existing RMP-covered processes, the new OCA guidance should be used. The new OCA guidance document may be obtained from the following Internet address: http://www.epa.gov/swercepp/ap-ocgu.htm.

Each facility that has RMP-covered processes containing ammonia, chlorine, or sulfur dioxide, should consider reviewing its worst-case and alternative release scenarios to determine if the use of the April 1999 final OCA guidance provides distances to the toxic endpoints that better meet the facility's objectives for RMP compliance.

Note: EPA has developed a software program called RMP*Comp that performs distance calculations using the simplified methods presented in EPA's OCA Guidance document. [16] The RMP*Comp program may be downloaded from EPA's Internet web site at the following address: http://www.epa.gov/ceppo/tools/rmp-comp/rmp-comp.html.

If the EPA's simple OCA approach provides overly conservative results, then a more detailed modeling approach may be necessary. In particular, more refined modeling of ARS events may be beneficial, since EPA has suggested that ARS events provide useful information for emergency planning and response. Several publicly available computer models can provide more refined and realistic OCA results for toxic and/or flammable releases. These models are generally more difficult to apply and usually require an experienced analyst to facilitate their use. Examples of such models and their practical use in analyzing releases of toxic and flammable substances are presented in API's *A Guidance Manual for Modeling Hypothetical Accidental Releases to the Atmosphere*.[36] A specialized program called HGSYSTEM is also publicly available from API for modeling releases of hydrogen fluoride.[37]

A variety of more refined modeling approaches for assessing VCEs for ARS events (e.g., TNO multienergy and the Baker-Strehlow methods) may be found in a text published by CCPS entitled *Guidelines for Evaluating the Characteristics of Vapor Cloud Explosions, Flash Fires, and BLEVEs*.[35] These refined VCE approaches take into account such factors as confinement, the presence of obstacles and structures, and the reactivity of the flammable substance, all of which affect the strength of a VCE. The CCPS book also provides alternative approaches for using the simple TNT equivalency method to more realistically model VCEs for ARS events and presents methods for analyzing flash fires, BLEVEs, and fireballs. Methods for assessing pool fires, jet fires, and fireballs can be found in *The SFPE Handbook of Fire Protection Engineering (Second Edition)*.[38]

Note: Consider using EPA's OCA Guidance[16] to perform Program Level screening of covered processes or preliminary screening of candidate WCS events. More refined modeling approaches can be used on the candidate WCS events that survive the screening process or on ARS events that will be used for emergency planning and response.

4.6 IDENTIFYING PUBLIC AND ENVIRONMENTAL RECEPTORS

The RMP rule requires the owner/operator to determine (1) the residential population and other public receptors and (2) the environmental receptors within the circles defined by the distances (i.e., the radii) to the endpoints for the WCS and ARS events [§68.30(a) and (b) and §68.33(a)]. The residential population must be estimated to two significant figures [§68.30(d)] and may be determined using the most recent census data or other updated information [§68.30(c)].

Note: EPA has developed CD ROM software called LandView™ III that can be used to estimate the residential population within a circle of a specified radius. LandView™ III is a geographic information system that has demographic and economic information from the 1990 census data for the United States. Information on LandView™ III can be obtained (1) by calling (301) 457-4100 or (2) through EPA's Right-to-Know Internet site at the following address: http://rtk.net/landview.

LandView™ III may incorrectly identify residential populations within small radii and sparsely populated areas around a plant site. In these instances, owners/operators may have to use other resources (e.g., their own knowledge of the surrounding community) to determine the residential populations.

The presence of the following public receptors must also be determined [§68.30(b)]:

- Institutions (e.g., schools, hospitals, and prisons)
- Parks and recreational areas
- Major commercial, office, and industrial buildings

Note: You are not required to estimate the number of people located at the public receptors listed above or provide a detailed listing of all the public receptors of the types listed above. You must only note the existence of such public receptor types in the RMPlan.

Note: Public receptors include recreational areas such as public swimming pools, public parks, and other areas that are used on a regular basis for recreational activities (e.g., baseball fields). Commercial and industrial areas include shopping malls, strip malls, downtown business areas, and industrial parks.

Public roads are NOT considered public receptors. According to the preamble to the final rule:

EPA decided that inclusion of public roads was unwarranted. EPA recognizes that people on public roads may be exposed during a release. In most cases, however, vehicles on public roads will be able to leave the area quickly and further access can be blocked, especially in isolated areas.

Note: Neighboring industrial complexes owned by different companies are considered to be public receptors for each other. For example, suppose that a fertilizer manufacturer is located just outside the fenceline of a refinery. These two facilities are considered public receptors for each other.

Note: Neighboring facilities that belong to the same industrial group and are under common control by a parent company (e.g., ABC Chemical and ABC Refining are both owned by ABC Corporation) may not be considered public receptors for each other if, for RMP compliance purposes, they are designated as a single stationary source, have fully coordinated emergency response programs, and submit a single RMPlan.

The rule also requires noting in the RMPlan the presence of the following environmental receptors [§68.33(a)]:

- Natural areas such as national parks, forests, or monuments
- Officially designated wildlife sanctuaries, preserves, or areas
- Federal wilderness areas

The above receptors can be found on local U.S. Geological Survey (USGS) maps or on maps based on USGS data [§68.33(b)].

Note: You are not required to provide a detailed listing of all the environmental receptors of the types listed above. You must only note the existence of such environmental receptor types in the RMPlan.

Note: In order to identify the environmental receptors encompassed by the WCS and ARS events, one or more county maps may be required, as well as several smaller (7.5 minute series) maps. Information on USGS maps may be obtained by contacting USGS Information Services at 1-800-HELPMAP. USGS maps and map dealers in your area may be identified through the Internet at the following address: http://edcwww.cr.usgs.gov/Webglis/glisbin/finder_main.pl?dataset_name=MAPS_LARGE.

4.7 COMPILING A 5-YEAR ACCIDENT HISTORY

The RMP rule requires the compilation of a 5-year accident history for all RMP regulated substances in covered processes (for ALL Program 1, 2, and 3 processes) at the refinery. Applicable events are those that resulted in any of the following [§68.20 and §68.42(a)]:

- Onsite deaths, injuries, or significant property damage
- Offsite deaths, injuries, property damage, evacuations, sheltering in place, or environmental damage

Note: Question IV.G.6 in EPA's Question and Answer Database[14] states that the owner or operator of a stationary source must determine whether onsite property damage as a result of an accidental release from a covered process was "significant." The owner or operator should be able to document such a decision.

Note: According to EPA's general RMP guidance document,[15] any level of known offsite property damage would trigger reporting of an accident in the 5-year accident history. An owner/operator is not required to conduct a survey to determine if such damage occurred. However, if the owner/operator knows, or should have known (e.g., it was reported in the newspapers) that offsite damage occurred, then the accident must be included in the 5-year accident history.

Note: Following are some factors that you may wish to consider in selecting the definition of significant onsite property damage:

- Consider dollar thresholds based on your internal policies and a reasonable judgment as to what level of damage is significant for your operations and your industry sector
- Note existing dollar thresholds used for other purposes (e.g., company thresholds for loss reporting). Such thresholds may or may not be appropriate values to use for identifying accidents to include in the accident history, but may be included in data that a facility is already tracking and could provide information about what is considered significant for other purposes
- If consistency with a local industry group is important, it may be necessary to negotiate a consensus

Note: EPA states that the 5-year accident history should include events with major offsite environmental impacts such as soil, groundwater, or drinking water contamination, fish kills, and vegetation damage. EPA intends that environmental damage should not be limited to environmental receptors.

The accident history must include all applicable events that have occurred in the 5-year period prior to the submittal date of the RMPlan. If the RMPlan is submitted on June 21, 1999, then applicable accidental releases occurring at the refinery on or after June 21, 1994, must be included in the accident history.

Note: According to EPA's general RMP guidance document,[15] if a facility changes ownership, then the new facility owner must include any accidents that occurred prior to the ownership transfer in the 5-year accident history. The owner/operator may wish to explain that ownership has changed in the executive summary of the risk management plan.

Note: Consider using the incident investigation tracking system in your PSM program to identify and compile the 5-year history. Simply modify the incident reporting form to include a check box that indicates whether the incident has qualifying effects of interest, and make sure that the reporting form includes data entry fields for the additional accident data required by the RMP rule (e.g., meteorological conditions). You may also consider including in the incident investigation tracking system, a check box that indicates whether the accident modifies the program level of an existing covered process.

Note: If participating with other facilities in communicating release history information to local stakeholders, consider establishing consistent definitions for onsite and offsite property damage when selecting accidents to be included in the release history.

Note: EPA requires reporting accidental releases only of covered substances (i.e., substances that cause a process to be covered by the RMP rule). Therefore, accidents in covered processes that do not release a covered chemical do not have to be reported.

However, you may consider developing a release history for releases of nonregulated substances that have occurred in the past, particularly if the releases (1) affected the community, (2) caused significant offsite environmental damage, or (3) received media coverage. This release history may be communicated to the local community, but would not necessarily be included in the RMPlan.

The RMP rule requires that the information listed in Table 4-7 be provided for each accident included in the 5-year history [§68.42(b)]. The numerical data required (e.g., quantity released) in the accident history must be provided to two significant figures [§68.42(c)].

Table 4-7
Information Required for Each Accident Reported in the 5-year History

- The date, time, and approximate duration of the release
- The chemical(s) released
- The estimated quantity released (in pounds) and, for mixtures containing regulated toxic substances, the percentage concentration by weight of the released regulated toxic substance in the liquid mixture
- The five- or six-digit NAICS code that most closely corresponds to the process
- The type of release event and its source
- Weather conditions, if known
- Onsite impacts
- Known offsite impacts
- Initiating event and contributing factors, if known
- Whether offsite responders were notified, if known
- Operational or process changes that resulted from investigation of the release

Note: Consult EPA's general RMP guidance document[15] for a listing of NAICS codes.

4.8 DOCUMENTATION AND UPDATING OF THE OFFSITE CONSEQUENCE ANALYSIS

The RMP rule requires two types of documentation for the OCA: (1) onsite documentation and (2) the information required to be in the RMPlan. The ***onsite***

documentation must include the OCA information listed in Table 4-8 for the WCS and the ARS events [§68.39].

Table 4-8
OCA Information that Must Be Retained in Onsite Documentation

- A description of the release scenario, the regulated substance(s) involved in the release, and the rationale for selection of the scenario
- The assumptions and parameters used in the analysis
- A description of any administrative controls and mitigation systems assumed to limit the quantity that could be released
- A description of the anticipated effects of controls and mitigation systems on the total quantity released and the release rate
- The estimated quantity released, the release rate, and the release duration
- A description of the methodology used to determine the distance to the endpoint (toxic or flammable, as applicable)
- The data used to estimate the population and environmental receptors potentially affected

No specific format for the information in Table 4-8 is specified by the RMP rule, so owners/operators may elect to use whatever format they choose.

The RMP rule requires that the WCS be reported in the RMPlan for each class of regulated substances (toxic and/or flammable) for all of the Program 2 and 3 processes [§68.25(a)(2)(i) and (ii)]. Additional WCSs must be reported for Program 2 and 3 processes if the scenarios would affect different public receptors [§68.25(a)(2)(iii)]. A WCS must also be reported for each Program 1 process [§68.25(a)(1)]. For all Program 2 and 3 processes, the rule also requires that one ARS be reported in the RMPlan for each regulated toxic substance and one ARS be reported for regulated flammable substances as a class [§68.28(a)]. No ARS is required for a Program 1 process.

The ***RMPlan documentation*** must include (1) an executive summary and (2) a data element checklist of OCA information. The executive summary must contain a brief description of the WCSs and the ARSs, including administrative controls and mitigation measures assumed to limit the distances for each reported scenario. In addition, the OCA information listed in Table 4-9 for the WCS and ARS events must be included in the RMPlan in the form of a data element checklist [§68.165(b)].

Note: You may choose, but are not required, to communicate to the local community more information than is required by the RMP rule, based on the needs of local stakeholders.

Table 4-9
OCA Information that Must Be Included in the RMPlan

- The name of the regulated substance involved in the release
- The weight percentage of the chemical in a liquid mixture (for toxics only)
- The physical state (for toxics only)

Table 4-9
OCA Information that Must Be Included in the RMPlan (cont'd)

- The methodology used to determine the distance to the endpoint (give model name)
- The type of release event (explosion, fire, toxic gas release, or liquid spill and evaporation)
- The quantity released (in pounds)
- The release rate
- The release duration
- The wind speed and atmospheric stability condition (for toxics only)
- The topography (urban or rural, for toxics only)
- The distance to the endpoint (toxic or flammable, as applicable)
- The public and environmental receptors with the distance to the endpoint (a checklist, not a detailed listing of all receptors)
- Passive mitigation accounted for in the OCA
- Active mitigation accounted for in the OCA (for ARSs only)

According to the RMP rule [§68.36(a)], the OCA must be reviewed and updated at least ***once every 5 years***. In addition, the OCA information in the RMPlan must be updated and resubmitted ***within 6 months*** of any changes in processes, quantities stored or handled, or any other aspect of the stationary source (i.e., the covered processes at the refinery) that would cause the distance to the endpoint to increase or decrease by a factor of two or more [§68.36(b)]. An example RMPlan executive summary containing the appropriate OCA information for a typical refinery is provided in Appendix C.

Note: You may want to inform the LEPC or other appropriate responders of any change that may affect the community emergency response plan, even if the change is not significant enough to warrant resubmitting the RMPlan. For a change that does require resubmittal of the RMPlan, the change should be communicated to the LEPC or other appropriate responders prior to resubmittal of the RMPlan.

4.9 EXAMPLE OF A REFINERY HAZARD ASSESSMENT

This section presents an example of a hazard assessment for a typical refinery. This example hazard assessment does not include consideration of all potential covered processes at a refinery, but illustrates the major steps (i.e., the thought process) associated with performing a hazard assessment on selected processes at a refinery. Furthermore, detailed consequence analysis calculations are not provided in this example; several resources for performing consequence analyses are discussed in Section 4.5. This example hazard assessment is performed in accordance with the requirements of the RMP rule originally published in the *Federal Register* on June 20, 1996,[2] and all amendments that have been made to the RMP rule/list rule through August 2000.

4.9.1 Example: Selecting Candidate Worst-case Release Scenarios

A plot plan for a typical refinery is shown in Figure 4-2. The only covered process in this example refinery containing a regulated toxic substance (H_2S) is the Hydrotreating Unit.

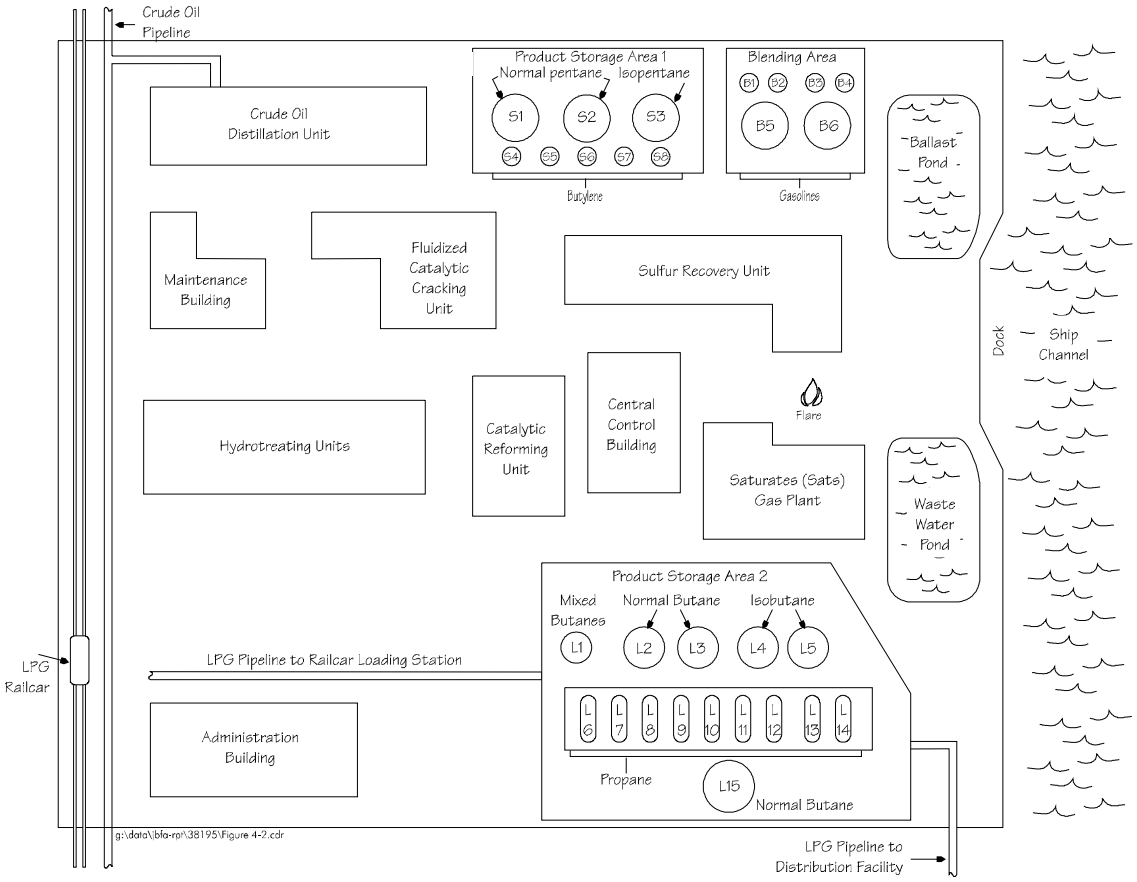

Figure 4-2
Example Oil Refinery Plot Plan

Note: This example assumes that the Hydrotreating Unit contains more than a TQ (i.e., greater than 10,000 pounds) of H_2S. This is a hypothetical assumption used for illustrative purposes only. Your refinery may not contain more than 10,000 pounds of H_2S in the Hydrotreating Unit or any other process at your plant site. However, your refinery may have other regulated toxic substances (e.g., chlorine or hydrogen fluoride) that exceed the TQ in a covered process. For this example refinery, only one process containing a TQ of a regulated toxic substance was identified.

The largest inventories of regulated flammable substances are found in the two product storage areas. Since these inventories are located near the fenceline, no other inventories of flammable substances were considered. The blending area contains flammable mixtures and gasoline, which are exempt from the RMP rule requirements (i.e., do not meet the NFPA 4 criteria).

Following a review of the plot plan and other process data for the refinery, the candidate WCS information presented in Table 4-10 for several regulated toxic and flammable substances was compiled. The candidate WCSs were selected because they represent the largest inventories in a piping segment or vessel. Credit for administrative controls was accounted for in determining the maximum quantity of flammable substance released from the largest i-pentane and butylene storage tanks. No other administrative controls or passive mitigation systems were accounted for in selecting the candidate scenarios. At this example refinery, the Catalytic Reforming Unit was judged to be a candidate Program 1 process because it is located in the middle of the refinery and no previous releases of RMP regulated substances resulting in offsite effects have occurred in the past 5 years. Therefore, a WCS VCE involving a release from the largest process vessel (high pressure separator) was selected. The WCS events to be reported in the RMPlan, as required by the RMP rule, will be selected based on the OCA results of the WCS events in Table 4-10.

4.9.2 Example: Selecting Candidate Alternative Release Scenarios

The candidate ARS events for this example hazard assessment are presented in Table 4-11. For the regulated toxic substance, a more realistic release of H_2S involving failure of the discharge line from the High Pressure Hot Oil Separator (HPHOS) is assumed. Releases from flanges in the discharge line have occurred at this refinery in the past. Therefore, a complete failure of the line is selected as a reasonable bounding scenario that would be useful for emergency response planning. Blowdown of the HPHOS through the flare system over a 30-minute period is accounted for as an active mitigation system.

For the regulated flammable substances, several candidate ARS events based on the RMP rule requirements are identified in Table 4-11. An n-pentane pool fire and a propane VCE resulting from a transfer line failure were selected because these types of accidents have been known to occur at other refineries or similar facilities and are considered to be events useful for emergency response planning.

4.9.3 Example: Additional Accidental Release Scenarios

For this example refinery, additional scenarios, presented in Table 4-12, involving some of the regulated flammables were also chosen to be analyzed. EPA's definition of a WCS VCE for regulated flammable substances can lead to overly conservative and misleading OCA results, particularly for flammable liquids with normal boiling points

Table 4-10
Candidate Worst-case Scenario Information for Regulated Substances at an Example Refinery

Regulated Substance	Process Description	Vessel/Pipe Inventory	Administrative Controls (AC) and/or Passive Mitigation (PM)	Maximum Temperature and Pressure
Regulated Toxic Substances				
H_2S	Hydrotreating Unit	2,000 pounds in the largest process vessel	No AC or PM credit assumed	800°F and 2,000 psia
Regulated Flammable Substances				
i-Pentane	Product Storage Area 1	VCE involving 4,900,000 pounds in the largest storage vessel (S3)	Written procedure in place to limit the inventory to 50% of its maximum possible inventory of 9,800,000 pounds	100°F and 20 psia
n-Pentane	Product Storage Area 1	VCE involving 11,000,000 pounds in the largest storage vessel (S1)	No AC or PM credit assumed	100°F and 16 psia
Butylene	Product Storage Area 1	VCE involving 4,300,000 pounds in the largest storage vessel (S6)	Written procedure in place to limit the inventory to 80% of its maximum possible inventory of 5,375,000 pounds	100°F and 63 psia
i-Butane	Product Storage Area 2	VCE involving 4,000,000 pounds in the largest storage vessel (L4)	No AC or PM credit assumed	100°F and 73 psia
n-Butane	Product Storage Area 2	VCE involving 5,300,000 pounds in the largest storage vessel (L15)	No AC or PM credit assumed	100°F and 52 psia
Propane	Product Storage Area 2	VCE involving 270,000 pounds in the largest storage vessel (L6)	No AC or PM credit assumed	100°F and 190 psia
Propane	Railcar Loading Station	VCE involving 130,000 pounds in the largest railcar	No AC or PM credit assumed	100°F and 190 psia
Mixture of hydrogen, methane, ethane, propane, butane, and pentane	Catalytic Reforming Unit	VCE involving 3,000 pounds in the largest storage vessel (L4)	No AC or PM credit assumed	900°F and 400 psia

Note: The information contained in this table is based on a hypothetical refinery and is presented for illustrative purposes only. The information should not be used directly to satisfy the requirements of the RMP rule.

Table 4-11
Candidate Alternative Release Scenario Information for Regulated Substances at an Example Refinery

Regulated Substance	Scenario Description	Release Rate and Duration	Active and/or Passive Mitigation	Temperature and Pressure
Regulated Toxic Substances				
H_2S	Failure of the discharge line of the High Pressure Hot Oil Separator (HPHOS)	53 pounds/minute for 30 minutes	The 30-minute release duration is the approximate time necessary to depressurize the HPHOS through the flare	450°F and 2,000 psia
Regulated Flammable Substances				
n-Pentane	Pool fire resulting from ignition of a large release from storage tank S1	Not applicable	Pool fire is contained in a rock-covered berm with a floor area of 43,425 ft^2	Not applicable
Propane	Failure of transfer line resulting in a VCE	2,070 pounds/minute for 15 minutes	No active or passive mitigation system credit	69°F and 200 psia

Note: The information contained in this table is based on a hypothetical refinery and is presented for illustrative purposes only. The information should not be used directly to satisfy the requirements of the RMP rule.

Table 4-12
Additional Release Scenario Information for Regulated Substances at an Example Refinery

Regulated Substance	Scenario Description	Release Rate and Duration	Active and/or Passive Mitigation	Temperature and Pressure
Regulated Flammable Substances				
i-Pentane	Catastrophic failure of storage tank S3 resulting in a VCE (more realistic worst-case VCE)	490,000 pounds/minute for 10 minutes	Full containment dike (33,750 ft^2) will limit spreading of the spill	100°F and 20 psia
n-Pentane	Catastrophic failure of storage tank S1 resulting in a VCE (more realistic worst-case VCE)	1,100,000 pounds/minute for 10 minutes	Full containment dike (43,425 ft^2) will limit spreading of the spill	100°F and 16 psia
n-Butane	Catastrophic failure of storage tank L15 resulting in a VCE (more realistic worst-case VCE)	530,000 pounds/minute for 10 minutes	No active or passive mitigation system credit	100°F and 52 psia
n-Butane	BLEVE of storage tank L15	5,300,000 pounds in the largest process vessel (L15)	No active or passive mitigation system credit	156°F and 114 psia (saturated vapor pressure associated with maximum vessel pressure of 1.2 × 80 psig, the relief valve setpoint)
n-Butane	Fireball involving contents of storage tank L15	5,300,000 pounds in the largest process vessel (L15)	No active or passive mitigation system credit	Not applicable

Note: The information contained in this table is based on a hypothetical refinery and is presented for illustrative purposes only. The information should not be used directly to satisfy the requirements of the RMP rule.

near or slightly below ambient temperature (e.g., i-pentane, n-pentane). Therefore, for this example refinery, the owner chose to perform more *realistic* (i.e., "sound science") analyses of the worst-case VCE events for the releases from the largest storage vessels containing i-pentane, n-pentane, and n-butane. In addition, BLEVE and fireball events involving the largest storage vessel of n-butane were selected for analysis, since these events have occurred at similar facilities (e.g., the series of BLEVE and fireball events that occurred at an LPG storage facility in Mexico City in 1984). These additional events may be of use in communicating RMP information to the stakeholders. However, these events are not required to be reported in the RMPlan. The events in Table 4-12 would provide stakeholders with more realistic information about the potential consequences of worst-case events.

Note: Owners/operators may also choose, but are not required, to communicate risks associated with potential releases of H_2S or other toxic substances, particularly if previous releases have impacted the community, even though the toxic substances are below the TQ in processes at the refinery. These potential releases would not be presented in the RMPlan, but they may be useful in communicating risks to local stakeholders.

4.9.4 Example: Modeling Parameters—Endpoints

The toxic endpoint for H_2S is 0.042 mg/liter (30 ppm) from Table 4-2. The explosion endpoint for VCEs and BLEVEs is 1-psi overpressure. The thermal endpoint for a pool fire is 5 kW/m^2 for a 40-second exposure time or an equivalent second-degree burn exposure. The thermal endpoints for the butane fireball are calculated using the approach discussed in Section 4.4.

4.9.5 Example: Modeling Parameters—Release Parameters

As required by the RMP rule, all of the WCS events in Tables 4-10 and 4-12 are assumed to occur at ground level. The maximum temperature and pressure of the released H_2S in the WCS event are the maximum process temperature of 800°F and a corresponding pressure of 2,000 psia. For the WCS events involving flammable materials in the Product Storage Area vessels and railcars, the release conditions are the maximum ambient temperature that has occurred in the past 3 years at the site (100°F) and the corresponding saturated vapor pressure of the material in the vessel or railcar. The candidate WCS for the Catalytic Reforming Unit assumes a maximum process temperature of 900°F and a corresponding process pressure of 400 psia. Note that the initial pressure for all of the candidate WCS events for flammable materials is above ambient pressure, indicating that the materials are stored as pressurized liquefied gases. Similar initial temperature and pressure assumptions are made for the additional accidental release scenarios presented in Table 4-12.

The release temperature/pressure for the ARS event in Table 4-11 involving a release of H_2S is assumed to be 450°F/2,000 psia, based on the typical process conditions. The ARS event in Table 4-11 involving a propane VCE assumes ambient temperature and a typical process pressure of 200 psia, as opposed to the maximum process conditions.

4.9.6 Example: Modeling Parameters—Meteorological/Surface Data

Worst-case and typical meteorological conditions were determined based on a review of data collected at a nearby National Weather Service station. Based on data for the most recent 3-year period available at the example refinery location, the following meteorological conditions were selected:

- **W*orst-case:*** F stability condition, 1.5 m/sec wind speed, 100°F maximum ambient

temperature, and 76% average relative humidity. Since F stability and a 1.5 m/sec wind speed were observed to occur on several occasions during the 3-year period, more unstable conditions and a higher wind speed could not be justified

- ***Typical or average:*** D stability condition, 3.9 m/sec average wind speed, 69°F average ambient temperature, and 76% average relative humidity

The worst-case meteorological conditions were used in assessing the WCS for the toxic release of H_2S, and the typical or average conditions were used in evaluating the ARS for H_2S. In evaluating the WCS VCEs for the flammable releases in Table 4-10, no specific meteorological conditions are required. However, the meteorological conditions can strongly influence the flammable mass associated with a VCE. For this example hazard assessment, the worst-case meteorological conditions were used in the evaluation of the more realistic VCE events for the i-pentane, n-pentane, and n-butane releases in Table 4-12. The VCE involving the propane transfer line failure in Table 4-11 was evaluated using the typical meteorological conditions listed above. The example refinery is located near heavily populated residential areas and a large city and has several onsite processing units and buildings. Therefore, the surrounding terrain is assumed to be urban when performing the dispersion calculations. The pool fire ARS event in Table 4-11 is assessed using the typical meteorological conditions listed above. The BLEVE and fireball events in Table 4-12 are not significantly affected by meteorological conditions used in the OCA.

4.9.7 Example: Performing Modeling Calculations

For the WCS and ARS events involving releases of H_2S, the released vapor cloud behaves as a neutrally buoyant gas because of the very high initial temperature associated with the releases. The sudden depressurization of the H_2S from 2,000 psia to atmospheric pressure causes a drop in the temperature of the released gas. This temperature drop was accounted for in the determination of the cloud density and the subsequent determination of the appropriate modeling approach. Both the WCS and ARS events involving H_2S were analyzed using a standard Gaussian plume modeling approach, which is applicable to buoyant or neutrally buoyant gas clouds.

The WCS VCEs in Table 4-10 for the regulated flammable substances were analyzed using the TNT-equivalency approach suggested in EPA's OCA guidance.[16] A 10% yield factor was assumed as required by the RMP rule when using the TNT-equivalency approach for the WCS VCE. The additional VCE events in Table 4-12 for i-pentane, n-pentane, and n-butane were also modeled using the TNT-equivalency approach with a 10% yield factor. However, the i-pentane and n-pentane VCEs also accounted for the expected pool formation and evaporation that would occur in determining the flammable mass, instead of assuming the full inventory of the storage tanks as the flammable mass. This makes a significant difference in the distance to the 1-psi endpoint. The BLEVE and fireball events in Table 4-12 were analyzed using methodologies documented in *Guidelines for Evaluating the Characteristics of Vapor Cloud Explosions, Flash Fires, and BLEVEs*.[35]

The ARS VCE in Table 4-11 was analyzed using the TNT-equivalency approach with a 3% yield factor. The 3% yield factor was judged to be more appropriate, based on site-specific factors (i.e., confinement and congestion) at the example refinery. The pool fire in Table 4-11 was analyzed using methodologies presented in *The SFPE Handbook of Fire Protection Engineering (Second Edition)*.[38]

The OCA results for the WCS and ARS events are presented in Tables 4-13 and 4-14,

respectively. The results for the additional VCE, BLEVE, and fireball events are presented in Table 4-15.

4.9.8 Example: Identifying Public and Environmental Receptors

The public and environmental receptors located within the distances to the endpoints for the OCA events are provided in Tables 4-13 through 4-15. The residential populations were determined using the LandView™ III software available from EPA. The presence of other public receptors was determined by reviewing local street maps and touring local neighborhoods and surrounding areas. The presence of RMP environmental receptors was identified from USGS maps of the surrounding area.

4.9.9 Example: Compiling a 5-year Accident History

The 5-year accident history for the regulated substances at the refinery is presented in Table 4-16. These data were taken from the refinery release history database that is used to document all releases, including those that exceed the reportable quantities under Section 304 of the Emergency Planning and Community Right-to-Know Act (EPCRA).[39]

4.9.10 Example: Selection of OCA Results for Inclusion in the RMPlan

The events selected for presentation in the RMPlan are indicated by asterisks (*) in Tables 4-13 and 4-14. The H_2S release must be presented in the RMPlan because it is the WCS with the greatest distance to the toxic endpoint for the regulated toxic substances (as a class) in Program 2 and 3 processes at the refinery. The n-pentane WCS VCE in Table 4-13 must be presented in the RMPlan because it is the WCS with the greatest distance to the explosion endpoint for the regulated flammable substances (as a class) in Program 2 and 3 processes at the refinery. The WCS VCE from Table 4-13 for the Catalytic Reforming Unit would also have to be presented if the process is reported as a Program 1 process.

The ARS events from Table 4-14 selected for inclusion in the RMPlan are (1) a release of H_2S from a pipe failure and (2) a propane VCE resulting from a transfer line failure. The H_2S release and the propane VCE are practical ARSs that would be useful for emergency response planning.

4.9.11 Example: Additional Events

The additional events presented in Table 4-15 illustrate that a VCE resulting from a release from the n-butane storage tank, as opposed to a VCE resulting from a release from the n-pentane storage tank, is a more realistic worst-case event. The overpressure effects from a BLEVE of the n-butane storage tank are significantly less than for the more realistic worst-case event. The distance (1.2 miles) to the thermal endpoint from a fireball involving the full contents of the n-butane storage tank is only slightly less than the distance (1.4 miles) to a 1-psi overpressure for the more realistic worst-case event. Because of the prescriptive nature of the RMP rule, none of the events in Table 4-15 would be presented in the RMPlan for the refinery. However, communicating these events to the local stakeholders may help demonstrate that you have considered all of the events that could potentially affect the public.

Table 4-13
Worst-case Scenarios: Offsite Consequence Analysis Results for the Events Identified at an Example Refinery

Regulated Substance	Scenario Description	Endpoint	Distance to the Endpoint (miles)	Public Receptors Within the Distance to the Endpoint	Environmental Receptors Within the Distance to the Endpoint
			Regulated Toxic Substances		
H_2S*	Release of 2,000 pounds over a 10-minute period from the Hydrotreating Unit	0.042 mg/liter (30 ppm)	1.2	21,000 residents and a recreational park	None
			Regulated Flammable Substances		
i-Pentane	VCE involving 4,900,000 pounds in the largest storage vessel (S3)	1 psi	1.4	25,000 residents and a recreational park	National park
n-Pentane*	VCE involving 11,000,000 pounds in the largest vessel (S1)	1 psi	1.8	35,000 residents and a recreational park	Wildlife refuge and national park
Butylene	VCE involving 4,300,000 pounds in the largest vessel (S6)	1 psi	1.3	23,000 residents and a recreational park	National park
i-Butane	VCE involving 4,000,000 pounds in the largest vessel (L4)	1 psi	1.3	23,000 residents and a recreational park	National park
n-Butane	VCE involving 5,300,000 pounds in the largest vessel (L15)	1 psi	1.4	25,000 residents and a recreational park	Wildlife refuge
Propane	VCE involving 270,000 pounds in the largest vessel (L6)	1 psi	0.52	3,300 residents and a recreational park	None
Propane	VCE involving 130,000 pounds in the largest railcar	1 psi	0.41	2,900 residents and a recreational park	None
Mixture of hydrogen, methane, ethane, propane, butane, and pentane*	VCE involving 3,000 pounds in the largest vessel (high pressure separator)	1 psi	0.16	None (distance to the endpoint does not extend beyond the fenceline)	None (distance to the endpoint does not extend beyond the fenceline)

*Indicates scenarios to be presented in the RMPlan.

Note: The information contained in this table is based on a hypothetical refinery and is presented for illustrative purposes only. The information should not be used directly to satisfy the requirements of the RMP rule.

Table 4-14
Alternative Release Scenarios: Offsite Consequence Analysis Results for the Events Identified at an Example Refinery

Regulated Substance	Scenario Description	Endpoint	Distance to the Endpoint (miles)	Public Receptors Within the Distance to the Endpoint	Environmental Receptors Within the Distance to the Endpoint
Regulated Toxic Substances					
H_2S*	Release of 1,600 pounds over a 30-minute period from the discharge line of the HPHOS	0.042 mg/liter (30 ppm)	0.12	30 residents and a recreational park	None
Regulated Flammable Substances					
n-Pentane	Pool fire resulting from ignition of a large release from a storage tank	5 kW/m^2 for 40 seconds	0.065	No residents or other public receptors affected	None
Propane*	VCE resulting from the release of 31,000 pounds from a transfer line over a 15-minute period	1 psi	0.071	10 residential public receptors	None

*Indicates scenarios to be presented in the RMPlan.

Note: The information contained in this table is based on a hypothetical refinery and is presented for illustrative purposes only. The information should not be used directly to satisfy the requirements of the RMP rule.

Table 4-15
Additional Release Scenarios: Offsite Consequence Analysis Results for the Events Identified at an Example Refinery

Regulated Substance	Scenario Description	Endpoint	Distance to the Endpoint (miles)	Public Receptors Within the Distance to the Endpoint	Environmental Receptors Within the Distance to the Endpoint
Regulated Flammable Substances					
i-Pentane	More realistic evaluation of a VCE resulting from the release of 4,900,000 pounds over a 10-minute period	1 psi	0.54	3,800 residents and a recreational park	None
n-Pentane	More realistic evaluation of a VCE resulting from the release of 11,000,000 pounds over a 10-minute period	1 psi	0.27	1,000 residents and a recreational park	None
n-Butane	More realistic evaluation of a VCE resulting from the release of 5,300,000 pounds over a 10-minute period	1 psi	1.4	25,000 residents and a recreational park	Wildlife refuge
n-Butane	BLEVE of storage tank (L15)	1 psi	0.24	1,700 residents	None
n-Butane	Fireball involving contents of storage tank (L15)	6.2 kW/m^2 for 30 seconds*	1.2	23,000 residents and a recreational park	None

*The 6.2 kW/m^2 thermal flux value was determined to be the equivalent thermal flux to cause second-degree burns for an 18-second exposure based on the method presented in Section 4.4.1.

Note: The information contained in this table is based on a hypothetical gas plant and is presented for illustrative purposes only. The information should not be used directly to satisfy the requirements of the RMP rule.

Table 4-16
Five-year Release History of RMP-regulated Substances at an Example Refinery

Regulated Substance	Date, Time, and Duration of the Release	Quantity Released (pounds) and Conc. (wt%)	NAICS Code	Type of Release Event and Source	Weather Conditions	Onsite Impacts	Offsite Impacts	Initiating Event/ Contributing Factors*	Were Offsite Responders Notified?	Operational or Process Changes
Incidents 5 years prior to June 21, 1999 (RMPlan submittal date)										
Propane	7/1/95, 3:43 a.m., ~10 min	> 1,000 (100%)	32411	Failure of fuel gas line to furnace	Unknown	Large fire, $850,000 of damage to furnace casing	None	Equipment failure	Yes	Improved metallurgy
H_2S and assorted flammable gases	11/18/95, time and duration unknown	> 100 (3%)	32411	Unburned emergency release from elevated flare stack	Overcast, winter conditions	None	Several homes were evacuated	Process design failure	Yes	Improved pilot detection and alarm
Methane through pentane	2/29/96, 1:14 p.m., ~25 min	> 10,000	32411	Overhead line leak and subsequent explosion	Unknown	$500,000 fire damage, $100,000 cleanup cost	None	Maintenance activity	Yes	Improved mix point piping and equipment
Incidents after publication of the RMP rule (June 20, 1996)										
H_2S	1/3/97, 11:58 a.m., ~10 min	~50 (3%)		Pump seal failure	5 mph wind, B stability, 35°F	Worker injury—loss of consciousness	None	Unsuitable equipment	No	Replaced pump seal with improved seal
Propane	7/10/98, 1:50 p.m., 43 min	~28,000	32411	Safety valve spring failure, no fire or explosion	20 mph wind, A stability, 72°F	None	City Fire Chief ordered shelter-in-place	Unsuitable equipment	Yes	Replaced safety valve with proper part

*The initiating event and contributing factors were taken from Appendix A of EPA's *RMP*Submit™ User's Manual*.[40]

Note: The information contained in this table is based on a hypothetical refinery and is presented for illustrative purposes only. The information should not be used directly to satisfy the requirements of the RMP rule.

4.10 DISCUSSION OF HAZARD ASSESSMENT ISSUES

The RMP rule specifies that a VCE must be the WCS event for regulated flammable substances. Other fire/explosion mechanisms (e.g., fireball following a BLEVE) may, in some cases, yield greater distances to the endpoint of concern. In written comments submitted to EPA during the RMP rulemaking process, API has supported giving analysts the flexibility to consider the appropriate types of fire/explosion mechanisms (VCE, fireballs, etc.) for releases of regulated flammable substances. As illustrated in Table 4-15, a fireball has the potential to exceed the thermal endpoint at a distance that is comparable to the 1-psi overpressure distance for a VCE. Owners/operators may choose, but are not required, to communicate this additional scenario to local stakeholders to demonstrate that they have considered all of the fire/explosion mechanisms that could affect the public.

5 RMP Rule—Prevention Program

Many refinery processes are subject to Program 3 prevention program requirements (OSHA PSM requirements). This chapter does not go into detail on how to develop a Program 3 prevention program; rather it highlights the prevention activities that differ between EPA RMP and OSHA PSM, and focuses on the type of information that may be included in a facility RMPlan executive summary (see Appendix C for a sample executive summary). Readers needing more detail concerning modifying an existing OSHA PSM program to satisfy EPA Program 3 requirements or information on EPA's Program 2 requirements should consult the CMA/API *RMP Compliance Guideline.*[17]

The accident prevention program summary should highlight the fundamental activities that are in place to prevent, control, and/or mitigate accidental releases of regulated substances. Many of these activities are not new to refineries, and the summary should convey this message where applicable. In addition, the summary should provide enough information to the reader to instill confidence in the refinery's ability to manage the hazards associated with the regulated substances.

The text for each prevention program element should address (1) the fundamental characteristics of the element and what is in place at the facility, (2) the significance of the activities or element, and (3) how the activity and/or supporting documentation is maintained. The text need not address **all** specific requirements; however, it should provide a basic description of the management system and its role in the accident prevention program.

An example prevention program summary is included as Appendix C. This summary can be used "as is" (if all statements are true for the facility) or can be customized to more accurately and descriptively summarize refinery activities. For example, a refinery may want to highlight exemplary practices.

Note:	EPA expects the summary to describe the prevention program information for each covered process as concisely as possible. If the information is the same for several covered processes, include that information only once and note for which processes it applies.

The following sections provide general guidance on the suggested content of each prevention program element as well as ideas regarding additional information that a refinery may want to include for each specific prevention program element.

5.1 EMPLOYEE PARTICIPATION

This section should describe the employee participation program and provide examples of how employees are involved in developing, implementing, and maintaining the accident prevention program. Permitting employee access to prevention program information and referencing the existence of a written employee participation plan are suggested. Examples of other information that a refinery might incorporate into a site-specific plan include:

- The written plan for employee participation
- An example of participation in each prevention program element
- A list of safety teams and their functions
- A list of typical safety meetings and the scheduled frequency

Note: EPA does not require that facilities involve employees in all aspects of the RMP beyond the prevention program. However, facilities may want to extend employee involvement to other RMP areas (e.g., compilation of the 5-year accident history and selection of alternative release scenarios). Employees can provide valuable insights into these efforts, and they will be a valuable resource for supporting the communication of RMPlan information to the community.

5.2 PROCESS SAFETY INFORMATION

This section should address the three basic types of documentation maintained (i.e., chemical hazards, process technology, and equipment information) and how this information is used to support the accident prevention program. Interactions with other prevention program elements, such as training, mechanical integrity, and management of change, can also be addressed. This helps demonstrate that the accident prevention program is highly integrated and that individual elements complement one another to provide a system for accident prevention. Other information that a refinery might choose to incorporate into its site-specific plan includes:

- Names of any specialty documents that have been developed
- A list of specific documentation that is maintained, with a description of the purpose or content of the documentation
- A list of the codes and standards used for design and maintenance of equipment

5.3 PROCESS HAZARD ANALYSIS

This section should identify the hazard evaluation technique(s) utilized for PHAs. The purpose of a PHA should also be stated, along with a general description of who participates in PHAs. The system for resolving recommendations should be described. The text should also address PHA updates and revalidations to demonstrate that this is an ongoing practice. Other information that a refinery may choose to incorporate into its site-specific plan includes:

- A description of any specific training provided to PHA team members or team leaders
- A list of process units and when the PHA was completed
- A list of process deviations and human errors considered during the PHAs
- The resolution status for PHA team findings

Note: According to EPA's general RMP guidance document,[15] any new PHAs completed or existing PHAs updated for OSHA PSM after August 19, 1996 (the effective date of the RMP rule) must consider offsite consequences.

Note: Consider highlighting how your PHAs treat the potential offsite effects of accident scenarios, since EPA expects you to make any necessary modifications to existing PHAs performed for OSHA PSM compliance purposes to handle this issue.

Note: The RMP rule does not require that the executive summary contain specific information about the PHAs of all covered processes. Rather, the rule requires that a facility provide a general summary. However, this summary may not present useful information to the LEPC or the community that may read the executive summary. Consider providing a more detailed picture of the extensive efforts a facility makes to evaluate and control process hazards.

5.4 OPERATING PROCEDURES

This section should identify the types of written operating procedures that have been developed and how they are used to support accident prevention. A brief summary of how procedures are maintained is recommended. Also, existence of troubleshooting guides or similar documents should be addressed. The fact that procedures are readily available should be included. Other information that a refinery may choose to incorporate into its site-specific plan includes:

- An example procedure
- A description of how hourly personnel are involved in developing/maintaining written procedures
- A procedure template that describes what information should be in the procedure
- A matrix that illustrates how each of the PSM-related procedure requirements is addressed
- A list of procedures (e.g., table of contents from an operating manual)

5.5 TRAINING

This section should provide an overview of the training program for operating personnel. The text should address new employee and refresher training. The text should also address verification of employee understanding of the training. The required training documentation should also be addressed. Other information that a refinery may choose to incorporate into a site-specific plan includes:

- An overview of additional safety training that is provided (e.g., hazard communication [HAZCOM])
- Added detail regarding employee comprehension verification (e.g., criteria for acceptance, type of test)
- A list of topics addressed during initial and refresher training
- An overview of any emergency drill program
- An overview of any special emergency response training (e.g., hazardous waste and emergency operations [HAZWOPER])

5.6 CONTRACTORS

This section should describe the basic types and functions of contractors utilized at the site (e.g., supplemental workforce during outages, specialty work, day-to-day operations or maintenance). Also, the text should provide an overview of the information that the refinery provides to contractors or contract employees. Furthermore, the refinery should address the evaluation of contractors prior to selection and the system for monitoring of contractors to ensure that they are fulfilling their PSM obligations. Some refineries may have contract employees who are treated almost identically to their own workers with respect to training. Additional information that a refinery may choose to incorporate into a site-specific plan includes:

- Specific criteria that are used as part of the contractor selection process
- An example checklist that is used as part of the bid process and/or for periodic evaluations of contractors
- An indication of the number of contract firms or contract employees on site during various operating modes (e.g., normal operation, turnarounds)

5.7 PRE-STARTUP SAFETY REVIEWS

This section should describe when a pre-startup safety review (PSSR) is performed and the purpose of the review. The refinery should also describe salient features of the PSSR program (e.g., the use of checklists, team composition, or expertise requirements). Additional information that a refinery may choose to incorporate into a site-specific plan includes:

- An example PSSR checklist
- An overview of the startup authorization requirements

5.8 MECHANICAL INTEGRITY

This section should provide an overview of the scope of the mechanical integrity program, including the equipment addressed and the basic components (e.g., training, inspections and tests, quality assurance). The refinery should consider addressing the purpose of each of the basic components to help readers understand the significance of the activities and how these activities provide a comprehensive system to manage the integrity of process equipment and controls. Additional information that a refinery may choose to incorporate into a site-specific plan includes:

- A list of the codes and standards followed for inspections and tests
- An overview of training or qualification requirements for specialized activities (e.g., welding on code vessels, performing inspections)
- A reference to using special alloys when appropriate to help control corrosion rates

5.9 HOT WORK PERMITS (SAFE WORK PRACTICES)

This section should identify the hot work permit procedure and other safe work practices required by §68.69(d), and describe the purpose for these written practices. The refinery should consider including a reference to any training that is provided regarding these work practices. Additional information that a refinery may choose to incorporate into a site-specific plan includes:

- Other safe work practices that are in place (e.g., lifting permits, excavation permits)
- Example permits

5.10 MANAGEMENT OF CHANGE

This section should refer to written procedures that are in place to manage change and should describe the basic purpose of the management of change (MOC) program, including the reason for the MOC system. Also, the text should address the fact that process safety information and procedures are updated to reflect modifications, and personnel are trained as necessary. Additional information that a refinery may choose to incorporate into a site-specific plan includes:

- An example of an MOC form
- Training that has been provided to workers to help them identify when the MOC system should be utilized (i.e., what is a change and specifics regarding the MOC procedure)
- A description of how temporary changes are managed
- An overview of authorization requirements

5.11 INCIDENT INVESTIGATION

This section should provide an overview of the incident investigation program, including the scope of the program. The text should describe the purpose for the program and the overall goal of preventing recurrences. The refinery should also describe how incident investigation results and findings are tracked until they are resolved, including documenting the resolution and communicating actions to affected personnel (including contractors). The summary should refer to the practice of retaining incident investigation reports so that PHA and PHA revalidation teams can review these reports as part of their activities. Additional information that a refinery may choose to incorporate into a site-specific plan includes:

- An example incident investigation form
- An overview of training provided to personnel who investigate incidents
- A description of OSHA incident rates (for lost-time incidents and other reportable incidents) for the past 5 years

5.12 COMPLIANCE AUDITS

This section should describe the purpose of prevention program compliance audits and their frequency. The text should also refer to the system for responding to compliance audit findings, including documenting the resolution of findings. Additional information that a refinery may choose to incorporate into a site-specific plan includes:

- An overview of training provided to audit team members
- An overview of the system to resolve audit findings so that readers understand that management is involved and interested in the audit process
- An indication of the extensiveness of the audit, either by the resources utilized or the number of questions asked or a combination of the two

Note:	Although the RMP requirement for compliance audits deals only with the RMP prevention program, refineries may find it useful to assess the status of all RMP compliance activities at the same time that the EPA prevention program compliance audit is conducted.

6 RMP Rule—Emergency Response Program

The emergency response program summary should describe the basic elements of your ERP for Program 2 and 3 processes. The summary should address the required elements of an ERP, as specified in §68.95(a):

- An emergency response plan
- Procedures for the use, inspection, testing, and maintenance of emergency response equipment
- Training for all employees in relevant procedures
- Procedures to review and update the emergency response plan

Note: The RMP rule does not require the development of an emergency response program if the employees of the stationary source will not respond to releases of accidental releases of regulated substances and certain other requirements are satisfied [see §68.90(b) of the RMP rule in Appendix F].

According to EPA's general RMP guidance document,[15] response is defined as specified in OSHA's HAZWOPER Standard (29 *CFR* §1910.120). OSHA defines emergency response as "a response effort by employees from outside the immediate release area or by other designated responders... to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance." The key factor is whether the responders have been designated for such tasks by their employer. This definition excludes "responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel" as well as "responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure)." Thus, if you expect your employees to take action to end a small leak (e.g., shutting a valve) or clean up a spill that does not pose an immediate safety or health hazard, this action could be considered an incidental response, and you would not need to develop an emergency response program if your employees are limited to such activities.

Most, if not all, of the requirements have likely been part of your ERP for an extended time. The summary does not need to contain exhaustive details about your emergency response program; however, a facility may want to highlight exemplary emergency response equipment or training. This section should refer to written plans that address emergency response and identify some salient features of these plans. A refinery considering an effort to develop, revise, or consolidate response and contingency plans may want to consider using the National Response Team's "One Plan" guidance document to focus its efforts.[41]

Note: Since the RMP ERP provisions require facilities to test, inspect, and maintain emergency response equipment, consider adding these items to the preventive maintenance program checklist and maintain records of when these activities are conducted. Also, consider maintaining these procedures using the same management system used for maintaining the operating procedures for the facility.

The ERP summary also needs to contain a description of the coordination between the site emergency response program and the local community emergency response plan. The summary should describe how the site interacts with local emergency response organizations (e.g., LEPC, fire department). The summary should also describe some of the activities that the refinery promotes and/or supports, such as emergency drills and LEPC meeting attendance. Additional information to consider putting in the summary includes:

- A description of mutual aid participation
- A list of the types of emergency response equipment on site

- A list of other related contingency plans (e.g., Oil Pollution Act of 1990 [OPA 90], spill prevention, containment, and control [SPCC])

Note:	Consider focusing the ERP RMPlan summary on how the facility interacts with the LEPC and the community. Highlight specific ways that the facility has done this in the past or is planning to do so in the future.
Note:	Some facilities may need only one effective means to alert the community, but other facilities may want to consider using a variety of means to notify the public in the event of a potential catastrophic release (e.g., 911 call, direct dial phone numbers, pager alert systems). Highlight these in the RMPlan.
Note:	Consider providing a complete set of material safety data sheets (MSDSs) to local emergency planning, response, and medical care organizations.

7 RMP Rule—Risk Management Plan

Section 68.150 of the RMP rule requires the owner or operator of covered processes to submit a single RMPlan that includes an executive summary and specific data involving RMP implementation activities. The information shall be submitted in a method and format to a central location to be specified by EPA. The owner or operator must submit the first RMPlan no later than the latest of the following dates:

- June 21, 1999
- Three years after the date on which a regulated substance is first listed by EPA
- The date on which a regulated substance is first present above a TQ in a process

Note: The RMPlan must be submitted to EPA as an electronic file on a diskette in a special format. EPA has developed a free Windows® software program called RMP*Submit[40] for compiling the RMPlan information and producing the appropriately formatted electronic file. Facilities that do not have access to sufficient computer resources may submit a paper copy of the RMPlan using official forms available from EPA (see Appendix D of this Guide). RMP*Submit may be obtained via the Internet at the following address: http://www.epa.gov/ceppo/ap-rmsb.htm.

Note: States or local government agencies (e.g., Air Pollution Control Districts) may take delegation of the RMP Program under section 112(l) of the CAA by adopting a program that is at least as stringent as the federal program and obtaining EPA approval of that program. In these instances, facilities may have to submit RMPlans not only to EPA but also to the agency that has been delegated to oversee and enforce the RMP rule requirements.

Several states are taking delegation of the Section 112(r) program (e.g., Louisiana, Rhode Island, and New Jersey) and have chosen to regulate chemicals that are not in Subpart F of the federal RMP rule. EPA has worked with Louisiana, Rhode Island, and New Jeresy to include these additional chemicals in RMP*Submit (EPA's software for RMPlan submission).

Besides adding chemicals, states taking delegation of the section 112(r) program may establish (1) additional control or procedural requirements for facilities in their states (e.g., requirements to alert specified agencies in case of release), (2) fees payable by owners/operators to support the state's enforcement program, and (3) different compliance dates than the federal RMP rule. If submitted (as part of the delegation package) and approved, those additional requirements will become federally enforceable. RMP*Submit, however, does *not* have a mechanism for providing any information with respect to such additional requirements. Check with your Implementing Agency to see if there are any additional requirements applicable to your facility and what reporting requirements might apply. A list of state contacts can be found in Appendix G of the *RMP*Submit User's Manual*.[40]

The following is a brief description of the required information for the RMPlan executive summary and the detailed RMP data.

7.1 DEVELOPING AN EXECUTIVE SUMMARY

The owner or operator shall provide an executive summary in the RMP that includes a brief description of the following elements:

- The accidental release prevention and emergency response policies at the stationary source
- The stationary source and regulated substances handled
- The WCSs and the ARSs, including administrative controls and mitigation measures to limit the distances for each reported scenario

- General accidental release prevention program and chemical-specific prevention steps
- The 5-year accident history
- The emergency response program
- Planned changes to improve safety

The RMP rule allows considerable leeway in the level of detail to include in the RMPlan executive summary. The RMP rule requirements and the data element guidelines for the executive summary are described in Table 7-1.

Table 7-1
Elements of the RMPlan Executive Summary

RMP Rule Requirement	Data Element Guideline
Briefly describe the accidental release prevention and emergency response policies	No additional guidance
Briefly describe the stationary source and the regulated substances handled	Include primary activities, use of regulated substances, and quantities handled or stored
Briefly describe the worst-case and alternative release scenarios, including administrative controls and mitigation measures that limit the endpoint distances	Include a description of the scenario (i.e., chemical, vessel size, and type of event [toxic release, explosion, etc.]) and whether the release would have offsite consequences. Presentation of endpoint distances is optional (see Note box below)
Briefly describe the general prevention program and chemical-specific prevention steps	State that the facility complies with applicable rules; can highlight specific steps key to the facility prevention program
Briefly describe the 5-year accident history	Should be a summary, not a list of accidental releases
Briefly describe the emergency response program	Mention public notification and alert systems
Briefly describe planned changes to improve safety	No additional guidance

Note: On November 15, 1998, Jim Makris of EPA's Chemical Emergency Preparedness and Prevention Office (CEPPO) issued a memorandum indicating that the OCA information (i.e., worst-case scenario and alternative release scenario data such as the endpoint distances) in the RMPlans would not be posted on the Internet. The information must, however, be submitted in the RMPlan.

Question VII.A.6 of EPA's Question and Answer Database[14] provides guidance on how to present the OCA information in the RMPlan executive summary. EPA states that facilities may satisfy the executive summary OCA requirements by "indicating the chemical, the size of the vessel, the type of release event (e.g., vapor cloud explosion in the case of flammables) and any administrative controls or mitigation measures involved in the scenario, and whether the release would have off-site consequences. Beyond that, each facility may decide what, if any, additional information to include in its executive summary." The Question and Answer Database gives the following example of how the OCA information may be presented in the executive summary:

> "Our worst-case scenario is failure of one 1,500-gallon storage tank of propane when filled to the greatest amount allowed (88% at 60 °F), resulting in a vapor cloud explosion. Since this facility is located in a relatively remote, unoccupied area, the worst-case scenario would not affect anyone beyond our property."

In addition to the RMP rule requirements and the data element guidelines, a facility may want to consider such factors as the following when developing its RMPlan executive summary:

- Whether the RMPlan will be the primary means of communicating RMP information to the public and, if so, the communication expectations of the public
- The extent of the hazards at the facility and the program levels of the processes

Note: The executive summary discussion of planned changes to improve safety do not have to include all changes suggested in PHAs. Rather, this item is to give the public an idea of the types of things that refineries are doing to reduce risk and improve safety.

Appendix C contains a model of an executive summary for a typical refinery. Facilities should consider adapting this model for use in compliance and communication activities. Local conditions may dictate that the summary be more or less detailed than the model. In communities in which the facility is likely to present RMP information in a public forum, owners/operators should consider developing a "public information summary" of the executive summary that conveys the essential RMPlan information in a graphical and easy-to-understand fashion. Such formats have been effective in the Kanawha Valley, West Virginia, and Calhoun/Victoria, Texas.

7.2 COMPLETING THE RMP DATA ELEMENTS CHECKLIST

The RMP rule also requires a variety of specific RMP implementation data. The following is a summary of the required items:

- Registration data
- Offsite consequence analysis data
- Five-year accident history
- Prevention program data for each covered process
- Emergency response program information

In addition, the owner/operator must certify that "... to the best of the signer's knowledge, information, and belief formed after reasonable inquiry, the information submitted is true, accurate, and complete." [§68.185]

Appendix D of this Guide contains the RMPlan submission forms as presented in Appendix A of the *RMP*Submit User's Manual*.[40] These are the official forms that may be used in the event that a facility has limited computer resources and is unable to submit the RMPlan electronically using the RMP*Submit software. The RMP*Submit program and user's manual may be obtained via the Internet at the following address: http://www.epa.gov/ceppo/ap-rmsb.htm.

Note: Most of the data elements listed in Appendix D of this Guide are mandatory. According to EPA, the following data elements are optional:
– LEPC name
– Facility (or Parent Company) E-mail address
– Facility Internet home page address
– Phone number at the facility for public inquiries
– Graphical representations of the OCA footprints

The RMP*Submit software provides two options for completing the data elements checklist for your prevention program. In the first option, a refinery may complete the data elements checklist for each unit that is associated with a given process. For example, if an RMP-covered process is comprised of five process units, then the prevention program data elements checklist may be completed for each of the five process units. In the second option, a refinery may complete the data elements checklist once for each RMP-covered process and then use the description field in RMP*Submit to describe in narrative form how the prevention program is implemented with respect to the different units in the process.

Note: According to EPA's *RMP*Submit User's Manual,*[40] when completing the prevention program data elements checklist for an RMP-covered process consisting of multiple units, EPA recognizes that prevention program implementation may involve different safeguards for different units within the process. For example, different production units may have different operating procedures. At the same time, some safeguards, such as management of change procedures, may apply to all units in the process. You may use the description field in the RMP*Submit data elements checklist to describe these differences. You could start by listing the common prevention program elements you implement for all of the units (e.g., use of an alarm system or standard management of change procedures). You may then indicate what additional prevention program elements you employ for specified units (e.g., use of a dike for certain process units).

7.3 DISTRIBUTION/COMMUNICATION OF OCA INFORMATION IN THE RMPlan

On August 5, 1999, PL 106-40 called the Chemical Safety Information, Site Security and Fuels Regulatory Relief Act,[13] was passed by the U.S. Congress and was signed into law by President Clinton. This Act modifies Section 112(r) of the CAA and provides restrictions on the distribution of OCA data in the RMPlans. The provisions of the Act:

- Required the President (on or before August 5, 2000) to (1) assess the increased risk of terrorist and other criminal activity associated with posting OCA information on the Internet and the incentives created by public disclosure of OCA information for reduction in the risk of accidental releases and (2) promulgate regulations governing the distribution of OCA information to officials and members of the public;
- Prohibited (until August 5, 2000) distribution of OCA information and any ranking of stationary sources derived from OCA information under a Freedom of Information Act request;
- Permited EPA (until August 5, 2000) to provide OCA information to (1) state and local authorities for official use only and (2) members of the public, provided the identity and location of the stationary source are not specified;
- Prohibited federal, state, and local authorities from disclosing OCA information to the public in any form or any statewide or national ranking of stationary sources based on the OCA information;
- Established fines for violating the provisions of the Act (up to $1,000,000 per year);
- Required owners/operators of stationary sources to notify EPA if they make OCA information available to the public without restrictions;
- Required EPA to maintain and make publicly available a list of all stationary sources that have notified EPA of their public disclosure of OCA information;
- Required EPA (on or before February 1, 2000) to develop and implement a system for providing OCA information, including facility identification, to any qualified researcher (including qualified researchers from industry or public interest groups);
- Prohibited qualified researchers from disseminating, or making available on the Internet, OCA information;
- Required EPA, in consultation with the Attorney General and the heads of other appropriate federal agencies, to establish a central database under control of the federal government that provides the public with access to OCA information that they may read, but prevents electronic or mechanical reproduction of the information;
- Required the Attorney General (by August 5, 2002) to study current industry security practices and make appropriate recommendations to Congress to enhance site security and to provide (by August 5, 2000) to certain congressional committees an interim report on its findings; and

- Required owners/operators of stationary sources with Program Level 2 or 3 processes subject to the RMP rule on or before June 21, 1999, to convene a public meeting (between August 5, 1998, and February 1, 2000) to (1) describe and discuss the local implications of their RMPlans and present a summary of their OCA information and (2) provide (on or before June 5, 2000) a certification to the director of the FBI that such a meeting was held or, for small businesses, that the OCA information has been publicly posted. **Note:** The public meeting requirement did not apply to sources that have only Program 1 processes and did not apply to processes subject to the RMP rule after June 21, 1999.

The full text of the Chemical Safety Information, Site Security and Fuels Regulatory Relief Act of 1999 may be obtained at the following Internet address: http://thomas.loc.gov/cgi-bin/query/z?c106:S.880.ENR:

On August 4, 2000,[12] EPA and the Department of Justice issued regulations governing access to, and dissemination of, the OCA information in RMPlans. The main provisions of the rule are:

- Provides read-only public access, with proper identification, to OCA information through the establishment of at least 50 reading rooms geographically distributed across the United States and its territories;
- Allows the public to view the OCA information in the reading rooms for up to 10 facilities per calendar month located anywhere in the country, without geographical restriction;
- Allows any person to view OCA information for facilities located in the jurisdiction of the LEPC where the person lives or works and for any additional facilities with a vulnerable zone extending into that LEPC's jurisdiction;
- Requires EPA to provide Internet access to a computer-based indicator that shall inform any person located in any state whether an address specified by that person might be within the vulnerable zone of one or more stationary sources;
- Restricts the OCA information that may be accessed through the Internet to a subset of data that ***excludes*** the distance to the toxic or flammable endpoint for the worst-case and alternative release scenarios;
- Allows members of LEPCs, State Emergency Response Committees (SERCs), and any other state or local government official to convey to the public OCA data elements orally or in writing, as long as the data elements are not conveyed in the format of sections 2 through 5 of an RMPlan or any electronic database developed by EPA from those sections;
- Allows LEPCs, and related local government agencies to provide read-only public access to a paper copy of the OCA sections of RMPlans (with no limits on the number of stationary sources) for stationary sources within the jurisdiction of the LEPC and for any other stationary source that has a vulnerable zone that extends into that jurisdiction;
- Allows SERCs and related state government agencies to provide read-only public access to the OCA sections of RMPlans for the same stationary sources as the LEPC in whose jurisdiction a person lives a works;
- Allows EPA to provide OCA information, upon request, to federal government officials, and state and local government officials;
- Allows state or local government officials to provide OCA information for stationary sources within their state to other state or local government officials within their state or to officials in a contiguous state;

- Allows EPA to provide OCA information, including facility identification, to qualified researchers;
- Prohibits, with the exceptions noted above, federal, state, and local government officials and qualified researchers from disseminating OCA information and OCA rankings to the public or to state and local government officials; and
- Allows EPA to establish an information technology system, under the control of the federal government, that makes OCA information available to the public via a read-only format.

Note: CMA has published a document entitled *RMP Communication Workbook* (Publication No. 365003) that may be of benefit to facilities in communicating RMP information to local communities. This workbook may be ordered by contacting CMA Publications Fulfillment Office at (301) 617-7824.

The Center for Environmental Communication (CEC) at Rutgers University also has a variety of publications that may be of benefit in communicating RMP information to local stakeholders. A particularly useful publication is *Outreach Materials About Risk Management Plans: Guidance from Pilot Research* (Publication RC-34). The CEC Internet address is: http://aesop.rutgers.edu/%7Ecec/.

7.4 RESUBMITTING A REVISED RISK MANAGEMENT PLAN

According to the RMP rule, resubmission of RMPlans shall be provided according to the following RMPlan update criteria listed in §68.190:

- Within 5 years of its initial submission or most recent update
- No later than 3 years after a newly regulated substance is first listed by EPA
- No later than the date on which a new regulated substance is first present in an already covered process above a threshold quantity
- No later than the date on which a regulated substance is first present above a threshold quantity in a process
- Within 6 months of a change that requires a revised PHA or hazard review
- Within 6 months of a change that requires a revised offsite consequence analysis
- Within 6 months of a change that alters the program level of any covered process

If a stationary source is no longer subject to this part, the owner or operator shall submit a revised registration to EPA within 6 months indicating that the stationary source is no longer covered.

There are three types of RMPlans: the initial RMPlan submission, a corrected RMPlan, and a complete RMPlan resubmission. The ***initial RMPlan submission*** is the first RMPlan submitted by the facility; this submission starts the 5-year anniversary for a complete RMPlan resubmission. A ***corrected RMPlan*** involves making minor corrections to the RMPlan that are not associated with the update criteria listed in §68.190 of the RMP rule (i.e., the bulleted items listed above). Corrections may involve minor administrative changes, such as providing a new phone number or contact name. Corrections to the RMPlan do not change the 5-year anniversary for submitting an updated RMPlan. A ***complete RMPlan resubmission*** involves changes resulting from one or more of the update criteria listed in §68.190 of the RMP rule; all nine sections of the RMPlan must be updated and resubmitted, and the 5-year anniversary for submitting the next updated RMPlan is reset.

Issue: EPA requires that a RMPlan be updated within 6 months of a change that requires a revised PHA. Preamble language states that PHA revisions are **not** expected to occur frequently. A literal interpretation of the regulatory text might indicate that RMPlan updates be done whenever an MOC review is done or a simple update/revalidation of a PHA is completed [61 *Federal Register* 31695]. EPA's general guidance document[15] states that all changes (except replacement in kind) are subject to MOC procedures. When processes undergo minor changes (e.g., minor rerouting of a piping run), information is typically added to a PHA file to reflect the change, even though the validity of the PHA is not affected by the modification. These minor changes and the addition of information about the change to the PHA file are not considered a "revision" of the PHA. Major changes that invalidate a PHA, leading you to "update" or "revalidate" the PHA so that it accurately reflects the hazards of the process, are considered a revision of the PHA under the RMP rule, and thus would require resubmission of the RMPlan.

As indicated in §68.36, a revised RMPlan must be submitted within 6 months if a change in processes, quantities stored or handled, or any other aspect of the stationary source might reasonably be expected to increase or decrease the distance to the endpoint in an OCA by a factor of two or more.

Note: During the 1996 RMP workshops,[34] EPA indicated that the factor of two criterion associated with the OCA endpoint distance only applies to the WCS and not the ARS. Therefore, if the endpoint distance for the WCS increases or decreases by a factor of two or more, a revised RMPlan must be submitted within 6 months of the change in the WCS.

8 Preparing for an RMP Compliance Audit

Sections 68.215 and 68.220 of the RMP rule contain provisions for implementing agencies to conduct periodic completeness checks, reviews, inspections, and audits (see Table 8-1 for definitions of these terms) of the RMPlans submitted by facilities to review the adequacy of the RMPlans and, when necessary, require revisions of the RMPlan submitted by a facility. The implementing agency is the state or local agency that is responsible for oversight and enforcement of the federal or state accidental release prevention program. If a state or local agency does not take delegation, then the EPA is the implementing agency for the state. EPA intends to use the audit process as a way to verify the quality of the program summarized in the RMPlan. EPA has limited resources allocated to auditing activities other than performing audits after significant accidental releases. This is not the case for state-delegated programs. For state-delegated programs, facilities may expect to see auditing activities that might involve more detailed onsite inspections.

Note: It is likely that EPA will initially invest its auditing resources on identifying facilities that (1) have not submitted their initial RMPlans or (2) have had significant accidental releases.

When it is reasonable, EPA will require modifications to the RMPlan that may lead to quality improvements in the underlying risk management program at the facility. EPA has published a document entitled *Guidance for Auditing Risk Management Plans/Programs Under Clean Air Act Section 112(r)*[42] (hereafter referred to as EPA's audit guidance) to assist implementing agencies in developing an RMP audit program and performing RMP audits. This document may be obtained from EPA at the following web address: http://www.epa.gov/ceppo/. Appendix H of this Guide presents the audit checklist (Annex C) from EPA's audit guidance.

Table 8-1
Definitions of Auditing Terminology

Term	Definition
RMPlan completeness check	An in-office check of the RMPlan. This check is performed by the RMP*Submit program to ensure that all of the necessary fields have been completed in the RMPlan. The EPA reporting center will use a similar technique when reviewing every RMPlan submitted to EPA.
RMPlan review	A review conducted by the implementing agency of the data in an RMPlan to identify discrepancies. For example, the executive summary and registration data can be compared to chemical inventory data submitted to the state under EPCRA section 312 [always remembering that EPCRA section 312 and CAA section 112(r) may have differences in thresholds]. Agencies may also want to review RMPlans to identify internal data inconsistencies (e.g., dates listed for activities should be verified as internally consistent), facilities with potential problems based on their accident histories, and unusual data (e.g., failure to list appropriate hazards under the prevention program). For example, if an RMPlan reports that there has recently been a major change in a process that triggered a review or revision of certain requirements [see 68.170(k)], but the RMPlan indicates that these requirements have not been reviewed or revised since the date of the change, further inquiry is warranted.

Table 8-1
Definitions of Auditing Terminology (cont'd)

Term	Definition
RMPlan audit	In an audit, the contents of the RMPlan are reviewed to determine completeness of the risk management program and adequate compliance with section 112(r) requirements. Audits involve more than simply reviewing the RMPlan; specifically, an audit involves an independent verification of the information in an RMPlan (e.g., by consulting other data sources or visiting the facility). Some elements of an audit include: verifying the number of processes a facility has included in its RMPlan, or the existence of mitigation systems reported in the RMPlan. An audit may also focus on accident histories and offsite consequence analyses (e.g., are the reported dates reasonable?). Additionally, audits could be useful in comparing accident histories with accidents reported to the State Emergency Response Commission (SERC) and LEPCs under EPCRA Section 304, which requires reporting of certain chemical releases. Audits may also compare practices among facilities within the same industry sector to determine if particular facilities within the state are meeting industry standards and implementing appropriate accident prevention activities.
Inspection	Inspections complement RMPlan audit activities and are valuable for evaluating compliance with the substantive elements of the Section 112(r) rule. Many implementing agencies that have programs for the protection of public health and safety already have staff who are qualified to conduct onsite inspections (e.g., water permitting agencies visit water treatment plants; fire inspectors check on propane distributors). With proper training, it may be efficient for these regulators and inspectors to add 112(r) compliance elements to their inspection checklist. Pursuant to an audit, which may be combined with an inspection, a stationary source may be required to revise its RMPlan and correct deficiencies in its underlying program. For example, if an audit indicated that a stationary source had not reviewed and updated operating procedures after a change and that such updates were needed, the stationary source could be required to update the procedures, retrain workers in the new procedures, and submit a revised RMPlan.

8.1 THE RMP AUDIT PROCESS

EPA's audit guidance[42] suggests that implementing agencies use a five-step approach for conducting an RMP audit at a stationary source:

1. Selecting a facility for an RMP audit
2. Offsite RMP audit activities
3. Onsite RMP audit activities
4. Concluding audit activities
5. After-audit actions

The following subsections describe the activities involved in each of the steps of the audit process as outlined in EPA's audit guidance.[43]

8.1.1 Selecting a Facility for an RMP Audit

Section 68.220(b) of the RMP rule indicates that the implementing agency may select a stationary source for an RMP audit based on any of the following criteria:

1. Accident history at the stationary source
2. Accident history of other stationary sources in the same industry
3. Quantity of regulated substances at the stationary source
4. Location and proximity of the stationary source to public and environmental receptors
5. Presence of specific regulated substances at the stationary source
6. Hazards identified in the RMPlan submitted by the stationary source
7. Neutral, random selection of a stationary source

EPA's audit guidance also indicates that related criteria that may be used to select a facility for an audit include the number of accidental releases that have occurred, whether there have been any catastrophic accidental releases, and the known toxicity of the chemicals used in the processes. Although not explicitly listed, public pressure and media coverage of accidents at a facility may prompt EPA to select a site for auditing under the accident history provision (Item 1 above).

Section 68.220(c) of the RMP rule exempts stationary sources that have a "Star" or "Merit" ranking under OSHA's voluntary protection program from RMP audits based on criteria (2) and (7) above. However, a facility may still be selected for an RMP audit based on any of the other criteria listed above.

8.1.2 Offsite RMP Audit Activities

The lead auditor determines whether or not the stationary source will be notified in advance of the site visit. Prior notification may be dictated by the implementing agency policy or practices. The lead auditor may elect to notify the facility, state, and local officials of the pending audit and request appropriate background information. The auditor(s) then can review this information prior to the visit, prepare a detailed list of topics and questions to help organize the onsite activities, and minimize the amount of time spent at the facility.

8.1.3 Onsite RMP Audit Activities

Section 68.220(d) of the RMP rule states that "the implementing agency shall have access to the stationary source, supporting documentation, and any area where an accidental release could occur." Upon entering the facility, the auditors will present their official credentials and sign a "sign-in" sheet, log, or visitor register.

Note: EPA's audit guidance[42] indicates the auditor(s) must not sign any type of "waiver" or "visitor release" that would relieve the source of responsibility for injury or limit the rights of the auditing agencies to collect or use data obtained from the stationary source. If a waiver or release is presented, the lead auditor should explain that such a document will not be signed and request a blank "sign-in" sheet. If the auditors are refused entry because they will not sign a release, the lead auditor should report all pertinent facts to the implementing agency's legal counsel. If the matter cannot be resolved, the auditor(s) should leave the facility. All events surrounding the refused entry must be fully documented, including the name(s) of the person(s) refusing entry.

The auditors will likely conduct an opening meeting with the management personnel (e.g., plant manager, superintendents of safety and operations, legal counsel, corporate representative). The lead auditor will explain the purpose and objectives of the audit. At a minimum, the following items will be addressed during the opening meeting:

- Discussion of entry and information gathering authorities (with presentation of auditor[s] credentials);
- Audit purpose and objectives;
- Onsite agenda;
- Identification and management of confidential business information (CBI);
- Information necessary to conduct the audit;
- Safety issues (e.g., source-specific safety orientation training, emergency response procedures, and alarms that may sound in an emergency);

- Schedule for exit briefing; and
- Audit report preparation.

The auditor(s) may request a detailed overview of the chemical processes and/or manufacturing operations at the source, including block flow and/or process flow diagrams indicating chemicals and processes involved. Prior to walking around the facility, the auditor(s) may request an explanation of the source's risk management program, including, at a minimum:

- How the elements of the program are implemented;
- Personnel who are responsible for the implementation of the various elements of the program; and
- A description of the source's records documenting compliance.

At the conclusion of the opening meeting, the lead auditor may request access to the following information, where applicable:

- Documentation for the hazard assessment, including selection of model and procedures followed;
- Documentation supporting reports under the 5-year accident history (e.g., follow-up release reports, initial notifications);
- Documentation for the process hazard analysis or hazard review;
- Standard operating procedures;
- Training records (e.g., hazard communication, emergency response) for all employees;
- Pre-startup safety review;
- Integrity or preventive maintenance records;
- Hot work permit program;
- Written procedures to manage change to processes;
- Plan of action for implementation of employee participation;
- Written process safety information;
- Incident investigation reports;
- The emergency response plan developed by the source;
- The two most recent compliance audit reports; and
- Documentation on coordination with local officials on emergency response activities.

After the opening meeting, the auditors may accomplish their tasks individually or in small groups. Special attention will be paid to (1) verifying the reported program levels for the covered processes and (2) comparing the facility's RMP policies and procedures actually implemented, especially for production or equipment changes. The audit checklist (provided as Appendix H of this Guide) may be used by auditors to ensure that the regulatory requirements are met and that a basic level of data quality is achieved.

During the audit, a variety of materials may be gathered relating to operations at the source. Most of these materials will be referenced in the audit report and maintained in a central file by the implementing agency.

In the exit briefing, the auditor(s) will meet with the management personnel to discuss the audit results. The lead auditor will report to the source management all significant findings, conclusions, and recommendations for which a team consensus exists. The auditor(s) will make source officials aware of any standards, guidelines, or resources that would be helpful in improving the source risk management program.

Note: Determining that a violation has occurred is generally done after an enforcement inspection by the appropriate enforcement program in consultation with legal counsel. The auditor(s) should not make any representations that could affect any subsequent enforcement actions against the source (e.g., guaranteeing no enforcement will be taken if a source performs certain actions to correct a deficiency). However, the audit leader should alert the management personnel to situations that are in need of immediate remediation (e.g., improper storage of incompatible chemicals).

Owners/operators should make appropriate preparations in advance of an ensuing RMP audit. These preparations may include the following:

- Preparing RMP compliance documentation and making it readily available;
- Training the receptionist on what to do when the auditors arrive at the facility; and
- Designating individuals to accompany the auditors during the onsite audit.

The individuals who will be accompanying the RMP auditors should escort the auditors at all times while they are at the facility. The escorts should be instructed to:

- Provide auditors only with information requested;
- Answer questions but limit their responses to what is asked;
- Not be argumentative with the auditors; and
- Not agree or disagree with any comments made or potential violations asserted by the auditors.

When the auditors arrive at the facility, their credentials should be checked, and they should be instructed in the hazards at the facility, what to do in the event of an emergency, and any personal protective equipment (PPE) that may be required while at the site. During the RMP audit, owners/operators should consider performing the following activities:

- Making a list of all documentation provided to the auditors;
- Taking the same photos as the auditors; and
- Taking notes of the auditors' activities while at the site (i.e., what did they see or do, and who did they talk to while at the site?).

8.1.4 Concluding Audit Activities

Following the site visits, the audit team will produce a report to summarize the information gathered during the audit. The findings, conclusions, and recommendations sections of the report will summarize the information from the completed checklists. Each finding will be documented with information collected through document reviews. Any conclusions will be based upon a comparative analysis of each finding with applicable rules, regulations, standards, and accepted guidances. Conclusions will be accompanied by recommendations. Each recommendation will cite the specific rules, regulations, standards, accepted guidances, or technical basis used to formulate the recommendation.

The original audit report will be maintained by the implementing agency. A copy of the report will be forwarded to the facility's owner or operator, as well as to the:

- State Emergency Response Commission;
- Local emergency planning committee in whose area the stationary source is located; and
- If requested, any other federal, state, and local agencies that participated in the audit.

8.1.5 After-audit Actions

Based on the results of the audit, the implementing agency may issue the owner or operator a written ***preliminary determination*** of necessary revisions to the stationary source's RMPlan to ensure that the RMPlan meets the RMP rule requirements. The preliminary determination should include an explanation of the basis for the revisions, reflecting industry standards and guidelines (such as American Institute of Chemical Engineers [AIChE]/CCPS guidelines and American Society of Mechanical Engineers [ASME] and API standards), to the extent that such standards and guidelines are applicable. The preliminary determination should also include a timetable for the implementation of the revisions [§68.220(e)].

The owner or operator should respond in writing to the preliminary determination. The response should state that the owner or operator will implement the revisions contained in the preliminary determination in accordance with the timetable included in the preliminary determination, or should state that the owner or operator rejects the revisions in whole or in part. For each rejected revision, the owner or operator should explain the basis for rejecting that revision. Such explanation may include substitute revisions [§68.220(f)(1)].

The written response should be received by the implementing agency within 90 days of the issuance of the preliminary determination. The implementing agency may specify a shorter period of time in the preliminary determination to protect public health and the environment. Prior to the written response being due and upon written request from the owner or operator, the implementing agency may provide additional time for the response to be received [§68.220(f)(2)].

After providing the owner or operator an opportunity to respond to the preliminary determination, the implementing agency may issue the owner or operator a written ***final determination*** of necessary revisions to the stationary source's RMPlan. The final determination may adopt or modify the revisions contained in the preliminary determination, or may adopt or modify the substitute revisions provided in response to the preliminary determination. A final determination that adopts a revision rejected by the owner or operator should include an explanation of the basis for the revision. A final determination that fails to adopt a substitute revision provided under §68.220(f) should include an explanation of the basis for finding such a substitute revision unreasonable [§68.220(g)].

Thirty days after completion of the actions detailed in the implementation schedule set in the final determination, the owner or operator will be in violation of RMPlan requirements (Subpart G of 40 *CFR* 68) unless the owner or operator revises the RMPlan, as required by the final determination, and submits the revised RMPlan [§68.220(h)].

Once a final determination has been made and the stationary source is deemed to be in violation of 40 *CFR* 68, the audit report, along with the final determination, should be referred to the appropriate program within the implementing agency for enforcement actions. If warranted, the implementing agency may initiate an enforcement action, rather than use the preliminary and final determination process.

The public should have access to the preliminary determinations, responses, and final determination pursuant to 42 U.S.C. 7414(c) [§68.210(a) and 68.220(i)]. The disclosure of classified information by the Department of Defense or other federal agencies or contractors of such agencies will be controlled by applicable laws, regulations, or executive orders concerning the release of classified information [§68.210(b)].

None of the actions described above will preclude, limit, or interfere in any way with the authority of the implementing agency to exercise its enforcement, investigatory, and information gathering authorities under the CAA concerning accidental releases [§68.220(j)].

8.2 DOCUMENTATION TO SUPPORT RMP COMPLIANCE

In preparation for an RMP audit conducted by the implementing agency, a facility should ensure that all of the appropriate documentation supporting the facility's RMP compliance is available for review by the audit team. Appendix I of this Guide provides examples of documentation that a facility may find useful or, in some cases necessary, to support compliance with the RMP rule requirements.

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41. "The National Response Team's Integrated Contingency Plan Guidance," *Federal Register*, Vol. 61, No. 109, June 5, 1996.

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APPENDIX A

An Approach for Determining the Quantity of Regulated Flammable Substances in Distillation Columns/Towers

Regulated Flammable Substances in Distillation Towers/Columns

Determining the quantity of regulated flammable substances in a distillation tower or column presents a special problem because the composition of the liquid and vapor streams varies at different locations within the column. Furthermore, there are two distinct phases within a typical distillation column—liquid and vapor. The following approach may be applied to estimate the quantity of regulated flammable substances in a column:

1. Determine if the vapor mixture exiting the top of the column contains any regulated flammable substances and satisfies the NFPA 4 criteria (see Section 2.4 of this Guide for a discussion of the NFPA 4 criteria). If it does, proceed to step 2. If it does not, then the inventory of regulated flammable substances in the column as a whole is exempt from the TQ determination. (**Note**: In most cases, the vapor mixture exiting the top of the column will meet the NFPA 4 criteria.)
2. Determine if the liquid mixture exiting the bottom of the column contains greater than 1 wt% of a regulated flammable substance. If it does, proceed to step 3. If it does not, then the bottoms liquid in the column is exempt from the TQ determination. Proceed to step 5.
3. Determine if the bottoms liquid mixture satisfies the NFPA 4 criteria. If it does, proceed to step 4. If it does not, then the bottoms liquid is exempt from the TQ determination. Proceed to step 5.
4. Determine the maximum bottoms liquid inventory, based on previous experience. For example, if the column has been completely filled at some point in the past (e.g., under abnormal operating conditions), then assume the full inventory. If the column has never been filled and its design would preclude completely filling it, then use the maximum expected inventory of bottoms liquid in the column.
5. Determine the point in the column where the liquid on the trays satisfies the NFPA 4 criteria. (**Note:** If the bottoms material satisfies the NFPA 4 criteria, then all of the trays in the column will as well.) Add the liquid inventory on each of the trays above this point to the bottoms inventory (if not exempt). Typically, 3 to 4 inches of liquid may be contained on a tray in a column. Therefore, every 3 to 4 trays constitute approximately 1 foot of liquid, which could be a significant quantity. The liquid quantity may be conservatively estimated by multiplying the liquid volume by the component in the mixture that has the highest density. If this approach is deemed too conservative, then the average liquid density may be used.
6. If the inventory calculation does not assume the column is liquid full, then multiply the liquid inventory (in lb) estimated in step 5 by 1.05 to conservatively account for the regulated flammable vapor inventory that may be present in the column. (**Note:** A comparison of the liquid and vapor densities for typical hydrocarbons indicates that the ratio of the densities of the vapor and liquid phases is less than 5% and, in many cases, is much less than 5%. Therefore, 1.05 is suggested as a reasonably conservative factor to use to account for any regulated flammable vapor mass that may be present in the column.)
7. If the amount of the regulated flammable mixture in the column is greater than 10,000 lb, the process is covered. If the column contains less than 10,000 lb, record the amount of the flammable mixture and proceed to the next largest column in the process.
8. Repeat these steps for regulated flammable mixtures in the process. (See Section 2.3 of this Guide for the procedure for estimating the quantity of regulated flammable materials in vessels.)

Example 1: Consider a simple column that is 4 ft in diameter, 12 ft tall, and has 24 trays. The liquid mixture in the bottoms of the column contains more than 1 wt% of pentane and meets the NFPA 4 criteria. The maximum liquid level is 5 ft, based on design features that preclude completely filling the column. The depth of liquid on the trays is approximately 3 in. The maximum density of the heaviest component in the mixture is 50 lb/ft^3. Estimate the quantity of regulated flammable substances in the column.

Calculations

Bottoms liquid volume	$V_{bot} = \pi \times R^2 \times L$ $V_{bot} = \pi \times (2\text{ ft})^2 \times 5\text{ ft} = 62.83\text{ ft}^3$
Trays liquid volume	$V_{tray} = \pi \times R^2 \times \text{Depth} \times \text{Number of trays}$ $V_{tray} = \pi \times (2\text{ ft})^2 \times 0.25\text{ ft} \times 24\text{ trays} = 75.40\text{ ft}^3$
Total liquid volume	$V_{total} = V_{bot} + V_{tray}$ $V_{total} = 62.83 + 75.40 = 138.23\text{ ft}^3$
Total liquid mass	$M_{liquid} = V_{total} \times \rho_{liquid}$ $M_{liquid} = 138.23\text{ ft}^3 \times 50\text{ lb/ft}^3 = 6{,}912\text{ lb}$
Total mass (accounting for vapor)	$M_{total} = 1.05 \times M_{liquid}$ $M_{total} = 1.05 \times 6{,}912\text{ lb} = 7{,}258\text{ lb}$

Example 2: Consider a column that is 4 ft in diameter, 12 ft tall, and has 24 trays. The vapor stream exiting the top of the column contains greater than 1 wt% propane and meets the NFPA 4 criteria, but the liquid mixture in the bottoms of the column does not meet the NFPA 4 criteria. The typical depth of liquid in the bottoms of the column is 3 ft. It is estimated that approximately 12 trays of liquid (the top 4 ft of the column) meet the NFPA 4 criteria. The depth of liquid on the individual trays (meeting the NFPA 4 criteria) is approximately 3 in. The maximum density of the heaviest liquid component on the trays is 50 lb/ft^3. The density of the heaviest vapor component is 0.3 lb/ft^3. Estimate the quantity of regulated flammable substances in the column.

Calculations

Trays liquid volume	$V_{tray} = \pi \times R^2 \times \text{Depth} \times \text{Number of trays}$ $V_{tray} = \pi \times (2\text{ ft})^2 \times 0.25\text{ ft} \times 12\text{ trays} = 37.70\text{ ft}^3$
Total liquid mass	$M_{liquid} = V_{tray} \times \rho_{liquid}$ $M_{liquid} = 37.70\text{ ft}^3 \times 50\text{ lb/ft}^3 = 1{,}885\text{ lb}$
Total vapor volume (ignoring the liquid on the trays)	$V_{vapor} = \pi \times R^2 \times [\text{Column Height} - \text{Bottoms Depth}]$ $V_{vapor} = \pi \times (2\text{ ft})^2 \times [12\text{ ft} - 3\text{ ft}] = 113.10\text{ ft}^3$
Total vapor mass	$M_{vapor} = V_{vapor} \times \rho_{vapor}$ $M_{vapor} = 113.10\text{ ft}^3 \times 0.3\text{ lb/ft}^3 = 34\text{ lb}$ (< 2% of liquid mass)

Total mass $M_{total} = M_{liquid} + M_{vapor}$

$M_{total} = 1{,}885 \text{ lb} + 34 \text{ lb} = 1{,}919 \text{ lb}$

or using the 5% approximation,

Total mass $M_{total} = 1.05 \times M_{liquid}$

$M_{total} = 1.05 \times 1{,}885 \text{ lb} = 1{,}979 \text{ lb}$

APPENDIX B

Vapor Cloud Explosion Modeling Using the Approach in EPA's OCA Guidance

DESCRIPTION OF VAPOR CLOUD EXPLOSION METHODOLOGY

EPA's *Risk Management Program Guidance for Offsite Consequence Analysis*[16] presents a simple VCE methodology referred to as the TNT equivalency method. This VCE method can be used to perform simple screening calculations for assessing Program 1 eligibility. The TNT method assumes that the consequences (i.e., the overpressures) of a VCE are similar to the consequences of a TNT explosion involving an equivalent amount of energy. For WCS events, the fundamental equation for estimating the distance to a 1-psi overpressure for a VCE using the TNT equivalency approach is given as follows:

$$D = 42.9 \times \left(0.1 \times W_f \times \frac{HC_f}{HC_{TNT}} \right)^{\frac{1}{3}} \qquad \text{(B-1)}$$

where D is the distance (in ft) to a 1-psi overpressure, W_f is the mass (in lb) of the flammable substance involved in the VCE, HC_f is the net heat of combustion (BTU/lb) of the flammable substance, and HC_{TNT} is the net heat of combustion (2,012 BTU/lb) of TNT. Table B-1 gives heat of combustion data for regulated flammable substances at a typical refinery.

Table B-1
Heat of Combustion Data for Regulated Flammable Substances at a Typical Refinery

Regulated Substance[1]	CAS Number	Net Heat of Combustion[2] (BTU/lb)
Acetylene	74-86-2	20,732
1,3-Butadiene	106-99-0	19,152
i-Butane	75-28-5	19,594
n-Butane	106-97-8	19,656
Butene	25167-67-3	19,433
Ethane	74-84-0	20,425
Hydrogen	1333-74-0	51,569
Methane	74-82-8	21,509
i-Pentane	78-78-4	19,308
n-Pentane	109-66-0	19,216
Propane	74-98-6	19,920
Propylene	115-07-1	19,674

[1] These flammable substances may not be present at all refineries.
[2] These values were taken from EPA's OCA Guidance[16] and converted from kJ/kg to BTU/lb.

DEVELOPMENT OF MATERIAL-SPECIFIC VCE RELATIONSHIPS

By substituting the appropriate heat of combustion values into the TNT equivalency method, material-specific relationships can be developed for estimating the distance to a 1-psi overpressure for a VCE involving a WCS event. Table B-2 presents these relationships for regulated flammable substances at a typical refinery. To use the relationships, simply input the flammable mass (W_f) into the appropriate relationship and calculate the distance D. Table B-3 presents the distances to a 1-psi overpressure (using the relationships in Table B-2) for a range of flammable masses of regulated flammable substances at a typical refinery. See the next subsection for guidance in determining the flammable mass (W_f).

Table B-2
Distance to 1-psi Relationships for a VCE Involving a WCS Event for Regulated Flammable Substances at a Typical Refinery

Regulated Substance[1]	CAS Number	Distance (ft) to 1-psi Overpressure Equation[2] Based on Flammable Mass W_f (lb)
Acetylene	74-86-2	$D = 43.3 \times W_f^{1/3}$
1,3-Butadiene	106-99-0	$D = 42.2 \times W_f^{1/3}$
i-Butane	75-28-5	$D = 42.5 \times W_f^{1/3}$
n-Butane	106-97-8	$D = 42.6 \times W_f^{1/3}$
Butene	25167-67-3	$D = 42.4 \times W_f^{1/3}$
Ethane	74-84-0	$D = 43.1 \times W_f^{1/3}$
Hydrogen	1333-74-0	$D = 58.7 \times W_f^{1/3}$
Methane	74-82-8	$D = 43.9 \times W_f^{1/3}$
i-Pentane	78-78-4	$D = 42.3 \times W_f^{1/3}$
n-Pentane	109-66-0	$D = 42.2 \times W_f^{1/3}$
Propane	74-98-6	$D = 42.8 \times W_f^{1/3}$
Propylene	115-07-1	$D = 42.6 \times W_f^{1/3}$

[1] These flammable substances may not be present at all refineries.
[2] These equations give the distance (in ft) to a 1-psi overpressure based on a flammable mass given in lb. To obtain the distance in miles, divide the distance in ft by 5,280.

For a mixture of regulated flammable substances, determine the distance based on the predominant flammable substance in the mixture (using an equation from Table B-2 for the predominant component and using the total weight of the flammable mixture) or use the following equation to calculate the net heat of combustion for the mixture:

$$HC_{mix} = \sum_{i=1}^{N} \frac{W_{fi}}{W_f} HC_i \qquad \text{(B-2)}$$

where HC_{mix} is the net heat of combustion (in BTU/lb) for the mixture, N is the number of flammable substances in the mixture, W_{fi} is the flammable mass (in lb) of substance i in the mixture, W_f is the total mass (in lb) of the flammable mixture, and HC_i is the net heat of combustion (BTU/lb) of substance i in the mixture. After calculating HC_{mix}, use equation B-1 to calculate the distance to a 1-psi overpressure for a VCE involving a WCS event.

ESTIMATING THE FLAMMABLE MASS (W_f) FOR VCEs

The flammable mass that should be used in Equation B-1, the distance relationships in Table B-2, or Table B-3 is determined based on the process or storage conditions for the WCS release quantity (see Section 4.2 of this Guide). Based on the RMP rule amendments[8-10] published in the *Federal Register* on May 26, 1999, the flammable mass W_f for a WCS is determined in one of the three following ways:

1. *For a material processed/stored as a gas or a pressurized liquefied gas:* The flammable mass W_f is the total quantity released.

2. *For a material processed/stored as a refrigerated liquefied gas (i.e., the material is processed/stored at its normal boiling point and at atmospheric pressure)*: If the released material is not contained such that its pool depth is greater than or equal to 1 cm (0.39 in.), then the flammable mass W_f is the total quantity released. If the released material is contained such that it forms a pool that is 1 cm or greater in depth, then the flammable mass W_f is determined by (1) assuming the pool instantaneously covers the containment area, (2) estimating the pool evaporation rate (lb/min), assuming the pool temperature is equal to the normal boiling point of the material, and (3) multiplying the pool evaporation rate by 10 min to obtain a total mass (lb) involved in the VCE.

3. *For a material processed/stored as a nonpressurized liquid (i.e., the normal boiling point of the material at atmospheric pressure is greater than both the maximum process/storage temperature and the maximum ambient temperature that have occurred in the past 3 years):* The flammable mass W_f is determined by (1) assuming the pool instantaneously forms a liquid pool, (2) estimating the pool evaporation rate (lb/min), assuming the pool temperature is the greater of the maximum process/storage temperature or the maximum ambient temperature that has occurred in the past 3 years, and (3) multiplying the pool evaporation rate by 10 min to obtain a total mass (lb) involved in the VCE.

For those cases where the flammable mass W_f is dependent upon the pool evaporation rate, EPA's OCA Guidance[16] presents a simple method for estimating the pool evaporation rate:

$$QR = 1.4 \times LF \times A \qquad \text{(B-3)}$$

where QR is the pool evaporation rate (in lb/min), LF is a liquid factor (in lb/min-ft^2), and A is the pool area (in ft^2). The liquid factor LF is a function of the temperature of the material in the liquid pool. Table B-4 presents the temperature-dependent LF values for regulated flammable substances at a typical refinery. The pool area A should be the lesser of (1) the area covered by an unconfined spill ($A_{uncontained}$) or (2) the diked or bermed area ($A_{contained}$), if spill is contained. The unconfined pool area may be estimated from the following:

$$A_{uncontained} = Q \times DF \qquad \text{(B-4)}$$

Table B-3
Distance to 1-psi Overpressure for a VCE Involving a WCS Event for RMP-regulated Flammable Substances at a Typical Refinery[1]

Flammable Mass (lb)		10,000	20,000	30,000	50,000	100,000	150,000	200,000	300,000	500,000
Chemical Name[2]	CAS No.	Distance (miles) to 1-psi Overpressure								
Acetylene	74-86-2	0.18	0.22	0.25	0.30	0.38	0.44	0.48	0.55	0.65
1,3-Butadiene	106-99-0	0.17	0.22	0.25	0.29	0.37	0.42	0.47	0.53	0.63
i-Butane	75-28-5	0.17	0.22	0.25	0.30	0.37	0.43	0.47	0.54	0.64
n-Butane	106-97-8	0.17	0.22	0.25	0.30	0.37	0.43	0.47	0.54	0.64
Butene	25167-67-3	0.17	0.22	0.25	0.30	0.37	0.43	0.47	0.54	0.64
Ethane	74-84-0	0.18	0.22	0.25	0.30	0.38	0.43	0.48	0.55	0.65
Hydrogen	1333-74-0	0.24	0.30	0.35	0.41	0.52	0.59	0.65	0.74	0.88
Methane	74-82-8	0.18	0.23	0.26	0.31	0.39	0.44	0.49	0.56	0.66
i-Pentane	78-78-4	0.17	0.22	0.25	0.30	0.37	0.43	0.47	0.54	0.64
n-Pentane	109-66-0	0.17	0.22	0.25	0.29	0.37	0.42	0.47	0.54	0.63
Propane	74-98-6	0.17	0.22	0.25	0.30	0.38	0.43	0.47	0.54	0.64
Propylene	115-07-1	0.17	0.22	0.25	0.30	0.37	0.43	0.47	0.54	0.64

[1] This table was taken from EPA's OCA Guidance.[16]
[2] These flammable substances may not be present at all refineries. There may also be other RMP-regulated flammable substances at a given refinery that are not listed in this table. Consult EPA's OCA Guidance[16] for data on other regulated flammable substances.

where $A_{uncontained}$ is the uncontained pool area (in ft^2), Q is the total quantity released (in lb), and DF is the density factor (in ft^2/lb) for the spilled material. The density factor DF is a function of the temperature of the material in the liquid pool. The temperature-dependent DF values for regulated flammable substances at a typical refinery are presented in Table B-4. The density factors are calculated assuming that the material spreads to a minimum pool thickness of 1 cm (0.39 in). Once the pool evaporation rate QR is estimated, then the flammable mass W_f is determined from the following:

$$W_f = QR \times 10 \quad \text{(B-5)}$$

Table B-4
Liquid Factor (LF) and Density Factor (DF) Values for Regulated Flammable Substances at a Typical Refinery

Regulated Substance*	CAS Number	Pool Temperature (°F)	Liquid Factor (LF) (lb/min-ft^2)	Density Factor (DF) (ft^2/lb)
Acetylene	74-86-2	-118.8**	0.12	0.78
1,3-Butadiene	106-99-0	24.1**	0.14	0.75
i-Butane	75-28-5	10.9**	0.15	0.82
n-Butane	106-97-8	31.1**	0.14	0.81
Butene	25167-67-3	20.8**	0.14	0.77
Ethane	74-84-0	-127.5**	0.14	0.89
Hydrogen	1333-74-0	-423.2**	0.21	6.89
Methane	74-82-8	-258.7**	0.15	0.15
i-Pentane	78-78-4	70	0.12	0.79
		75	0.13	0.79
		80	0.15	0.80
		82.1**	0.15	0.80
n-Pentane	109-66-0	70	0.09	0.78
		75	0.10	0.78
		80	0.11	0.79
		85	0.12	0.79
		90	0.13	0.80
		95	0.14	0.80
		96.9**	0.15	0.80
Propane	74-98-6	-43.7**	0.14	0.83
Propylene	115-07-1	-53.8**	0.14	0.79

* These flammable substances may not be present at all refineries.
** This temperature corresponds to the normal boiling point of the substance at atmospheric pressure. If the pool temperature is greater than this temperature, then the substance is a pressurized liquefied gas and the flammable mass W_f should be the total quantity released (i.e., use of pool evaporation to calculate W_f is not appropriate).

EXAMPLE APPLICATIONS OF VCE RELATIONSHIPS

Example 1: Consider a storage vessel containing 270,000 lb of propane stored as a pressurized liquefied gas. Because the propane is stored as a liquid under pressure, the RMP rule requires that the flammable mass W_f be the total quantity released. The distance to a 1-psi overpressure for a VCE involving this WCS event is given by the following relationship for propane from Table B-2:

$$D = 42.8 \times (270{,}000 \text{ lb})^{1/3} = 2{,}766 \text{ ft or } 0.52 \text{ mile}$$

Using Table B-3, the distance to a 1-psi overpressure for the propane VCE is between 0.47 mile (for 200,000 lb) and 0.54 mile (for 300,000 lb). Linear interpolation for a flammable mass of 270,000 lb yields a distance of 0.52 mile.

Example 2: Consider a storage vessel containing 270,000 lb of propane stored as a refrigerated liquefied gas at a maximum temperature of –43.7 °F and at atmospheric pressure. The storage tank has a containment berm with a surface area of 2,000 ft^2 that will contain the full inventory of 270,000 lb. Because the propane is stored at its normal boiling point and at atmospheric pressure and the storage tank has a containment berm, the flammable mass W_f is estimated based on the pool evaporation rate. First, the uncontained pool area $A_{uncontained}$ is calculated using equation B-4 (with a DF value of 0.83 for propane) for comparison to the contained pool area $A_{contained}$ of 2,000 ft^2.

$$A_{uncontained} = (270{,}000 \text{ lb}) \times (0.83 \text{ ft}^2/\text{lb}) = 224{,}100 \text{ ft}^2$$

Since the uncontained pool area (224,100 ft^2) is greater than the contained pool area (2,000 ft^2), the pool depth in the bermed area is greater than 1 cm (0.39 in.). If the uncontained pool area had been less than the contained pool area, then the pool depth in the bermed area would have been less than 1 cm, and the total quantity released (270,000 lb) would have to be used as the flammable mass W_f. However, since the pool depth in the bermed area is greater than 1 cm, the flammable mass is estimated based on the pool evaporation rate. The pool evaporation rate is estimated using equation B-3 (with an LF of 0.14 for propane from Table B-4):

$$QR = 1.4 \times (0.14 \text{ lb/min-ft}^2) \times (2{,}000 \text{ ft}^2) = 392 \text{ lb/min}$$

The flammable mass is then estimated using equation B-5:

$$W_f = (392 \text{ lb/min}) \times 10 = 3{,}920 \text{ lb}$$

The distance to a 1-psi overpressure for a VCE involving this WCS event is given by the following relationship for propane from Table B-2:

$$D = 42.8 \times (3{,}920 \text{ lb})^{1/3} = 675 \text{ ft or } 0.13 \text{ mile}$$

Since the flammable mass is less than 10,000 lb, Table B-3 cannot be used to estimate the distance to a 1-psi overpressure for this WCS event.

Example 3: Consider a storage vessel containing 5,000,000 lb of n-pentane stored at a maximum temperature of 95 °F (based on meteorological observations at the site for the past 3 years) and at atmospheric pressure. The storage tank has a containment berm with a surface area of 20,000 ft^2 that will contain the full inventory of 5,000,000 lb. Because

the n-pentane is stored at below its normal boiling point and at atmospheric pressure, the flammable mass W_f is estimated based on the pool evaporation rate. First, the uncontained pool area $A_{uncontained}$ is calculated using equation B-4 (with a DF value of 0.80 for n-pentane from Table B-4) for comparison to the contained pool area $A_{contained}$ of 20,000 ft^2.

$$A_{uncontained} = (5{,}000{,}000 \text{ lb}) \times (0.80 \text{ ft}^2/\text{lb}) = 4{,}000{,}000 \text{ ft}^2$$

Since the uncontained pool area (4,000,000 ft^2) is greater than the contained pool area (20,000 ft^2), the contained pool area should be used to estimate the pool evaporation rate. The pool evaporation rate is estimated using equation B-3 (with an LF of 0.14 for n-pentane at 95 °F from Table B-4):

$$QR = 1.4 \times (0.14 \text{ lb/min-ft}^2) \times (20{,}000 \text{ ft}^2) = 3{,}920 \text{ lb/min}$$

The flammable mass is then estimated using equation B-5:

$$W_f = (3{,}920 \text{ lb/min}) \times 10 = 39{,}200 \text{ lb}$$

The distance to a 1-psi overpressure for a VCE involving this WCS event is given by the following relationship for n-pentane from Table B-2:

$$D = 42.2 \times (39{,}200 \text{ lb})^{1/3} = 1{,}434 \text{ ft or } 0.27 \text{ mile}$$

Using Table B-3, the distance to a 1-psi overpressure for the n-pentane VCE is between 0.25 mile (for 30,000 lb) and 0.29 mile (for 50,000 lb). Linear interpolation for a flammable mass of 39,200 lb yields a distance of 0.27 mile.

APPENDIX C

Refinery Model Risk Management Plan Executive Summary

The RMP rule requires an executive summary in the RMPlan. The summary must address the following items:

- Accidental release prevention and response policies
- Description of the stationary source and regulated substances
- Offsite consequence analysis results
- General accidental release prevention program and chemical-specific prevention steps
- Five-year accident history
- Emergency response program
- Planned changes to improve safety

Use the following text as an example of language that may be appropriate for an RMPlan executive summary. The level of detail in the RMPlan should reflect site-specific needs.

If your facility chooses to do additional (voluntary) RMP communication activities within the community, this executive summary may be helpful in developing specific RMP communication tools. Consider developing such communication tools with assistance from community outreach and risk communication specialists. The CMA/API *RMP Compliance Guideline*[17] addresses basic RMP communication issues.

Model Refinery Risk Management Plan: Executive Summary

ACCIDENTAL RELEASE PREVENTION AND RESPONSE POLICIES

The ABC refinery has a long-standing commitment to worker and public safety. This commitment is demonstrated by the resources invested in accident prevention, such as training personnel and considering safety in the design, installation, operation, and maintenance of our processes. Our policy is to implement reasonable controls to prevent foreseeable releases of regulated substances. However, if a release does occur, our trained personnel will respond to control and contain the release.

DESCRIPTION OF THE STATIONARY SOURCE AND REGULATED SUBSTANCES

The ABC refinery, located in Anywhere, U.S.A., operates a variety of processes to produce petroleum products (e.g., natural gas, propane, butane, condensate) from raw crude oil. The refinery has several regulated flammables, such as propane, butane, etc. In addition, the refinery uses and/or processes chlorine, ammonia, and hydrogen sulfide, which are also regulated substances.

HAZARD ASSESSMENT RESULTS

The worst-case scenario (WCS) associated with toxic substances in Program 2 and 3 processes at the refinery is a catastrophic failure in the Hydrotreating Unit, resulting in a release of 2,000 pounds of hydrogen sulfide gas over a 10-minute period. Although we have numerous controls to prevent such releases and to manage their consequences, no credit for administrative controls or passive mitigation measures was taken into account in evaluating this scenario. The toxic cloud formed by this release would reach offsite locations and nearby public receptors. No Program 1 processes containing regulated toxic substances were identified at the refinery.

The alternative case scenario (ARS) for hydrogen sulfide is failure of the discharge line of the High Pressure Hot Oil Separator (HPHOS), resulting in a release of 1,600 pounds of hydrogen sulfide gas over a 30-minute period. The 30-minute release duration is the approximate time necessary to depressurize the HPHOS through the flare system and thus stop the release. No other mitigation measures were taken into account in evaluating this scenario. The toxic cloud formed by this release would reach offsite locations and nearby public receptors.

The WCS associated with a release of flammable substances in Program 2 and 3 processes at the refinery is a vapor cloud explosion (VCE) involving the full inventory of the largest storage tank containing normal pentane (n-pentane). No administrative controls are in place to limit the storage inventory in the tank; therefore, the full tank inventory of 11,000,000 pounds is assumed to release, completely vaporize, and ignite, resulting in a VCE. Although we have numerous controls to prevent such releases and to manage their consequences, no credit for passive mitigation measures was taken into account in evaluating this WCS. The pressure wave resulting from the VCE would reach offsite locations and nearby public receptors.

The ARS for flammable substances at the refinery is a VCE resulting from the release of propane from a transfer line (31,000 pounds released over a 15-minute period). The release is expected to be isolated by the operators within 15 minutes (active mitigation).

This event was selected as being a practical scenario for use in emergency planning and response. The pressure wave resulting from the VCE would reach offsite locations, but would not impact any public receptors.

Figures C-1 and C-2 (on pages C-5 and C-6) graphically present the hazard assessment results for the toxic and flammable WCS and ARS events, respectively.

The WCS for the Catalytic Reforming Unit (a Program 1 process) is a VCE involving the full inventory of the high pressure separator vessel containing a mixture of hydrogen, methane, ethane, propane, butane, and pentane. No administrative controls are in place to limit the storage inventory in the high pressure separator, so the full tank inventory of 3,000 pounds is assumed to release, completely vaporize, and ignite, resulting in a VCE. No passive mitigation measures were taken into account in evaluating this WCS. The pressure wave resulting from the VCE would not reach offsite locations.

Note: Graphical depiction of the hazard assessment results is NOT required in the RMPlan but may be useful in communicating the information to the local stakeholders. These "plume maps" could include the following items or features:

- The location of the hypothetical release within the plant
- The shape/area affected by the scenario
- The most likely wind direction
- The location of particular public or environmental receptors

GENERAL ACCIDENTAL RELEASE PREVENTION PROGRAM STEPS

The following is a summary of the general accident prevention program in place at the ABC refinery. Because processes at the refinery that are regulated by the EPA RMP regulation are also subject to the OSHA PSM standard, this summary addresses each of the OSHA PSM elements and describes the management system in place to implement the accident prevention program.

Employee Participation

The ABC refinery encourages employees to participate in all facets of process safety management and accident prevention. Examples of employee participation range from updating and compiling technical documents and chemical information to participating as a member of a process hazard analysis (PHA) team. Employees have access to all information created as part of the refinery accident prevention program. Specific ways that employees can be involved in the accident prevention program are documented in an employee participation plan that is maintained at the refinery and addresses each accident prevention program element. In addition, the refinery has a number of initiatives under way that address process safety and employee safety issues. These initiatives include forming teams to promote both process and personal safety. The teams typically have members from various areas of the plant, including operations, maintenance, engineering, and plant management.

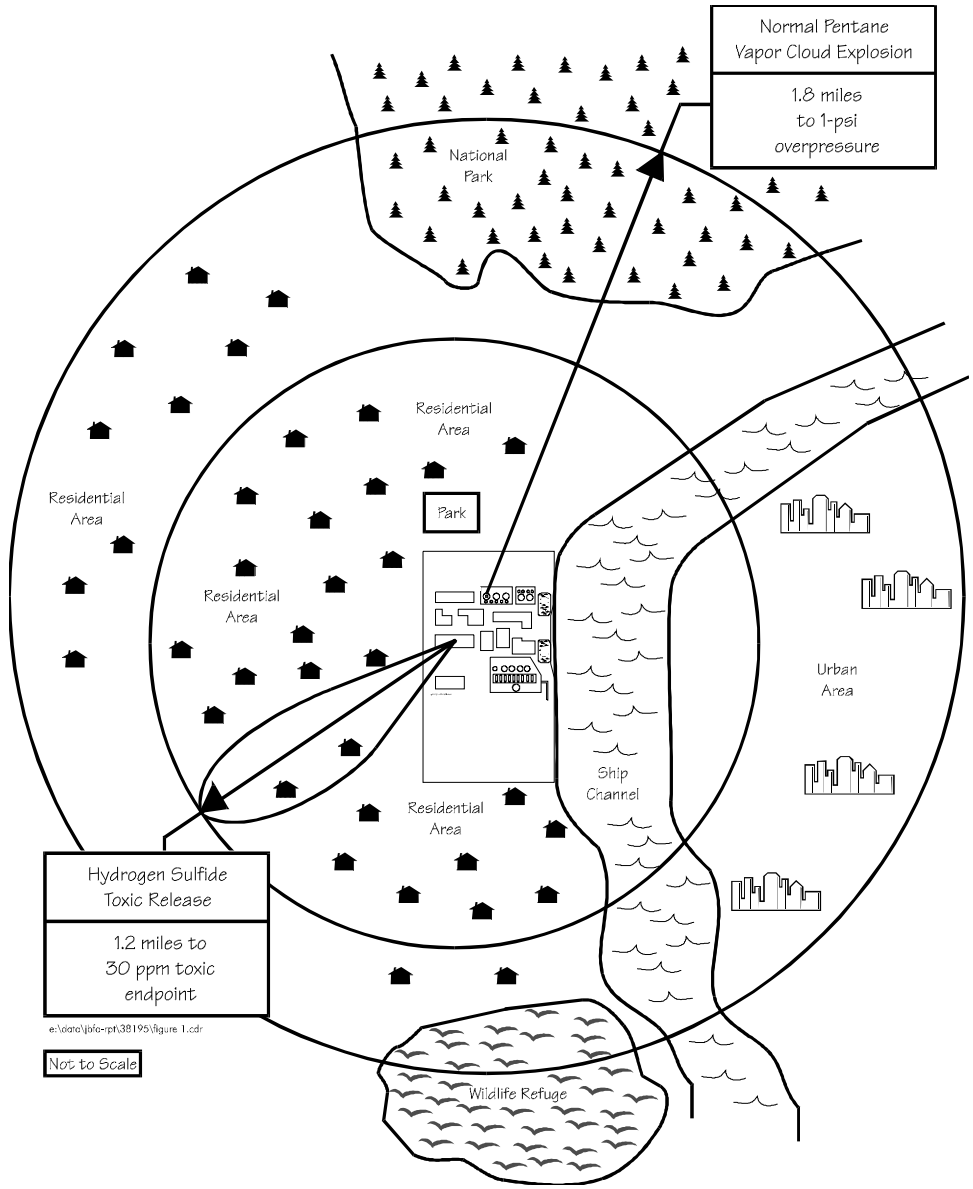

Figure C-1
Hazard Assessment Results for the Worst-case Scenarios at the Example Refinery

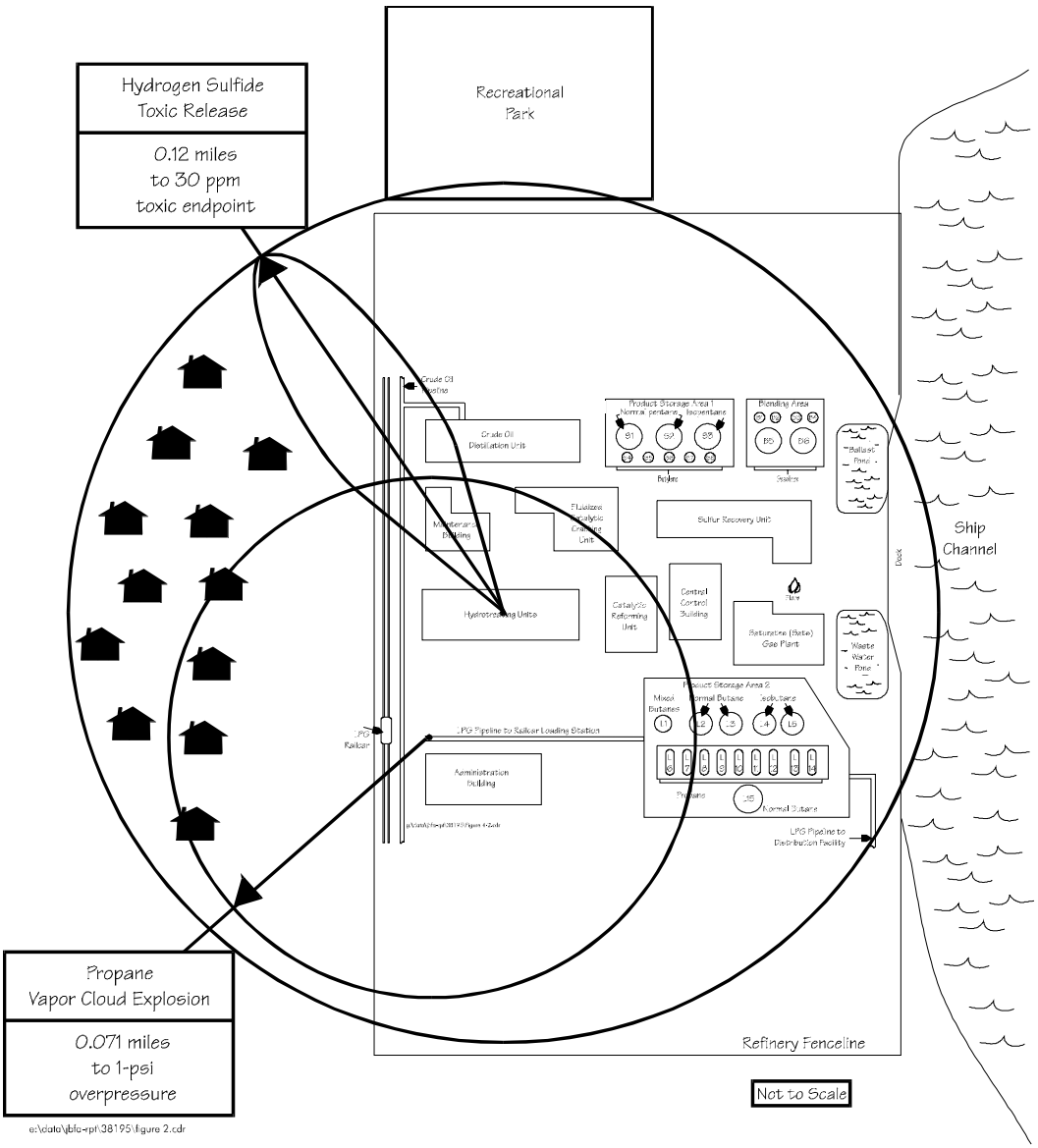

Figure C-2
Hazard Assessment Results for the Alternative Release Scenarios at the Example Refinery

Process Safety Information

The ABC refinery keeps a variety of technical documents that are used to help maintain safe operation of the processes. These documents address chemical properties and associated hazards, limits for key process parameters and specific chemical inventories, and equipment design basis/configuration information. Specific departments within the refinery are assigned responsibility for maintaining up-to-date process safety information. A table summarizing the reference documents and their location is readily available as part of the written employee participation plan to help employees locate any necessary process safety information.

Chemical-specific information, including exposure hazards and emergency response/ exposure treatment considerations, is provided in material safety data sheets (MSDSs). This information is supplemented by documents that specifically address known corrosion concerns and any known hazards associated with the inadvertent mixing of chemicals. For specific process areas, the refinery has documented safety-related limits for specific process parameters (e.g., temperature, level, composition) in a Key Process Parameter Document. The refinery ensures that the process is maintained within these limits using process controls and monitoring instruments, highly trained personnel, and protective instrument systems (e.g., automated shutdown systems).

The refinery also maintains numerous technical documents that provide information about the design and construction of process equipment. This information includes materials of construction, design pressure and temperature ratings, electrical rating of equipment, etc. This information, in combination with written procedures and trained personnel, provides a basis for establishing inspection and maintenance activities, as well as for evaluating proposed process and facility changes to ensure that safety features in the process are not compromised.

Process Hazard Analysis

The ABC refinery has a comprehensive program to help ensure that hazards associated with the various processes are identified and controlled. Within this program, each process is systematically examined to identify hazards and ensure that adequate controls are in place to manage these hazards.

The ABC refinery primarily uses the hazard and operability (HAZOP) analysis technique to perform these evaluations. HAZOP analysis is recognized as one of the most systematic and thorough hazard evaluation techniques. The analyses are conducted using a team of people who have operating and maintenance experience as well as engineering expertise. This team identifies and evaluates hazards of the process as well as accident prevention and mitigation measures, and makes suggestions for additional prevention and/or mitigation measures when the team believes such measures are necessary.

The PHA team findings are forwarded to local and corporate management for resolution. Implementation of mitigation options in response to PHA findings is based on a relative risk ranking assigned by the PHA team. This ranking helps ensure that potential accident scenarios assigned the highest risk receive immediate attention. All approved mitigation options being implemented in response to PHA team findings are tracked until they are complete. The final resolution of each finding is documented and retained.

To help ensure that the process controls and/or process hazards do not eventually deviate significantly from the original design safety features, the ABC refinery periodically updates and revalidates the hazard analysis results. These periodic reviews are conducted at least every 5 years and will be conducted at this frequency until the process is no longer operating. The results and findings from these updates are documented and retained. Once again, the team findings are forwarded to management for consideration, and the final resolution of the findings is documented and retained.

Operating Procedures

The ABC refinery maintains written procedures that address various modes of process operations, such as (1) unit startup, (2) normal operations, (3) temporary operations, (4) emergency shutdown, (5) normal shutdown, and (6) initial startup of a new process. These procedures can be used as a reference by experienced operators and provide a basis for consistent training of new operators. These procedures are periodically reviewed and annually certified as current and accurate. The procedures are maintained current and accurate by revising them as necessary to reflect changes made through the management of change process.

In addition, the ABC refinery maintains a Key Process Parameter Document that provides guidance on how to respond to upper or lower limit exceedances for specific process or equipment parameters. This information, along with written operating procedures, is readily available to operators in the process unit and for other personnel to use as necessary to safely perform their job tasks.

Training

To complement the written procedures for process operations, the ABC refinery has implemented a comprehensive training program for all employees involved in operating a process. New employees receive basic training in refinery operations if they are not already familiar with such operations. After successfully completing this training, a new operator is paired with a senior operator to learn process-specific duties and tasks. After operators demonstrate (e.g., through tests, skills demonstration) having adequate knowledge to perform the duties and tasks in a safe manner on their own, they can work independently. In addition, all operators periodically receive refresher training on the operating procedures to ensure that their skills and knowledge are maintained at an acceptable level. This refresher training is conducted at least every 3 years. All of this training is documented for each operator, including the means used to verify that the operator understood the training.

Contractors

The ABC refinery uses contractors to supplement its workforce during periods of increased maintenance or construction activities. Because some contractors work on or near process equipment, the refinery has procedures in place to ensure that contractors (1) perform their work in a safe manner, (2) have the appropriate knowledge and skills, (3) are aware of the hazards in their workplace, (4) understand what they should do in the event of an emergency, (5) understand and follow site safety rules, and (6) inform refinery personnel of any hazards that they find during their work. This is accomplished by providing contractors with (1) a process overview, (2) information about safety and health hazards, (3) emergency response plan requirements, and (4) safe work practices prior to their beginning work. In addition, the ABC refinery evaluates contractor safety programs

and performance during the selection of a contractor. Refinery personnel periodically monitor contractor performance to ensure that contractors are fulfilling their safety obligations.

Pre-startup Safety Reviews (PSSRs)

The ABC refinery conducts a PSSR for any new facility or facility modification that requires a change in the process safety information. The purpose of the PSSR is to ensure that safety features, procedures, personnel, and the equipment are appropriately prepared for startup prior to placing the equipment into service. This review provides one additional check to make sure construction is in accordance with the design specifications and that all supporting systems are operationally ready. The PSSR review team uses checklists to verify all aspects of readiness. A PSSR involves field verification of the construction and serves a quality assurance function by requiring verification that accident prevention program requirements are properly implemented.

Mechanical Integrity

The ABC refinery has well-established practices and procedures to maintain pressure vessels, piping systems, relief and vent systems, controls, pumps and compressors, and emergency shutdown systems in a safe operating condition. The basic aspects of this program include: (1) conducting training, (2) developing written procedures, (3) performing inspections and tests, (4) correcting identified deficiencies, and (5) applying quality assurance measures. In combination, these activities form a system that maintains the mechanical integrity of the process equipment.

Maintenance personnel receive training on (1) an overview of the process, (2) safety and health hazards, (3) applicable maintenance procedures, (4) emergency response plans, and (5) applicable safe work practices to help ensure that they can perform their job in a safe manner. Written procedures help ensure that work is performed in a consistent manner and provide a basis for training. Inspections and tests are performed to help ensure that equipment functions as intended, and to verify that equipment is within acceptable limits (e.g., adequate wall thickness for pressure vessels). If a deficiency is identified, employees will correct the deficiency before placing the equipment back into service (if possible), or an MOC team will review the use of the equipment and determine what actions are necessary to ensure the safe operation of the equipment.

Another integral part of the mechanical integrity program is quality assurance. The ABC refinery incorporates quality assurance measures into equipment purchases and repairs. This helps ensure that new equipment is suitable for its intended use and that proper materials and spare parts are used when repairs are made.

Safe Work Practices

The ABC refinery has long-standing safe work practices in place to help ensure worker and process safety. Examples of these include (1) control of the entry/presence/exit of support personnel, (2) a lockout/tagout procedure to ensure isolation of energy sources for equipment undergoing maintenance, (3) a procedure for safe removal of hazardous materials before process piping or equipment is opened, (4) a permit and procedure to control spark-producing activities (i.e., hot work), and (5) a permit and procedure to ensure that adequate precautions are in place before entry into a confined space. These procedures (and others), along with training of affected personnel, form a system to help ensure that operations and maintenance activities are performed safely.

Management of Change

The ABC refinery has a comprehensive system to manage changes to processes. This system requires that changes to items such as process equipment, chemicals, technology (including process operating conditions), procedures, and other facility changes be properly reviewed and authorized before being implemented. Changes are reviewed to (1) ensure that adequate controls are in place to manage any new hazards and (2) verify that existing controls have not been compromised by the change. Affected chemical hazard information, process operating limits, and equipment information, as well as procedures, are updated to incorporate these changes. In addition, operating and maintenance personnel are provided any necessary training on the change.

Incident Investigation

The ABC refinery promptly investigates all incidents that resulted in, or reasonably could have resulted in, a fire/explosion, toxic gas release, major property damage, environmental loss, or personal injury. The goal of each investigation is to determine the facts and develop corrective actions to prevent a recurrence of the incident or a similar incident. The investigation team documents its findings, develops recommendations to prevent a recurrence, and forwards these results to refinery management for resolution. Corrective actions taken in response to the investigation team's findings and recommendations are tracked until they are complete. The final resolution of each finding or recommendation is documented, and the investigation results are reviewed with all employees (including contractors) who could be affected by the findings. Incident investigation reports are retained for at least 5 years so that the reports can be reviewed during future PHAs and PHA revalidations.

Compliance Audits

To help ensure that the accident prevention program is functioning properly, the ABC refinery periodically conducts an audit to determine whether the procedures and practices required by the accident prevention program are being implemented. Compliance audits are conducted at least every 3 years. Both hourly and management personnel participate as audit team members. The audit team develops findings that are forwarded to refinery management for resolution. Corrective actions taken in response to the audit team's findings are tracked until they are complete. The final resolution of each finding is documented, and the two most recent audit reports are retained.

CHEMICAL-SPECIFIC PREVENTION STEPS

The processes at the ABC refinery have hazards that must be managed to ensure continued safe operation. The accident prevention program summarized previously is applied to all Program 2 and 3 EPA RMP-covered processes at the ABC refinery. Collectively, these prevention program activities help prevent potential accident scenarios that could be caused by (1) equipment failures and (2) human errors.

In addition to the accident prevention program activities, the ABC refinery has safety features on many units to help (1) contain/control a release, (2) quickly detect a release, and (3) reduce the consequences of (mitigate) a release. The following types of safety features are used in various processes:

Release Detection

- Hydrocarbon detectors with alarms

Release Containment/Control

- Process relief valves that discharge to a flare to capture and incinerate episodic releases
- Scrubber to neutralize chemical releases
- Valves to permit isolation of the process (manual or automated)
- Automated shutdown systems for specific process parameters (e.g., high level, high temperature)
- Vessel to permit partial removal of the process inventory in the event of a release (e.g., dump tank)
- Curbing or diking to contain liquid releases
- Redundant equipment and instrumentation (e.g., uninterruptible power supply for process control system, backup firewater pump)
- Atmospheric relief devices

Release Mitigation

- Fire suppression and extinguishing systems
- Deluge system for specific equipment
- Trained emergency response personnel
- Personal protective equipment (e.g., protective clothing, self-contained breathing apparatus)
- Blast-resistant buildings to help protect control systems and personnel

FIVE-YEAR ACCIDENT HISTORY

The ABC refinery has an excellent record of accident prevention over the past 5 years; the frequency of accidental releases has decreased. Except for an incident involving a release of hydrogen sulfide gas in 1995 (resulting in evacuation of several homes), and a propane release in 1998 during which a precautionary shelter-in-place order was issued, none of the incidents that have occurred have resulted in offsite effects. We investigate every incident very carefully to determine ways to prevent similar incidents from occurring. The following table is a summary of the number of incidents that have occurred during the past 5 years:

	1995	1996	1997	1998	1999
Number of RMP Events with Onsite Effects	1	1	1	0	0
Number of RMP Events with Offsite Effects	1	0	0	1	0

EMERGENCY RESPONSE PROGRAM INFORMATION

The ABC refinery maintains a written emergency response program, which is in place to protect worker and public safety as well as the environment. The program consists of procedures for responding to a release of a regulated substance, including the possibility of a fire or explosion if a flammable substance is accidentally released. The procedures address all aspects of emergency response, including proper first-aid and medical treatment for exposures, evacuation plans and accounting for personnel after an evacuation, notification of local emergency response agencies and the public if a release occurs, and postincident cleanup and decontamination requirements. In addition, the ABC refinery has procedures that address maintenance, inspection, and testing of emergency response equipment, as well as instructions that address the use of emergency response equipment. Employees receive training in these procedures as necessary to perform their specific emergency response duties. The emergency response program is updated when necessary based on modifications made to refinery processes or other refinery facilities. The emergency response program changes are administered through the MOC process, which includes informing and/or training affected personnel in the changes.

The overall emergency response program for the ABC refinery is coordinated with the Anywhere, U.S.A., Local Emergency Planning Committee (LEPC). This coordination includes periodic meetings of the committee, which includes local emergency response officials, local government officials, and industry representatives. The ABC refinery has around-the-clock communications capability with appropriate LEPC officials and emergency response organizations (e.g., fire department). This provides a means of notifying the public of an incident, if necessary, as well as facilitating quick response to an incident. In addition to periodic LEPC meetings, the ABC refinery conducts periodic emergency drills that involve the LEPC and emergency response organizations, and the refinery provides annual refresher training to local emergency responders regarding the hazards of regulated substances in the refinery.

PLANNED CHANGES TO IMPROVE SAFETY

The ABC refinery resolves all findings from PHAs, some of which result in modifications to the process. The following types of changes are planned:

- Decrease in process chemical inventory involving the use of ammonia for waste treatment
- Revised process instrumentation and/or controls in the fluidized catalytic cracking unit
- Hydrocarbon release detection system in the LPG loading rack area
- Improved spill control dikes in the tank farm
- Revisions to personnel training programs
- Revised written operating procedures in the LPG storage area

APPENDIX D

RMPlan Submission Forms

The following RMPlan submission forms are from Appendix A of EPA's *RMP*Submit™ User's Manual*, EPA 550-B99-001, February 1999. Detailed instructions for completing the forms are provided in Chapter 2 of the user's manual. The user's manual may be obtained from EPA's web site at http://www.epa.gov/swercepp/ap-rmsb.htm.

Risk Management Plan Form

Section 112(r) of the Clean Air Act

Form Approved: 2/22/1999
OMB Control Number: 2050-0144

IMPORTANT: Type or print; read instructions before completing form.

Submission Type:	**Where to Send Completed Forms:**
❑ First-Time RMP Submission ❑ Correction to My Current RMP ❑ Re-Submission (all 9 sections are updated and certified)	RMP Reporting Center P.O. Box 3346 Merrifield, VA 22116-3346 Attention: RMP*Submit

Facility Name: _____

____ – ____ – ____
EPA Facility ID# (leave blank for first submission only)

ES Executive Summary

(attach a separate piece of paper if you need additional space)

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only)

1 Section 1. Registration

1.1 Source Identification

1.1.a. Facility Name (maximum 50 characters)

1.1.b. Parent Company #1 Name (maximum 50 characters)

1.1.c. Parent Company #2 Name (maximum 50 characters)

1.2. EPA Facility Identifier (12 characters)

(leave blank for first submission only)

1.3. Other EPA Systems Facility Identifier (15 characters)

1.4. Dun and Bradstreet Numbers (DUNS) (9 characters)

1.4.a. Facility DUNS	1.4.b. Parent Company #1 DUNS	1.4.c. Parent Company #2 DUNS

1.5 Facility Location

1.5.a. Street - Line 1 (maximum 35 characters)

1.5.b. Street - Line 2 (maximum 35 characters)

1.5.c. City (maximum 19 characters)

1.5.d. State

1.5.e. Zip Code Zip +4 Code

1.5.f. County (maximum 20 characters)

1.5.g. Facility Latitude (report in degrees, minutes, and seconds)

+/- D D M M S S . S

1.5.h. Facility Longitude (report in degrees, minutes, and seconds)

+/- D D D M M S S . S

1.5.i. Method for determining Lat/Long (see User Manual for codes)

1.5.j. Description of location identified by Lat/Long (see User Manual for codes)

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only)

1 Section 1. Registration

1.6. Owner or Operator

1.6.a. Name (maximum 35 characters)

1.6.b. Phone ( ) -

Owner or Operator Mailing Address

1.6.c. Street - Line 1 (maximum 35 characters)

1.6.d. Street - Line 2 (maximum 35 characters)

1.6.e. City (maximum 19 characters)

1.6.f. State

1.6.g. Zip Code Zip +4 Code

1.7. Name and title of person or position responsible for RMP (part 68) implementation

1.7.a. Name of person (maximum 35 characters)

1.7.b. Title of person or position (maximum 35 characters)

1.8. Emergency Contact

1.8.a. Name (maximum 35 characters)

1.8.b. Title of person or position (maximum 35 characters)

1.8.c. Phone ( ) -

1.8.d. 24-Hour Phone ( ) -

1.8.e. 24-Hour Phone Extension/PIN # (maximum 35 characters)

1.9. Other Points of Contact (Optional)

1.9.a. Facility or Parent Company E-mail Address (maximum 100 characters)

1.9.b. Facility Public Contact Phone Number ( ) -

1.9.c. Facility or Parent Company WWW Homepage Address (maximum 100 characters)

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐–☐☐☐☐–☐☐☐☐

1 Section 1. Registration

1.10. Local Emergency Planning Committee (LEPC) (optional) (maximum 30 characters)

1.11. Number of full-time employees (FTEs) on site

☐☐☐☐☐

1.12. Covered by (select all that apply)

- ❑ 1.12.a. OSHA PSM
- ❑ 1.12.b. EPCRA section 302
- ❑ 1.12.c. CAA Title V Air Operating Permit Program. If covered, specify permit ID# below.

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

1.13. OSHA Star or Merit Ranking (optional)

❑ Yes ❑ No

1.14. Last Safety Inspection (by an External Agency) Date

☐☐ ☐☐ ☐☐☐☐
M M D D Y Y Y Y

1.15. Last Safety Inspection Performed by an External Agency (select one)

- ❑ 1.15.a. OSHA
- ❑ 1.15.b. State occupational safety agency
- ❑ 1.15.c. EPA
- ❑ 1.15.d. State environmental agency
- ❑ 1.15.e. Fire department
- ❑ 1.15.f. Never had one
- ❑ 1.15.g. Other (specify) (maximum 50 characters)

_____

_____

1.16. Will this RMP involve Predictive Filing? (optional)

❑ Yes ❑ No

Facility Name: _____

EPA Facility ID# (leave blank for first submission only)

1 Section 1. Registration

1.17. Process Specific Information. For each covered process, fill in this page. If you are reporting more than one process, make a photocopy of this page and report each process on a separate sheet.

Process ID# (optional–for your reference only)

Process Description (optional–for your reference only)

1.17.a. Program Level (select one)

❑ 1 ❑ 2 ❑ 3

1.17.b. NAICS Code(s) (five or six digits)

1.17.c. Chemical(s) (regulated substance(s))

1.17.c.1. Name (maximum 100 characters)	1.17.c.2. CAS Number (10 characters)	1.17.c.3. Quantity (lbs) (max. 12 chars.)

If you need more space to list NAICS codes or chemicals, please make a photocopy of this sheet.

Are you claiming confidential business information in this section? ❑

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only)

2 Section 2. Toxics: Worst Case

(If you need to report a worst-case scenario, make a photocopy of pages 2-1 and 2-2 and report each scenario separately)

2.1. Chemical

2.1.a. Name (maximum 100 characters)

2.1.b. Percent weight of chemical (if in a mixture)

__ __ . __ %

2.2. Physical state (select one)

- ❑ 2.2.a. Gas
- ❑ 2.2.b. Liquid
- ❑ 2.2.c. Gas liquified by pressure
- ❑ 2.2.d. Gas liquified by refrigeration

2.3. Model Used (select one or enter another model name in Other below)

- ❑ 2.3.a. EPA's OCA Guidance Reference Tables or Equations
- ❑ 2.3.b. EPA's RMP Guidance for Ammonia Refrigeration Reference Tables or Equations
- ❑ 2.3.d. EPA's RMP Guidance for Waste Water Treatment Plants Reference Tables or Equations
- ❑ 2.3.e. EPA's RMP Guidance for Warehouses Reference Tables or Equations
- ❑ 2.3.f. EPA's RMP Guidance for Chemical Distributors Reference Tables or Equations
- ❑ 2.3.g. EPA's RMP*Comp™
- ❑ 2.3.h. Areal Locations of Hazardous Atmospheres (ALOHA®)
- ❑ 2.3.z. Other model (specify) (maximum 255 characters)

_____

2.4. Scenario (select one)

- ❑ 2.4.a. Gas Release
- ❑ 2.4.b. Liquid Spill and Vaporization

2.5. Quantity released (lbs)

__ __ __ __ __ __ __ __ __ __ __ __

2.6. Release rate (lbs/minute)

__ __ __ __ __ __ __ __ . __

2.7. Release duration (minutes)

__ __ __ __ . __

2.8. Wind speed (meters/second)

__ __ __ __ . __

2.9. Atmospheric stability class (A-F)

__

2.10. Topography (select one)

- ❑ 2.10.a. Urban
- ❑ 2.10.b. Rural

2.11. Distance to endpoint (miles)

__ __ __ . __ __

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐–☐☐☐☐–☐☐☐☐

2 Section 2. Toxics: Worst Case

2.12. Estimated residential population within distance to endpoint (numeric)

☐☐ , ☐☐☐ , ☐☐☐

2.13. Public receptors within distance to endpoint (select all that apply)

- ❑ 2.13.a. Schools
- ❑ 2.13.b. Residences
- ❑ 2.13.c. Hospitals
- ❑ 2.13.d. Prison/Correctional Facilities
- ❑ 2.13.e. Recreation Areas
- ❑ 2.13.f. Major commercial, office, or industrial areas
- ❑ 2.13.g. Other (specify) (maximum 200 characters)

_____

_____

_____

2.14. Environmental receptors within distance to endpoint (select all that apply)

- ❑ 2.14.a. National or State Parks, Forests, or Monuments
- ❑ 2.14.b. Officially Designated Wildlife Sanctuaries, Preserves, or Refuges
- ❑ 2.14.c. Federal Wilderness Area
- ❑ 2.14.d. Other (specify) (maximum 200 characters)

_____

_____

2.15. Passive mitigation considered (select all that apply)

- ❑ 2.15.a. Dikes
- ❑ 2.15.b. Enclosures
- ❑ 2.15.c. Berms
- ❑ 2.15.d. Drains
- ❑ 2.15.e. Sumps
- ❑ 2.15.f. Other (specify) (maximum 200 characters)

_____

_____

2.16. Graphics file name (optional) (maximum 12 characters)

Are you claiming confidential business information in this section? ❑

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐–☐☐☐☐–☐☐☐☐

3 Section 3. Toxics: Alternative Releases

(If you need to report more than one alternative release scenario, make a copy of pages 3-1 and 3-2 and report each scenario separately)

3.1. Chemical

3.1.a. Name (maximum 100 characters)

3.1.b. Percent weight of chemical (if in a mixture)

☐☐ . ☐%

3.2. Physical State (select one)

- ❑ 3.2.a. Gas
- ❑ 3.2.b. Liquid
- ❑ 3.2.c. Gas liquified by pressure
- ❑ 3.2.c. Gas liquified by refrigeration

3.3. Model Used (select one or enter another model name in Other below)

- ❑ 3.3.a. EPA's OCA Guidance Reference Tables or Equations
- ❑ 3.3.b. EPA's RMP Guidance for Ammonia Refrigeration Reference Tables or Equations
- ❑ 3.3.d. EPA's RMP Guidance for Waste Water Treatment Plants Reference Tables or Equations
- ❑ 3.3.e. EPA's RMP Guidance for Warehouses Reference Tables or Equations
- ❑ 3.3.f. EPA's RMP Guidance for Chemical Distributors Reference Tables or Equations
- ❑ 3.3.g. EPA's RMP*Comp™
- ❑ 3.3.h. Areal Locations of Hazardous Atmospheres (ALOHA®)
- ❑ 3.3.z. Other model (specify) (maximum 200 characters)

_____

3.4. Scenario (select one)

- ❑ 3.4.a. Transfer hose failure
- ❑ 3.4.b. Pipe leak
- ❑ 3.4.c. Vessel leak
- ❑ 3.4.d. Overfilling
- ❑ 3.4.e. Rupture disk/relief valve failure
- ❑ 3.4.f. Excess flow device failure
- ❑ 3.4.g. Other (specify) (maximum 35 characters)

_____

_____

3.5. Quantity released (lbs)

☐☐☐☐☐☐☐☐☐☐☐☐

3.6. Release rate (lbs/minute)

☐☐☐☐☐☐☐☐ . ☐

3.7. Release duration (minutes)

☐☐☐☐ . ☐

3.8. Wind speed (meters/second)

☐☐☐ . ☐

3.9. Atmospheric stability class (A-F)

☐

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐-☐☐☐☐-☐☐☐☐

3 Section 3. Toxics: Alternative Releases

3.10. Topography (select one)

- ❑ 3.10.a. Urban
- ❑ 3.10.b. Rural

3.11. Distance to endpoint (miles)

☐☐☐ . ☐☐

3.12. Estimated residential population within distance to endpoint

☐☐ , ☐☐☐ , ☐☐☐

3.13. Public receptors within distance to endpoint (select all that apply)

- ❑ 3.13.a. Schools
- ❑ 3.13.b. Residences
- ❑ 3.13.c. Hospitals
- ❑ 3.13.d. Prisons/Correctional facilities
- ❑ 3.13.e. Recreation areas
- ❑ 3.13.f. Major commercial, office, or industrial areas
- ❑ 3.13.g. Other (specify) (maximum 200 characters)

_____

3.14. Environmental receptors within distance to endpoint (select all that apply)

- ❑ 3.14.a. National or State Parks, Forests, or Monuments
- ❑ 3.14.b. Officially Designated Wildlife Sanctuaries, Preserves, or Refuges
- ❑ 3.14.c. Federal Wilderness Area
- ❑ 3.14.d. Other (specify) (maximum 200 characters)

_____

_____

3.15. Passive mitigation considered (select all that apply)

- ❑ 3.15.a. Dikes
- ❑ 3.15.b. Enclosures
- ❑ 3.15.c. Berms
- ❑ 3.15.d. Drains
- ❑ 3.15.e. Sumps
- ❑ 3.15.f. Other (specify) (maximum 200 characters)

_____

3.16. Active mitigation considered (select all that apply)

- ❑ 3.16.a. Sprinkler systems
- ❑ 3.16.b. Deluge systems
- ❑ 3.16.c. Water curtain
- ❑ 3.16.d. Neutralization
- ❑ 3.16.e. Excess flow valve
- ❑ 3.16.f. Flares
- ❑ 3.16.g. Scrubbers
- ❑ 3.16.h. Emergency shutdown systems
- ❑ 3.16.i. Other (specify) (maximum 200 characters)

_____

_____

3.17 Graphics file name (optional) (maximum 12 characters)

Are you claiming confidential business information in this section? ❑

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only)

4 Section 4. Flammables: Worst Case

(If you need to report more than one worst-case scenario, make a photocopy of pages 4-1 and 4-2 and report each scenario separately)

4.1. Chemical Name (maximum 100 characters)

4.2. Model Used (select one or enter another model name in Other below)

- ❑ 4.2.a. EPA's OCA Guidance Reference Tables or Equations
- ❑ 4.2.c. EPA's RMP Guidance for Propane Storage Facilities Reference Tables or Equations
- ❑ 4.2.d. EPA's RMP Guidance for Waste Water Treatment Plants Reference Tables or Equations
- ❑ 4.2.e. EPA's RMP Guidance for Warehouses Reference Tables or Equations
- ❑ 4.2.f. EPA's RMP Guidance for Chemical Distributors Reference Tables or Equations
- ❑ 4.2.g. EPA's RMP*Comp™
- ❑ 4.2.z. Other model (specify) (maximum 235 characters)

_____

4.3. Scenario (only one option)

Vapor Cloud Explosion

4.4. Quantity released (lbs)

4.5. Endpoint Used (only one option)

1 PSI

4.6. Distance to endpoint (miles)

4.7. Estimated residential population within distance to endpoint

4.8. Public receptors within distance to endpoint (select all that apply)

- ❑ 4.8.a. Schools
- ❑ 4.8.b. Residences
- ❑ 4.8.c. Hospitals
- ❑ 4.8.d. Prisons/Correctional Facilities
- ❑ 4.8.e. Recreation Areas
- ❑ 4.8.f. Major commercial, office, or industrial areas
- ❑ 4.8.g. Other (specify) (maximum 200 characters)

_____

_____

4.9. Environmental receptors within distance to endpoint (select all that apply)

- ❑ 4.9.a. National or State Parks, Forests, or Monuments
- ❑ 4.9.b. Officially Designated Wildlife Sanctuaries, Preserves, or Refuges
- ❑ 4.9.c. Federal Wilderness Area
- ❑ 4.9.d. Other (specify) (maximum 200 characters)

_____

_____

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐–☐☐☐☐–☐☐☐☐

4 Section 4. Flammables: Worst Case

4.10. Passive mitigation considered (select all that were considered in defining the release quantity or rate for the worst-case scenario)

❑ 4.10.a. Blast walls

❑ 4.10.b. Other (specify) (maximum 200 characters)

_____

_____

4.11. Graphics file name (optional) (maximum 12 characters)

Are you claiming confidential business information in this section? ❑

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only)

5 Section 5. Flammables: Alternative Releases

(If you need to report more than one alternative release scenario, make a copy of pages 5-1 and 5-2 and report each scenario separately)

5.1. Chemical Name (maximum 100 characters)

5.2. Model Used (select one or enter another model name in Other below)

- ❑ 5.2.a. EPA's OCA Guidance Reference Tables or Equations
- ❑ 5.2.c. EPA's RMP Guidance for Propane Storage Facilities Reference Tables or Equations
- ❑ 5.2.d. EPA's RMP Guidance for Waste Water Treatment Plants Reference Tables or Equations
- ❑ 5.2.e. EPA's RMP Guidance for Warehouses Reference Tables or Equations
- ❑ 5.2.f. EPA's RMP Guidance for Chemical Distributors Reference Tables or Equations
- ❑ 5.2.g. EPA's RMP*Comp™
- ❑ 5.2.z. Other model (specify) (maximum 255 characters)

_____

5.3. Scenario (select one)

- ❑ 5.3.a. Vapor cloud explosion
- ❑ 5.3.b. Fireball
- ❑ 5.3.c. BLEVE
- ❑ 5.3.d. Pool fire
- ❑ 5.3.e. Jet fire
- ❑ 5.3.f. Vapor cloud fire
- ❑ 5.3.g. Other (specify) (maximum 30 characters)

_____

_____

5.4. Quantity released (lbs)

|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

5.5. Endpoint used (select one)

- ❑ 5.5.a. 1 PSI
- ❑ 5.5.b. 5 kw/m^2 for 40 seconds
- ❑ 5.5.c. Lower flammability limit (specify) |_|_|.|_|

5.6. Distance to endpoint (miles)

|_|_|_|.|_|_|

5.7. Estimated residential population within distance to endpoint

|_|_|,|_|_|_|,|_|_|_|

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ____-____-____

5 Section 5. Flammables: Alternative Releases

5.8. Public receptors within distance to endpoint (select all that apply)

- ❑ 5.8.a. Schools
- ❑ 5.8.b. Residences
- ❑ 5.8.c. Hospitals
- ❑ 5.8.d. Prisons/Correctional facilities
- ❑ 5.8.e. Recreation areas
- ❑ 5.8.f. Major commercial, office, or industrial areas
- ❑ 5.8.g. Other (specify) (maximum 200 characters)

_____

_____

5.9. Environmental receptors within distance to endpoint (select all that apply)

- ❑ 5.9.a. National or State Parks, Forests, or Monuments
- ❑ 5.9.b. Officially Designated Wildlife Sanctuaries, Preserves, or Refuges
- ❑ 5.9.c. Federal Wilderness Area
- ❑ 5.9.d. Other (specify) (maximum 200 characters)

_____

_____

5.10. Passive mitigation considered (select all that apply)

- ❑ 5.10.a. Dikes
- ❑ 5.10.b. Fire walls
- ❑ 5.10.c. Blast walls
- ❑ 5.10.d. Enclosures
- ❑ 5.10.e. Other (specify) (maximum 200 characters)

_____

_____

5.11. Active mitigation considered (select all that apply)

- ❑ 5.11.a. Sprinkler system
- ❑ 5.11.b. Deluge system
- ❑ 5.11.c. Water curtain
- ❑ 5.11.d. Excess flow valve
- ❑ 5.11.e. Other (specify) (maximum 200 characters)

_____

_____

5.12. Graphics file name (optional) (maximum 12 characters)

Are you claiming confidential business information in this section? ❑

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only)

6 Section 6. Five-Year Accident History

(If you need to report more than one accident history, make a photocopy of pages 6-1 through 6-3 and report each accident separately)

Would you like to certify that your facility *did not have* any reportable accidents in the last 5 years?

❑ Yes; leave the rest of this section blank ❑ No; fill out this section for each accident

6.1. Date of accident (day, month, and year)

M M D D Y Y Y Y

6.2. Time accident began (hours and minutes)

H H M M ❑ a.m. ❑ p.m.

6.3. NAICS code of process involved

6.4. Release duration (hours and minutes)

H H H M M

6.5. Chemical(s) released (if you need more space to list chemicals, please make a photocopy of this sheet)

6.5.a.i. Chemical name (maximum 100 characters)	6.5.a.ii CAS number	6.5.b. Quantity released (lbs.)	6.5.c. Percent weight of chemical if in a mixture (toxics only)
			. %
			. %
			. %
			. %

6.6. Release event (select at least one)

❑ a. Gas release
❑ b. Liquid spill/evaporation
❑ c. Fire
❑ d. Explosion

6.7. Release source (select at least one)

❑ a. Storage vessel
❑ b. Piping
❑ c. Process vessel
❑ d. Transfer hose
❑ e. Valve
❑ f. Pump
❑ g. Joint
❑ h. Other (specify) (maximum 200 characters)

_____

_____

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐–☐☐☐☐–☐☐☐☐

6 Section 6. Five-Year Accident History

6.8. Weather conditions at time of event

a.i. Wind speed (numerical) ☐☐☐.☐	Wind speed unit ❑ miles/hr. ❑ knots ❑ meters/sec.	a.ii. Wind direction ☐☐☐
b. Temperature (°F) ☐☐☐	c. Atmospheric stability class (A-F) ☐	❑ d. Precipitation present

❑ e. Unknown weather conditions (check if a-d are all unknown)

6.9. On-site Impacts

a. Deaths (enter numbers)		b. Injuries (enter numbers)	
a.i. Employees or contractors	☐☐☐☐☐	b.i. Employees or contractors	☐☐☐☐☐
a.ii. Public responders	☐☐☐	b.ii. Public responders	☐☐☐
a.iii. Public	☐☐☐☐☐	b.iii. Public	☐☐☐☐☐

c. Property damage

$ ☐☐☐,☐☐☐,☐☐☐

6.10. Known off-site impacts (enter numbers)

a. Deaths	☐☐☐☐☐☐☐☐	d. Evacuated	☐☐☐☐☐☐☐☐
b. Hospitalizations	☐☐☐☐☐☐☐☐	e. Sheltered-in-place	☐☐☐☐☐☐☐☐
c. Other medical treatment	☐☐☐☐☐☐☐☐	f. Property damage ($):	☐☐☐☐☐☐☐☐☐☐☐

6.10.g. Environmental damage (select all that apply)

❑ g.1. Fish or animal kills
❑ g.2. Tree, lawn, shrub, or crop damage
❑ g.3. Water contamination
❑ g.4. Soil contamination
❑ g.5. Other (specify) (maximum 200 characters)

_____

_____

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐–☐☐☐☐–☐☐☐☐

6 Section 6. Five-Year Accident History

6.11. Initiating event (select one)

- ❑ a. Equipment failure
- ❑ b. Human error
- ❑ c. Natural (weather conditions, earthquake)
- ❑ d. Unknown

6.12. Contributing factors (select all that apply)

- ❑ a. Equipment failure
- ❑ b. Human error
- ❑ c. Improper procedure
- ❑ d. Overpressurization
- ❑ e. Upset condition
- ❑ f. By-pass condition
- ❑ g. Maintenance activity/inactivity
- ❑ h. Process design failure
- ❑ i. Unsuitable equipment
- ❑ j. Unusual weather conditions
- ❑ k. Management error
- ❑ l. Other (specify) (maximum 200 characters)

_____

_____

6.13. Off-site responders notified (select one)

- ❑ a. Notified only
- ❑ b. Notified and responded
- ❑ c. No, not notified
- ❑ d. Unknown

6.14. Changes introduced as a result of the accident (select at least one)

- ❑ a. Improved/upgraded equipment
- ❑ b. Revised maintenance
- ❑ c. Revised training
- ❑ d. Revised operating procedures
- ❑ e. New process controls
- ❑ f. New mitigation systems
- ❑ g. Revised emergency response plan
- ❑ h. Changed process
- ❑ i. Reduced inventory
- ❑ j. None
- ❑ k. Other (specify) (maximum 200 characters)

_____

_____

_____

_____

Are you claiming confidential business information in this section? ❑

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐–☐☐☐☐–☐☐☐☐

7 Section 7. Prevention Program: Program 3

(If you need to report more than one prevention program, make a photocopy of pages 7-1 through 7-4 and report each separately)

Prevention program description:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

7.1 NAICS code for process ☐☐☐☐☐☐

7.2 Chemical name(s) (maximum 100 characters)	

If you need more space to list chemicals, please make a photo copy of this sheet.

7.3. Date on which the safety information was last reviewed or revised

M M D D Y Y Y Y

7.4. Process Hazards Analysis (PHA)

7.4.a. Date of last PHA or PHA update

M M D D Y Y Y Y

7.4.b. Technique used (select at least one)

- ❑ 7.4.b.1. What If
- ❑ 7.4.b.2. Checklist
- ❑ 7.4.b.3. What If/Checklist (combined)
- ❑ 7.4.b.4. HAZOP
- ❑ 7.4.b.5. Failure Mode & Effects Analysis
- ❑ 7.4.b.6. Fault Tree Analysis
- ❑ 7.4.b.7. Other (Specify) (maximum 200 characters)

_____

_____

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ____-____-____

7 Section 7. Prevention Program: Program 3

7.4.c. Expected or actual date of completion of all changes resulting from last PHA or PHA update

M M D D Y Y Y Y

7.4.d. Major hazards identified (select at least one)

- ❑ 7.4.d.1. Toxic release
- ❑ 7.4.d.2. Fire
- ❑ 7.4.d.3. Explosion
- ❑ 7.4.d.4. Runaway reaction
- ❑ 7.4.d.5. Polymerization
- ❑ 7.4.d.6. Overpressurization
- ❑ 7.4.d.7. Corrosion
- ❑ 7.4.d.8. Overfilling
- ❑ 7.4.d.9. Contamination
- ❑ 7.4.d.10. Equipment failure
- ❑ 7.4.d.11. Loss of cooling, heating, electricity, instrument air
- ❑ 7.4.d.12. Earthquake
- ❑ 7.4.d.13. Floods (flood plain)
- ❑ 7.4.d.14. Tornado
- ❑ 7.4.d.15. Hurricanes
- ❑ 7.4.d.16. Other (specify) (maximum 200 characters)

_____

7.4.e. Process controls in use (select at least one)

- ❑ 7.4.e.1. Vents
- ❑ 7.4.e.2. Relief valves
- ❑ 7.4.e.3. Check valves
- ❑ 7.4.e.4. Scrubbers
- ❑ 7.4.e.5. Flares
- ❑ 7.4.e.6. Manual shutoffs
- ❑ 7.4.e.7. Automatic shutoffs
- ❑ 7.4.e.8. Interlocks
- ❑ 7.4.e.9. Alarms and procedures
- ❑ 7.4.e.10. Keyed bypass
- ❑ 7.4.e.11. Emergency air supply
- ❑ 7.4.e.12. Emergency power
- ❑ 7.4.e.13. Backup pump
- ❑ 7.4.e.14. Grounding equipment
- ❑ 7.4.e.15. Inhibitor addition
- ❑ 7.4.e.16. Rupture disks
- ❑ 7.4.e.17. Excess flow device
- ❑ 7.4.e.18. Quench system
- ❑ 7.4.e.19. Purge system
- ❑ 7.4.e.20. None
- ❑ 7.4.e.21. Other (specify) (maximum 200 characters)

_____

7.4.f. Mitigation systems in use (select at least one)

- ❑ 7.4.f.1. Sprinkler system
- ❑ 7.4.f.2. Dikes
- ❑ 7.4.f.3. Fire walls
- ❑ 7.4.f.4. Blast walls
- ❑ 7.4.f.5. Deluge system
- ❑ 7.4.f.6. Water curtain
- ❑ 7.4.f.7. Enclosure
- ❑ 7.4.f.8. Neutralization
- ❑ 7.4.f.9. None
- ❑ 7.4.f.10. Other (specify) (maximum 200 characters)

_____

7.4.g. Monitoring/detection systems in use (select at least one)

- ❑ 7.4.g.1. Process area detectors
- ❑ 7.4.g.2. Perimeter monitors
- ❑ 7.4.g.3. None
- ❑ 7.4.g.4. Other (specify) (maximum 200 characters)

_____

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐–☐☐☐☐–☐☐☐☐

7 Section 7. Prevention Program: Program 3

7.4.h. Changes since last PHA or PHA update (select at least one)

- ❑ 7.4.h.1. Reduction in chemical inventory
- ❑ 7.4.h.2. Increase in chemical inventory
- ❑ 7.4.h.3. Change in process parameters
- ❑ 7.4.h.4. Installation of process controls
- ❑ 7.4.h.5. Installation of process detection systems
- ❑ 7.4.h.6. Installation of perimeter monitoring systems
- ❑ 7.4.h.7. Installation of mitigation systems
- ❑ 7.4.h.8. None recommended
- ❑ 7.4.h.9. None
- ❑ 7.4.h.10. Other (specify) (maximum 200 characters)

_____

_____

7.5 Date of most recent review or revision of operating procedures

M M D D Y Y Y Y

7.6 Training

7.6.a. Date of most recent review or revision of training programs

M M D D Y Y Y Y

7.6.b. Type of training provided (select at least one)

- ❑ 7.6.b.1. Classroom
- ❑ 7.6.b.2. On the job
- ❑ 7.6.b.3. Other (specify) (maximum 200 characters) _____

7.6.c. Type of competency testing used (select at least one)

- ❑ 7.6.c.1. Written test
- ❑ 7.6.c.2. Oral test
- ❑ 7.6.c.3. Demonstration
- ❑ 7.6.c.4. Observation
- ❑ 7.6.c.5. Other (specify) (maximum 200 characters)

_____

7.7. Maintenance

7.7.a. Date of most recent review or revision of maintenance procedures

M M D D Y Y Y Y

7.7.b. Date of most recent equipment inspection or test

M M D D Y Y Y Y

7.7.c. Equipment most recently inspected or tested (list equipment) (maximum 200 characters)

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only)

7 Section 7. Prevention Program: Program 3

7.8. Management of Change

7.8.a. Date of most recent change that triggered management of change procedures

M M D D Y Y Y Y

7.8.b. Date of most recent review or revision of management of change procedures

M M D D Y Y Y Y

7.9. Date of most recent pre-startup review

M M D D Y Y Y Y

7.10. Compliance audits

7.10.a. Date of most recent compliance audit

M M D D Y Y Y Y

7.10.b. Expected or actual date of completion of all changes resulting from the compliance audit

M M D D Y Y Y Y

7.11. Incident investigation

7.11.a. Date of your most recent incident investigation (if any)

M M D D Y Y Y Y

7.11.b. Expected or actual date of completion of all changes resulting from the incident investigation

M M D D Y Y Y Y

7.12. Date of most recent review or revision of employee participation plans

M M D D Y Y Y Y

7.13. Date of most recent review or revision of hot work permit procedures

M M D D Y Y Y Y

7.14. Date of most recent review or revision of contractor safety procedures

M M D D Y Y Y Y

7.15. Date of most recent evaluation of contractor safety performance

M M D D Y Y Y Y

Are you claiming confidential business information in this section? ☐

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐–☐☐☐☐–☐☐☐☐

8 Section 8. Prevention Program: Program 2

(If you need to report more than one prevention program, make a photocopy of pages 8-1 through 8-4 and report each separately)

Prevention program description:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

8.1. NAICS Code for process: ☐☐☐☐☐☐

8.2. Chemical name(s): (maximum 100 characters)	

If you need more space to list chemicals, please make a photo copy of this sheet.

8.3. Safety information

8.3.a. Date of most recent review or revision of safety information ☐☐ M M ☐☐ D D ☐☐☐☐ Y Y Y Y

8.3.b. Federal/state regulations or industry-specific design codes and standards used to demonstrate compliance with the safety information requirement (select at least one)

- ❑ 8.3.b.1. NFPA 58 (or state law based on NFPA 58)
- ❑ 8.3.b.2. OSHA (29 CFR 1910.111)
- ❑ 8.3.b.3. ASTM Standards
- ❑ 8.3.b.4. ANSI Standards
- ❑ 8.3.b.5. ASME Standards
- ❑ 8.3.b.6. None
- ❑ 8.3.b.7. Other (specify) (maximum 200 characters)

  _____

  _____
- ❑ 8.3.b.8. Comments (maximum 100 characters)

  _____

  _____

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ____-____-____

8 Section 8. Prevention Program: Program 2

8.4. Hazard review

8.4.a. Date of completion of most recent hazard review or update

M M D D Y Y Y Y

8.4.b. Expected or actual date of completion of all changes resulting from the hazard review

M M D D Y Y Y Y

8.4.c. Major hazards identified (select at least one)

- ❑ 8.4.c.1. Toxic release
- ❑ 8.4.c.2. Fire
- ❑ 8.4.c.3. Explosion
- ❑ 8.4.c.4. Runaway reaction
- ❑ 8.4.c.5. Polymerization
- ❑ 8.4.c.6. Overpressurization
- ❑ 8.4.c.7. Corrosion
- ❑ 8.4.c.8. Overfilling
- ❑ 8.4.c.9. Contamination
- ❑ 8.4.c.10. Equipment failure
- ❑ 8.4.c.11. Loss of cooling, heating, electricity, instrument air
- ❑ 8.4.c.12. Earthquake
- ❑ 8.4.c.13. Floods (flood plain
- ❑ 8.4.c.14. Tornado
- ❑ 8.4.c.15. Hurricanes
- ❑ 8.4.c.16. Other (specify) (maximum 200 characters)

_____

_____

8.4.d. Process controls in use (select at least one)

- ❑ 8.4.d.1. Vents
- ❑ 8.4.d.2. Relief valves
- ❑ 8.4.d.3. Check valves
- ❑ 8.4.d.4. Scrubbers
- ❑ 8.4.d.5. Flares
- ❑ 8.4.d.6. Manual shutoffs
- ❑ 8.4.d.7. Automatic shutoffs
- ❑ 8.4.d.8. Interlocks
- ❑ 8.4.d.9. Alarms and procedures
- ❑ 8.4.d.10. Keyed bypass
- ❑ 8.4.d.11. Emergency air supply
- ❑ 8.4.d.12. Emergency power
- ❑ 8.4.d.13. Backup pump
- ❑ 8.4.d.14. Grounding equipment
- ❑ 8.4.d.15. Inhibitor addition
- ❑ 8.4.d.16. Rupture disks
- ❑ 8.4.d.17. Excess flow device
- ❑ 8.4.d.18. Quench system
- ❑ 8.4.d.19. Purge system
- ❑ 8.4.d.20. None
- ❑ 8.4.d.21. Other (specify) (maximum 200 characters)

_____

_____

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only) ☐☐☐☐–☐☐☐☐–☐☐☐☐

8 Section 8. Prevention Program: Program 2

8.4.e. Mitigation systems in use (select at least one)

- ❑ 8.4.e.1. Sprinkler system
- ❑ 8.4.e.2. Dikes
- ❑ 8.4.e.3. Fire walls
- ❑ 8.4.e.4. Blast walls
- ❑ 8.4.e.5. Deluge system
- ❑ 8.4.e.6. Water curtain
- ❑ 8.4.e.7. Enclosure
- ❑ 8.4.e.8. Neutralization
- ❑ 8.4.e.9. None
- ❑ 8.4.e.10. Other (specify) (maximum 200 characters)

_____

_____

8.4.f. Monitoring/detection systems in use (select at least one)

- ❑ 8.4.f.1. Process area detectors
- ❑ 8.4.f.2. Perimeter monitors
- ❑ 8.4.f.3. None
- ❑ 8.4.f.4. Other (specify) (maximum 200 characters)

_____

_____

8.4.g. Changes since last hazard review or hazard review update (select at least one)

- ❑ 8.4.g.1. Reduction in chemical inventory
- ❑ 8.4.g.2. Increase in chemical inventory
- ❑ 8.4.g.3. Change in process parameters
- ❑ 8.4.g.4. Installation of process controls
- ❑ 8.4.g.5. Installation of process detection systems
- ❑ 8.4.g.6. Installation of perimeter monitoring systems
- ❑ 8.4.g.7. Installation of mitigation systems
- ❑ 8.4.g.8. None recommended
- ❑ 8.4.g.9. None
- ❑ 8.4.g.10. Other (specify) (maximum 200 characters)

_____

_____

8.5. Date of most recent review or revision of operating procedures

M M D D Y Y Y Y

8.6. Training

8.6.a. Date of most recent review or revision of training programs

M M D D Y Y Y Y

8.6.b. Type of training provided (select at least one)

- ❑ 8.6.b.1. Classroom
- ❑ 8.6.b.2. On the job
- ❑ 8.6.b.3. Other (specify) (maximum 200 characters)

_____

Are you claiming confidential business information in this section? ❑

Facility Name: _____

EPA Facility ID# (leave blank for first submission only)

8 Section 8. Prevention Program: Program 2

8.6.c. Type of competency test used (select at least one)

- ❑ 8.6.c.1. Written test
- ❑ 8.6.c.2. Oral test
- ❑ 8.6.c.3. Demonstration
- ❑ 8.6.c.4. Observation
- ❑ 8.6.c.5. Other (specify) (maximum 200 characters)

_____

_____

8.7. Maintenance

8.7.a. Date of most recent review or revision of maintenance procedures

M M D D Y Y Y Y

8.7.b. Date of most recent equipment inspection or test

M M D D Y Y Y Y

8.7.c. Equipment most recently inspected or tested (list equipment) (maximum 200 characters)

8.8. Compliance audits

8.8.a. Date of most recent compliance audit

M M D D Y Y Y Y

8.8.b. Expected or actual date of completion of all changes resulting from the compliance audit

M M D D Y Y Y Y

8.9. Incident investigation

8.9.a. Date of your most recent incident investigation (if any)

M M D D Y Y Y Y

8.9.b. Expected or actual date of completion of all changes resulting from the incident investigation

M M D D Y Y Y Y

8.10. Date of most recent change that triggered a review or a revision of safety information, the hazard review, operating or maintenance procedures, or training

M M D D Y Y Y Y

Are you claiming confidential business information in this section? ❑

EPA Risk Management Plan

Facility Name: _____

EPA Facility ID# (leave blank for first submission only)

9 Section 9. Emergency Response

9.1. Written emergency response (ER) plan

9.1.a. ❑ Is your facility included in the written community emergency response plan?

9.1.b. ❑ Does your facility have its own written emergency response plan?

9.2. ❑ Does your facility's ER plan include specific actions to be taken in response to accidental releases of regulated substance(s)?

9.3. ❑ Does your facility's ER plan include procedures for informing the public and local agencies responding to accidental releases?

9.4. ❑ Does your facility's ER plan include information on emergency health care?

9.5. Date of most recent review or update of your facility's ER plan

M M D D Y Y Y Y

9.6. Date of most recent ER training for your facility's employees

M M D D Y Y Y Y

9.7. Local agency with which your facility's ER plan or response activities are coordinated

9.7.a. Name of agency (maximum 35 characters)

9.7.b. Phone number ( ) -

9.8. Subject to (select all that apply)

❑ 9.8.a. OSHA Regulations at 29 CFR 1910.38
❑ 9.8.b. OSHA Regulations at 29 CFR 1910.120
❑ 9.8.c. Clean Water Act Regulations at 40 CFR 112
❑ 9.8.d. RCRA Regulations at 40 CFR 264, 265, 279.52
❑ 9.8.e. OPA-90 Regulations at 40 CFR 112, 33 CFR 154, 49 CFR 194, 30 CFR 254
❑ 9.8.f. State EPCRA Rules or Laws
❑ 9.8.g. Other (specify) (maximum 200 characters)

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_____

Are you claiming confidential business information in this section? ❑

APPENDIX E

Glossary

GLOSSARY

Italicized terms and their definitions are taken from the RMP rule and the RMP list rule.

Term	Definition
Accidental release	An unanticipated emission of a regulated substance or other extremely hazardous substance into the ambient air from a stationary source.
Acute exposure	Refers to a single exposure that occurs over a relatively short period of time (e.g., during exposure to a vapor cloud resulting from an accidental release).
Administrative controls	Written procedural mechanisms used for hazard control.
Aerosol entrainment	When small liquid droplets remain suspended in a vapor cloud instead of falling to the ground.
Alternate release scenarios	The scenarios other than worst case provided in the hazard assessment. For alternative scenarios, sources may consider the effects of both passive and active mitigation systems.
Article	A manufactured item, as defined under 29 *CFR* 1910.1200(b), that is formed to a specific shape or design during manufacture, that has end use functions dependent in whole or in part upon the shape or design during end use, and that does not release or otherwise result in exposure to a regulated substance under normal conditions of processing and use.
Atmospheric dispersion	The dilution of a vapor or gas as it mixes with the surrounding air and moves downwind.

Term	Definition
Atmospheric stability	A classification of the amount of turbulence (horizontal and vertical movement of the surrounding air) that exists in the atmosphere at any given time. Levels of atmospheric stability are identified with a letter (A–F). Unstable conditions (A–C) generally occur during mid-day with clear skies and light winds; these conditions cause considerable horizontal and vertical turbulence and result in rapid dispersion of a vapor cloud as it moves downwind. Neutral conditions (D) can occur during the day or night with cloudy skies and moderate-to-strong winds; these conditions cause less turbulence in the horizontal and vertical directions than unstable conditions and result in less rapid dispersion of the vapor cloud as it moves downwind. Stable conditions (E–F) generally occur at night or early morning with clear skies and light winds; there is very little horizontal or vertical turbulence, which results in very slow dispersion of the vapor cloud as it moves downwind.
Average concentration	The time-weighted concentration at a given downwind location over a specified period of time or duration of exposure (i.e., the averaging time).
Averaging time	The time interval over which the instantaneous concentration of the hazardous material within the vapor cloud is averaged to assess the effects of the exposure.
Boiling liquid expanding vapor explosion (BLEVE)	The explosive vaporization of a superheated liquid when it is rapidly (instantaneously) released from a storage container or transportation vessel. The resulting release of energy generates an overpressure, and a fireball often occurs if the material is combustible and the container/vessel failure is caused by an external fire. The primary consequences of a BLEVE are (1) the overpressure that may be generated, (2) large vessel fragments that may be propelled away from the explosion, and (3) when applicable, thermal radiation from the fireball.
Boiling point	The 20% evaporated point of a distillation performed in accordance with ASTM D 86. This definition comes from NFPA 30 Flammable and Combustible Liquids Code.

Term	Definition
Catastrophic release	A major uncontrolled emission, fire, or explosion, involving one or more regulated substances that presents imminent and substantial endangerment to public health and the environment.
Chronic exposure	Refers to multiple or continuous exposures occurring over a long period of time (i.e., months or years).
Classified information	Defined in the Classified Information Procedures Act, 18 U.S.C. App. 3, Section 1(a) as "any information or material that has been determined by the United States Government pursuant to an executive order, statute, or regulation, to require protection against unauthorized disclosure for reasons of national security.
Concentration in air, parts per million (ppm), % by volume (vol%)	The relative amount (volume) of a material that is contained within a vapor cloud in the air, often expressed in parts per million (ppm) or % by volume (vol%). A concentration of 1,000,000 ppm (or 100 vol%) means that the vapor cloud volume consists only of the material with no air. A concentration of 500,000 ppm (or 50 vol%) means that the vapor cloud volume is one-half material and one-half air.
Condensate	Hydrocarbon liquid separated from natural gas that condenses due to changes in temperature, pressure, or both, and remains liquid at standard conditions.
Consequence analysis	The prediction of the effects of accidental releases using mathematical models, historical experience of accident effects, and/or experimental results. Includes estimating a source term, predicting the transport of energy or the release of material through the environment, and/or estimating the effects of the release.
Covered process	A process that has a regulated substance present in more than a threshold quantity as determined under §68.115. of 40 *CFR* 68.
Crude oil	Any naturally occurring, unrefined petroleum product.
Delayed ignition	The ignition of a flammable vapor cloud, several minutes following its release, usually associated with a point distant from the release.

Term	Definition
Dense gas, heavy gas	A vapor cloud that is more dense (or heavier) than the surrounding air. Such a cloud has a tendency to hug the ground following the release. The atmospheric dispersion of a heavy gas cloud is driven primarily by the difference in density between the vapor cloud and the surrounding air rather than by the surrounding atmospheric turbulence.
Designated agency	Any state or local agency designated by the air permitting authority as the agency responsible for the review of an RMP for completeness.
Dispersion model	Any method used to predict (based on release information and meteorological data) the characteristics (e.g., concentration and dimensions) of a vapor cloud as it moves downwind. The method may be based on experimental data, theoretical data, or a combination of the two. In many cases, the method is often put into a computer program for easy use.
Dose	A measure of total exposure to a specific hazard (toxic concentration, thermal radiation, etc.) that occurs during the duration of a release event (passage time of a toxic cloud, duration of a burning fireball, etc.). For example, exposure to a constant, toxic vapor cloud concentration of 1,000 ppm for 10 minutes results in a toxic dose of 10,000 ppm-min. Exposure to a constant thermal radiation intensity of 5,000 W/m^2 for 10 seconds results in a thermal dose of 50,000 $W\text{-}sec/m^2$ or 50,000 J/m^2.
Endpoint	A toxic substance's Emergency Response Planning Guideline level 2 (ERPG 2) developed by the American Industrial Hygiene Association (AIHA). If a substance has no ERPG 2, then the endpoint is the level of concern (LOC) from the Technical Guidance for Hazards Analysis, updated where necessary to reflect new toxicity data. For vapor cloud fires and jet fires, the lower flammability limit provided by the NFPA or other sources shall be used.
Emergency response planning guideline (ERPG)	The concentration of a hazardous material in air above which some members of the public may begin to experience adverse effects. The AIHA approves and publishes three levels (ERPG 1, ERPG 2, and ERPG 3, defined below), each related to the severity of effect.

Term	Definition
Environmental receptor	Natural areas such as national or state parks, forests, or monuments; officially designated wildlife sanctuaries, preserves, refuges, or areas; and federal wilderness areas, that could be exposed at any time to toxic concentrations, radiant heat, or overpressure greater than or equal to the endpoints provided in §68.22(a) of this part, as a result of an accidental release and that can be identified on local USGS maps.
ERPG 1	The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor.
ERPG 2	The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action.
ERPG 3	The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects.
Explosion	A release of energy that causes a transient change in the density, pressure, and velocity of the air surrounding the source of energy. This release of energy may generate a damaging pressure wave. If the source of energy originates from rapid depressurization of a vessel (high pressure vessel rupture or BLEVE), this is referred to as a ***physical explosion***. If the source of energy originates from combustion of flammable material (vapor cloud explosion), it is called a ***chemical explosion***.
Exposure time	The total time interval over which an individual is actually exposed to a hazardous condition (material in a vapor cloud, fire, etc.).
Field gas	Gas extracted from a production well before the gas enters a natural gas processing plant.

Term	Definition
Fireball	A fireball results following the immediate ignition of a rapid (instantaneous) release of a flammable vapor or superheated liquid or liquid/vapor mixture. The burning cloud tends to rise, expand, and assume a spherical shape. A fireball usually exists for only 10 to 20 seconds; however, it may present thermal radiation effects and severely burn individuals hundreds of feet from the source of the fireball. A fireball often accompanies a BLEVE if the released liquid is flammable and the release results from vessel failure caused by an external fire.
Flammability limits, upper and lower	Represent the range of concentration in air of a flammable vapor or mist that will undergo self-sustaining combustion (i.e., will burn). For example, the flammability limits for propane are 21,000–95,000 ppm (often represented as percentage: 2.1–9.5% by volume). Outside these limits, a propane vapor cloud will not undergo self-sustaining combustion. ***The upper flammability limit (UFL)*** is the maximum concentration of a hazardous material in air that can be ignited or burn (e.g., for propane the UFL is 95,000 ppm or 9.5% by volume). The ***LFL*** is the minimum concentration of a hazardous material in air that can be ignited or burn (e.g., for propane, the LFL is 21,000 ppm or 2.1% by volume).
Flash fire	Results when a flammable vapor-air or vapor/mist-air mixture is ignited. A flash fire usually exists for only a few seconds; however, individuals located within or near the vapor cloud when it ignites may suffer severe burns.
Footprint	The area potentially affected by an accidental release of hazardous material in which the level of concern is exceeded. For example, the footprint for a toxic release could represent the area covered by the toxic cloud in which the average concentration of the material in the cloud exceeded the ERPG 3 value. For an explosion, the footprint would be the area in which the level of concern for overpressure would be exceeded (see "vulnerability zone").
Hazard assessment	As used in connection with EPA's RMP rule, an analysis to estimate the potential consequences of accidental releases of hazardous materials on the public and on the environment when such impacts provide a direct pathway to acute human health effects.

Term	Definition
Immediately dangerous to life and health (IDLH)	The maximum concentration in air to which a healthy worker may be exposed for 30 minutes without experiencing any escape-impairing symptoms or permanent health effects. IDLH values are published by the National Institute for Occupational Safety and Health (NIOSH). The IDLH concentration is intended to be used for respirator selection for workers and is not applicable for assessing health effects to the general public.
Implementing agency	The state or local agency that obtains delegation for an accidental release prevention program under subpart E of part 63 under section 112(l) of the CAA. The implementing agency may, but is not required to, be the state or local air permitting agency. If a state or local agency does not take delegation, EPA will be the implementing agency for the state.
Injury	Any effect on a human that results either from direct exposure to toxic concentrations; radiant heat; or overpressures from accidental releases or from the direct consequences of a vapor cloud explosion (such as flying glass, debris, and other projectiles) from an accidental release and that requires medical treatment or hospitalization.
Jet fire	Results from the ignition of a flammable vapor or liquid/vapor mixture that is being continuously discharged from an orifice, leak, or rupture. The resulting flame has a torch-like appearance and may pose thermal radiation hazards to nearby individuals.
Level of concern (LOC)	Refers to the criteria that are used to determine the extent of a footprint predicted in a hazard assessment (see "footprint"). LOCs can be specified for toxic exposure (e.g., ERPGs), exposure to fires/flames (thermal exposure criteria), and explosions (overpressure). LOCs are selected based on the objectives of the hazard assessment. For example, ERPG 2 is often used in consequence analyses directed at improving emergency planning activities. The footprint for ERPG 2 indicates the areas where people may need to take protection or perform other emergency actions to avoid serious health effects.

Term	Definition
Local emergency planning committee (LEPC)	A local interdisciplinary group appointed by the State Emergency Response Commission (SERC) to develop a comprehensive emergency plan for responding to accidental releases of hazardous materials that could affect the public. Individual plants/facilities have the primary responsibility of responding to onsite (i.e., within the fenceline) emergencies, while the LEPC is responsible for developing plans for safeguarding the public if hazardous materials migrate off site (i.e., over the fenceline). The membership of the LEPC must include local citizens, emergency responders, members of law enforcement, local media, as well as industry representatives.
Major change	Introduction of a new process, process equipment, or regulated substance, an alteration of process chemistry that results in any change to safe operating limits, or other alteration that introduces a new hazard.
Medical treatment	Treatment, other than first aid, administered by a physician or registered professional personnel under standing orders from a physician.
Mitigation system, active, passive	Specific activities, technologies, or equipment designed or deployed to capture or control substances upon loss of containment to minimize exposure of the public or the environment. ***Passive mitigation*** Equipment, devices, or technologies that function without human, mechanical, or other energy input. An example of a passive mitigation system is a dike surrounding a storage tank that limits the spread and vaporization of a spilled hazardous material. ***Active mitigation*** Equipment, devices, or technologies that need human, mechanical, or other energy input to function. An example of an active mitigation system is an automatic shutoff valve that limits the duration of a hazardous material release.

Term	Definition
Mixing layer, mixing height	The layer of air closest to the earth's surface into which materials will disperse when released. The top or depth of the layer, referred to as the ***mixing height***, varies from location to location, time of day, and time of year. The top of the mixing layer acts as a "ceiling" to restrict vertical spreading of a vapor cloud. Therefore, a thin (shallow) mixing layer results in less rapid dispersion of a vapor cloud as it moves downwind, possibly resulting in a larger footprint compared to the same situation having a thicker (deeper) mixing layer.
Model accuracy	The ability of a model to produce results that match the experimental (or known) data.
Model uncertainty	The statistical confidence limits (upper and/or lower bounds) associated with a model prediction compared to the actual, unknown outcome. For example, a model may predict that the concentration in a vapor cloud is 500 ppm with an uncertainty of 50% (i.e., 500 ppm, ±50%). This means the actual value of the concentration (which is not known) is expected to fall somewhere between 250 ppm and 750 ppm.
Natural gas processing plant (gas plant)	Any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural products, or both, classified as NAICS code 211112 (previously SIC code 1321). A separator, dehydration unit, heater treater, sweetening unit, compressor, or similar equipment shall not be considered a "processing site" unless such equipment is physically located within a natural gas processing plant (gas plant) site.
Off site	Areas beyond the property boundary of the stationary source or areas within the property boundary to which the public has routine and unrestricted access during or outside business hours.
Overpressure	The sudden increase in the local atmospheric pressure that may result from an explosion. The standard pressure in the atmosphere is approximately 14.7 pounds per square inch at sea level. An explosion that causes a 3 pound per square inch overpressure means that the local atmospheric pressure suddenly increased from 14.7 to 17.7 lb per square inch. Significant overpressure may cause severe injury to exposed individuals and damage to property.

Term	Definition
Passive gas	A vapor cloud that is buoyant (i.e., light) or neutrally buoyant compared to the surrounding air. The atmospheric dispersion of such a cloud is completely dominated by turbulence (horizontal and vertical movement of air) in the atmosphere. A passive gas does not have a tendency to hug the ground like a heavy or dense gas.
Peak concentration	The maximum, instantaneous (i.e., zero averaging time) concentration that occurs at a given downwind location as a vapor cloud passes the location.
Petroleum refining process unit	A process unit used in an establishment primarily engaged in petroleum refining as defined in NAICS code 32411 for petroleum refining (formerly SIC code 2911) and used for the following: (1) Producing transportation fuels (such as gasoline, diesel fuels, and jet fuels), heating fuels (such as kerosene, fuel gas distillate, and fuel oils), or lubricants; (2) Separating petroleum; or (3) Separating, cracking, reacting, or reforming intermediate petroleum streams. Examples of such units include, but are not limited to, petroleum based solvent units, alkylation units, catalytic hydrotreating, catalytic hydrorefining, catalytic hydrocracking, catalytic reforming, catalytic cracking, crude distillation, lube oil processing, hydrogen production, isomerization, polymerization, thermal processes, and blending, sweetening, and treating processes. Petroleum refining process units include sulfur plants.
Plume	The appearance of a vapor cloud that is being released over a prolonged period of time from a stack, pipe, vessel, or evaporating pool. The resulting vapor cloud is elongated and spreads out as it moves downwind, having a cigar-shaped appearance.
Pool depth	The thickness of a liquid pool that is spilled onto a given surface (concrete, gravel, soil, water, etc.). The minimum pool depth that a liquid spill may attain as it spreads out depends on such factors as the roughness and contour of the surface, the liquid viscosity, and the liquid pour point temperature.
Pool fire	Results from the ignition of flammable vapors that evaporate from a flammable liquid spill. The flames associated with the pool fire may produce thermal radiation effects to individuals located near the fire.

Term	Definition
Population	The public.
Pressure wave	A moving disturbance that emanates from an explosion and causes a localized increase in atmospheric pressure (overpressure) as it traverses the atmosphere.
Process	Any activity involving a regulated substance, includ-ing any use, storage, manufacturing, handling, or the onsite movement of such chemicals or combination of these activities. For purposes of this definition, any group of vessels that are interconnected and separate vessels that are located such that a highly hazardous chemical could be involved in a potential release shall be considered a single process.
Produced water	Water extracted from the earth from an oil or natural gas production well, or that is separated from oil or natural gas after extraction.
Public	Any person except employees or contractors at the stationary source.
Public receptor	Offsite residences, institutions (e.g., schools, hospitals), industrial, commercial, and office buildings, parks, or recreational areas inhabited or occupied by the public at any time without restriction by the stationary source where members of the public could be exposed to toxic concentrations, radiant heat, or overpressure, as a result of an accidental release
Rainout	When liquid droplets fall to the ground instead of remaining in a vapor cloud.
Regulated substance	Any substance listed pursuant to section 112(r)(3) of the Clean Air Act as amended in §68.130 of 40 *CFR* 68.
Release duration	The total time interval over which a hazardous material is being released to the surrounding air.
Release rate	Refers to the quantity (in pounds, kilograms, gallons, etc.) of a hazardous material that is released per unit time (per second, per minute, per hour, etc.) from a tank, pipe, or other piece of equipment.

Term	Definition
Retail facility	A stationary source at which no more than one-half of the income is obtained from direct sales to end users or at which more than one-half of the fuel sold, by volume, is sold through a cylinder exchange program.
Shelter-in-place	A method of protecting oneself from exposure to a toxic vapor cloud by remaining inside an enclosure (building or house) until the concentration within the vapor cloud (outside of the enclosure) has decreased to a safe level.
Solar radiation	The amount of thermal radiation from the sun that reaches the earth's surface. The solar radiation varies at different locations, hours of the day, times of the year, and cloudiness.
Source term	Defines the quantity or release rate, the duration of the release, and the form (liquid, vapor, or liquid and vapor) for an accidental release of a hazardous material.
Stationary source	Any buildings, structures, equipment, installations, or substance emitting stationary activities which belong to the same industrial group, which are located on one or more contiguous properties, which are under the control of the same person (or persons under common control), and from which an accidental release may occur. The term stationary source does not apply to transportation, including the storage incident to transportation, of any regulated substance or any other extremely hazardous substance under the provisions of this part. A stationary source includes transportation containers used for storage not incident to transportation and transportation containers connected to equipment at a stationary course for loading or unloading. Transportation includes, but is not limited to, transportation subject to oversight or regulation under 49 *CFR* Parts 192, 193, or 195, or a state natural gas or hazardous liquid program for which the state has in effect a certification to DOT under 49 U.S.C. section 601005. A stationary source does not include naturally occurring hydrocarbon reservoirs. Properties shall not be considered contiguous solely because of a railroad or pipeline right-of-way.
Stoichiometric concentration	The concentration of a flammable material in air with the precise amount of oxygen needed to burn all of the flammable material, assuming complete combustion (i.e., if combustion were complete, no excess fuel or oxygen would be present following the combustion process).

Term	Definition
Surface roughness	A measure of the weighted-average height of surface objects (grass, trees, buildings, etc.) in the vicinity (upwind and downwind) of the released hazardous material. The surface roughness influences the atmospheric dispersion of a released hazardous material by increasing turbulence (horizontal and/or vertical movement) of the surrounding air. Small values of surface roughness create less turbulence and result in less rapid dilution of the cloud as it moves downwind, while larger values of surface roughness create more turbulence and result in more rapid dilution of the cloud as it moves downwind.
Thermal radiation	Energy produced by sources of heat (sun, electric heater, fireball, jet fire, pool fire, etc.) that is subsequently transmitted through the air. Thermal radiation may cause severe burns to individuals located near the source of heat; the severity of health effects from thermal radiation depends upon a variety of factors (e.g., thermal flux intensity, exposure duration, angle of exposure, protective clothing).
Threshold quantity	The quantity specified for regulated substances pursuant to section 112(r)(5) of the Clean Air Act as amended, listed in §68.130 and determined to be present at a stationary source as specified in §68.115 of 40 *CFR* 68.
Typical meteorological conditions	The temperature, wind speed, cloud cover, and atmospheric stability class prevailing at the site, based on data gathered at or near the site or from a local meteorological station.
Vapor cloud explosion (VCE)	Results from the ignition of a cloud of flammable vapor or vapor/mist. The burning cloud generates expanding gases so quickly that a damaging pressure wave is produced. Partial confinement and/or significant congestion, resulting in increased turbulence in the burning cloud, are usually required for high velocity flame propagation (which generates damaging overpressures). The overpressure produced by the VCE can cause severe injuries and damage at significant distances from the point of release and/or the point of ignition.
Vessel	Any reactor, tank, drum, barrel, cylinder, vat, kettle, boiler, pipe, hose, or other container.

Term	Definition
Vulnerability zone	The vulnerability zone is the overlay of all footprints associated with a hypothetical accidental release of hazardous material, accounting for the variation in the wind direction at the time of the release. For a toxic release, the vulnerability zone is obtained by rotating the footprint to include all possible wind directions, which results in a circular area.
Wind persistence	The tendency of the wind to blow in a given direction, within some angular range, for several consecutive hours. A wind persistence value of 5 hours means that the wind blows in approximately the same direction for 5 consecutive hours.
Wind speed	The velocity of the wind as it moves through the atmosphere, generally measured by the NWS at a height of 10 meters (33 ft) from the ground and reported based on the direction the wind is originating (e.g., winds from the southeast). The wind speed is most often reported as being within some range of values (i.e., 5 - 10 mph). The wind speed influences the atmospheric dispersion of hazardous vapor clouds. While the NWS reports wind speeds at a height of 10 meters from the ground, the wind speed does vary as a function of elevation. Wind speeds used in dispersion models should represent values that are consistent with the actual height of the release or the depth of the vapor cloud, as appropriate.
Worst-case release	The release of the largest quantity of a regulated substance from a vessel or process line failure that results in the greatest distance to an endpoint defined in § 68.22(a) of 40 *CFR* 68.
Worst-case scenario	An accidental release involving a hazardous material that would result in the worst (most severe) offsite consequences.

APPENDIX F

Consolidated Version of the RMP Rule (40 *CFR* 68)

This copy of the RMP rule consolidates the rule language published in the *Federal Register* on January 31, 1994 (59 *FR* 4477), June 20, 1996 (61 *FR* 31667), August 25, 1997 (62 *FR* 45130), January 6, 1998 (63 *FR* 639), January 6, 1999 (64 *FR* 964), May 26, 1999 (64 *FR* 28695), and March 13, 2000 (65 *FR* 13243).API, its employees, officers, directors, and other assigns accept no liability for any regulatory impact that may occur at any facility as a result of any differences between this copy of the rule and the final rule as published and amended by the EPA.

PART 68—CHEMICAL ACCIDENT PREVENTION PROVISIONS

PART 68—CHEMICAL ACCIDENT PREVENTION PROVISIONS (cont'd)

Subpart G—Risk Management Plan

Subpart H—Other Requirements

Subpart A—General

§68.1 Scope.

This Part sets forth the list of regulated substances and thresholds, the petition process for adding or deleting substances to the list of regulated substances, the requirements for owners or operators of stationary sources concerning the prevention of accidental releases, and the State accidental release prevention programs approved under section 112(r). The list of substances, threshold quantities, and accident prevention regulations promulgated under this part do not limit in any way the general duty provisions under section 112(r)(1).

§68.2 Stayed Provisions.

(a) Stay issued on June 20, 1996, is no longer in effect.
(b) Stay issued on June 20, 1996, is no longer in effect.
(c) Stay issued on May 28, 1999, is no longer in effect.

§68.3 Definitions.

For the purposes of this Part:

Accidental release means an unanticipated emission of a regulated substance or other extremely hazardous substance into the ambient air from a stationary source.

Act means the Clean Air Act as amended (42 U.S.C. 7401 et seq.)

Administrative controls mean written procedural mechanisms used for hazard control.

Administrator means the administrator of the U.S. Environmental Protection Agency.

AIChE/CCPS means the American Institute of Chemical Engineers/ Center for Chemical Process Safety.

API means the American Petroleum Institute.

Article means a manufactured item, as defined under 29 *CFR* 1910.1200(b), that is formed to a specific shape or design during manufacture, that has end use functions dependent in whole or in part upon the shape or design during end use, and that does not release or otherwise result in exposure to a regulated substance under normal conditions of processing and use.

ASME means the American Society of Mechanical Engineers.

CAS means the Chemical Abstracts Service.

Catastrophic release means a major uncontrolled emission, fire, or explosion, involving one or more regulated substances that presents imminent and substantial endangerment to public health and the environment.

Classified information means "classified information'' as defined in the Classified Information Procedures Act, 18 U.S.C. App. 3, section 1(a) as "any information or material that has been determined by the United States Government pursuant to an executive order, statute, or regulation, to require protection against unauthorized disclosure for reasons of national security.''

Condensate means hydrocarbon liquid separated from natural gas that condenses due to changes in temperature, pressure, or both, and remains liquid at standard conditions.

Covered process means a process that has a regulated substance present in more than a threshold quantity as determined under §68.115.

Crude oil means any naturally occurring, unrefined petroleum liquid.

Designated agency means the state, local, or Federal agency designated by the state under the provisions of §68.215(d).

DOT means the United States Department of Transportation.

Subpart A—General (cont'd)

Environmental receptor means natural areas such as national or state parks, forests, or monuments; officially designated wildlife sanctuaries, preserves, refuges, or areas; and Federal wilderness areas, that could be exposed at any time to toxic concentrations, radiant heat, or overpressure greater than or equal to the endpoints provided in §68.22(a) , as a result of an accidental release and that can be identified on local U. S. Geological Survey maps.

Field gas means gas extracted from a production well before the gas enters a natural gas processing plant.

Hot work means work involving electric or gas welding, cutting, brazing, or similar flame or spark-producing operations.

Implementing agency means the state or local agency that obtains delegation for an accidental release prevention program under subpart E, 40 *CFR* part 63. The implementing agency may, but is not required to, be the state or local air permitting agency. If no state or local agency is granted delegation, EPA will be the implementing agency for that state.

Injury means any effect on a human that results either from direct exposure to toxic concentrations; radiant heat; or overpressures from accidental releases or from the direct consequences of a vapor cloud explosion (such as flying glass, debris, and other projectiles) from an accidental release and that requires medical treatment or hospitalization.

Major change means introduction of a new process, process equipment, or regulated substance, an alteration of process chemistry that results in any change to safe operating limits, or other alteration that introduces a new hazard.

Mechanical integrity means the process of ensuring that process equipment is fabricated from the proper materials of construction and is properly installed, maintained, and replaced to prevent failures and accidental releases.

Medical treatment means treatment, other than first aid, administered by a physician or registered professional personnel under standing orders from a physician.

Mitigation or mitigation system means specific activities, technologies, or equipment designed or deployed to capture or control substances upon loss of containment to minimize exposure of the public or the environment. Passive mitigation means equipment, devices, or technologies that function without human, mechanical, or other energy input. Active mitigation means equipment, devices, or technologies that need human, mechanical, or other energy input to function.

NAICS means North American Industry Classification System.

Natural gas processing plant (gas plant) means any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both, classified as North American Industrial Classification System (NAICS) code 211112 (previously Standard Industrial Classification [SIC] code 1321).

NFPA means the National Fire Protection Association.

Offsite means areas beyond the property boundary of the stationary source, and areas within the property boundary to which the public has routine and unrestricted access during or outside business hours.

OSHA means the U.S. Occupational Safety and Health Administration. Owner or operator means any person who owns, leases, operates, controls, or supervises a stationary source.

Petroleum refining process unit means a process unit used in an establishment primarily engaged in petroleum refining as defined in NAICS code 32411 for petroleum refining (formerly SIC code 2911) and used for the following: (1) Producing transportation fuels (such as gasoline, diesel fuels, and jet fuels), heating fuels (such as kerosene, fuel gas distillate, and fuel oils), or lubricants; (2) Separating petroleum; or (3) Separating, cracking, reacting, or reforming intermediate petroleum streams.

Examples of such units include, but are not limited to, petroleum based solvent units, alkylation units, catalytic hydrotreating, catalytic hydrorefining, catalytic hydrocracking, catalytic reforming, catalytic cracking, crude distillation, lube oil processing, hydrogen production, isomerization, polymerization, thermal processes, and blending, sweetening, and treating processes. Petroleum refining process units include sulfur plants.

Population means the public.

Process means any activity involving a regulated substance including any use, storage, manufacturing, handling, or on-site movement of such substances, or combination of these activities. For the purposes of this definition, any group of vessels that are interconnected, or separate vessels that are located such that a regulated substance could be involved in a potential release, shall be considered a single process.

Subpart A—General (cont'd)

Produced water means water extracted from the earth from an oil or natural gas production well, or that is separated from oil or natural gas after extraction.
Public means any person except employees or contractors at the stationary source.
Public receptor means offsite residences, institutions (e.g., schools, hospitals), industrial, commercial, and office buildings, parks, or recreational areas inhabited or occupied by the public at any time without restriction by the stationary source where members of the public could be exposed to toxic concentrations, radiant heat, or overpressure, as a result of an accidental release.
Regulated substance is any substance listed pursuant to section 112(r)(3) of the Clean Air Act as amended, in *§68.130*.
Replacement in kind means a replacement that satisfies the design specifications.
Retail facility means a stationary source at which no more than one-half of the income is obtained from direct sales to end users or at which more than one-half of the fuel sold, by volume, is sold through a cylinder exchange program.
RMP means the risk management plan required under subpart G of this part.
Stationary source means any buildings, structures, equipment, installations, or substance emitting stationary activities which belong to the same industrial group, which are located on one or more contiguous properties, which are under the control of the same person (or persons under common control), and from which an accidental release may occur. The term stationary source does not apply to transportation, including the storage incident to transportation, of any regulated substance or any other extremely hazardous substance under the provisions of this part. A stationary source includes transportation containers used for storage not incident to transportation and transportation containers connected to equipment at a stationary course for loading or unloading. Transportation includes, but is not limited to, transportation subject to oversight or regulation under 49 *CFR* Parts 192, 193, or 195, or a state natural gas or hazardous liquid program for which the state has in effect a certification to DOT under 49 U.S.C. section 601005. A stationary source does not include naturally occurring hydrocarbon reservoirs. Properties shall not be considered contiguous solely because of a railroad or pipeline right-of-way.
Threshold quantity means the quantity specified for regulated substances pursuant to section 112(r)(5) of the Clean Air Act as amended, listed in §68.130 and determined to be present at a stationary source as specified in §68.115 of this Part.
Typical meteorological conditions means the temperature, wind speed, cloud cover, and atmospheric stability class, prevailing at the site based on data gathered at or near the site or from a local meteorological station.
Vessel means any reactor, tank, drum, barrel, cylinder, vat, kettle, boiler, pipe, hose, or other container.
Worst-case release means the release of the largest quantity of a regulated substance from a vessel or process line failure that results in the greatest distance to an endpoint defined in §68.22(a).

§68.10 Applicability.

(a) An owner or operator of a stationary source that has more than a threshold quantity of a regulated substance in a process, as determined under §68.115, shall comply with the requirements of this part no later than the latest of the following dates:
  (1) June 21, 1999;
  (2) Three years after the date on which a regulated substance is first listed under §68.130; or
  (3) The date on which a regulated substance is first present above a threshold quantity in a process.

(b) Program 1 eligibility requirements. A covered process is eligible for Program 1 requirements as provided in §68.12(b) if it meets all of the following requirements:
  (1) For the five years prior to the submission of an RMP, the process has not had an accidental release of a regulated substance where exposure to the substance, its reaction products, overpressure generated by an explosion involving the substance, or radiant heat generated by a fire involving the substance led to any of the following offsite:
    (i) Death;
    (ii) Injury; or
    (iii) Response or restoration activities for an exposure of an environmental receptor;
  (2) The distance to a toxic or flammable endpoint for a worst-case release assessment conducted under Subpart B and §68.25 is less than the distance to any public receptor, as defined in §68.30; and

Subpart A—General (cont'd)

(3) Emergency response procedures have been coordinated between the stationary source and local emergency planning and response organizations.

(c) Program 2 eligibility requirements. A covered process is subject to Program 2 requirements if it does not meet the eligibility requirements of either paragraph (b) or paragraph (d) of this section.

(d) Program 3 eligibility requirements. A covered process is subject to Program 3 if the process does not meet the requirements of paragraph (b) of this section, and if either of the following conditions is met:

(1) The process is in NAICS code 32211, 32411, 32511, 325181, 325188, 325192, 325199, 325211, 325311, or 32532; or

(2) The process is subject to the OSHA process safety management standard, 29 *CFR* 1910.119.

(e) If at any time a covered process no longer meets the eligibility criteria of its Program level, the owner or operator shall comply with the requirements of the new Program level that applies to the process and update the RMP as provided in §68.190.

(f) The provisions of this part shall not apply to any Outer Continental Shelf (OCS) source, as defined in 40 *CFR* 55.2.

§68.12 General requirements.

(a) General requirements. The owner or operator of a stationary source subject to this part shall submit a single RMP, as provided in §§68.150 to 68.185. The RMP shall include a registration that reflects all covered processes.

(b) Program 1 requirements. In addition to meeting the requirements of paragraph (a) of this section, the owner or operator of a stationary source with a process eligible for Program 1, as provided in §68.10(b), shall:

(1) Analyze the worst-case release scenario for the process(es), as provided in §68.25; document that the nearest public receptor is beyond the distance to a toxic or flammable endpoint defined in §68.22(a); and submit in the RMP the worst-case release scenario as provided in §68.165;

(2) Complete the five-year accident history for the process as provided in §68.42 of this part and submit it in the RMP as provided in §68.168;

(3) Ensure that response actions have been coordinated with local emergency planning and response agencies; and

(4) Certify in the RMP the following: ``Based on the criteria in 40 *CFR* 68.10, the distance to the specified endpoint for the worst-case accidental release scenario for the following process(es) is less than the distance to the nearest public receptor: [list process(es)]. Within the past five years, the process(es) has (have) had no accidental release that caused offsite impacts provided in the risk management program rule (40 *CFR* 68.10(b)(1)). No additional measures are necessary to prevent offsite impacts from accidental releases. In the event of fire, explosion, or a release of a regulated substance from the process(es), entry within the distance to the specified endpoints may pose a danger to public emergency responders. Therefore, public emergency responders should not enter this area except as arranged with the emergency contact indicated in the RMP. The undersigned certifies that, to the best of my knowledge, information, and belief, formed after reasonable inquiry, the information submitted is true, accurate, and complete. [Signature, title, date signed].''

(c) Program 2 requirements. In addition to meeting the requirements of paragraph (a) of this section, the owner or operator of a stationary source with a process subject to Program 2, as provided in §68.10(c), shall:

(1) Develop and implement a management system as provided in §68.15;

(2) Conduct a hazard assessment as provided in §§68.20 through 68.42;

(3) Implement the Program 2 prevention steps provided in §§68.48 through 68.60 or implement the Program 3 prevention steps provided in §§68.65 through 68.87;

(4) Develop and implement an emergency response program as provided in §§68.90 to 68.95; and

(5) Submit as part of the RMP the data on prevention program elements for Program 2 processes as provided in §68.170.

(d) Program 3 requirements. In addition to meeting the requirements of paragraph (a) of this section, the owner or operator of a stationary source with a process subject to Program 3, as provided in §68.10(d) shall:

(1) Develop and implement a management system as provided in §68.15;

(2) Conduct a hazard assessment as provided in §§68.20 through 68.42;

Subpart A—General (cont'd)

(3) Implement the prevention requirements of §§68.65 through 68.87;
(4) Develop and implement an emergency response program as provided in §§68.90 to 68.95 of this part; and
(5) Submit as part of the RMP the data on prevention program elements for Program 3 processes as provided in §68.175.

§68.15 Management.

(a) The owner or operator of a stationary source with processes subject to Program 2 or Program 3 shall develop a management system to oversee the implementation of the risk management program elements.
(b) The owner or operator shall assign a qualified person or position that has the overall responsibility for the development, implementation, and integration of the risk management program elements.
(c) When responsibility for implementing individual requirements of this part is assigned to persons other than the person identified under paragraph (b) of this section, the names or positions of these people shall be documented and the lines of authority defined through an organization chart or similar document.

Subpart B—Hazard Assessment

§68.20 Applicability.

The owner or operator of a stationary source subject to this part shall prepare a worst-case release scenario analysis as provided in §68.25 of this part and complete the five-year accident history as provided in §68.42. The owner or operator of a Program 2 and 3 process must comply with all sections in this subpart for these processes.

§68.22 Offsite consequence analysis parameters.

(a) Endpoints. For analyses of offsite consequences, the following endpoints shall be used:
  (1) Toxics. The toxic endpoints provided in Appendix A of this part.
  (2) Flammables. The endpoints for flammables vary according to the scenarios studied:
    (i) Explosion. An overpressure of 1 psi.
    (ii) Radiant heat/exposure time. A radiant heat of 5 kw/m^2 for 40 seconds.
    (iii) Lower flammability limit. A lower flammability limit as provided in NFPA documents or other generally recognized sources.
(b) Wind speed/atmospheric stability class. For the worst-case release analysis, the owner or operator shall use a wind speed of 1.5 meters per second and F atmospheric stability class. If the owner or operator can demonstrate that local meteorological data applicable to the stationary source show a higher minimum wind speed or less stable atmosphere at all times during the previous three years, these minimums may be used. For analysis of alternative scenarios, the owner or operator may use the typical meteorological conditions for the stationary source.
(c) Ambient temperature/humidity. For worst-case release analysis of a regulated toxic substance, the owner or operator shall use the highest daily maximum temperature in the previous three years and average humidity for the site, based on temperature/humidity data gathered at the stationary source or at a local meteorological station; an owner or operator using the RMP Offsite Consequence Analysis Guidance may use 25 deg.C and 50 percent humidity as values for these variables. For analysis of alternative scenarios, the owner or operator may use typical temperature/humidity data gathered at the stationary source or at a local meteorological station.

Subpart B—Hazard Assessment (cont'd)

(d) Height of release. The worst-case release of a regulated toxic substance shall be analyzed assuming a ground level (0 feet) release. For an alternative scenario analysis of a regulated toxic substance, release height may be determined by the release scenario.

(e) Surface roughness. The owner or operator shall use either urban or rural topography, as appropriate. Urban means that there are many obstacles in the immediate area; obstacles include buildings or trees. Rural means there are no buildings in the immediate area and the terrain is generally flat and unobstructed.

(f) Dense or neutrally buoyant gases. The owner or operator shall ensure that tables or models used for dispersion analysis of regulated toxic substances appropriately account for gas density.

(g) Temperature of released substance. For worst case, liquids other than gases liquified by refrigeration only shall be considered to be released at the highest daily maximum temperature, based on data for the previous three years appropriate for the stationary source, or at process temperature, whichever is higher. For alternative scenarios, substances may be considered to be released at a process or ambient temperature that is appropriate for the scenario.

§68.25 Worst-case release scenario analysis.

(a) The owner or operator shall analyze and report in the RMP:
  (1) For Program 1 processes, one worst-case release scenario for each Program 1 process;
  (2) For Program 2 and 3 processes:
    (i) One worst-case release scenario that is estimated to create the greatest distance in any direction to an endpoint provided in Appendix A of this part resulting from an accidental release of regulated toxic substances from covered processes under worst-case conditions defined in §68.22;
    (ii) One worst-case release scenario that is estimated to create the greatest distance in any direction to an endpoint defined in §68.22(a) resulting from an accidental release of regulated flammable substances from covered processes under worst-case conditions defined in §68.22; and
    (iii) Additional worst-case release scenarios for a hazard class if a worst-case release from another covered process at the stationary source potentially affects public receptors different from those potentially affected by the worst-case release scenario developed under paragraphs (a)(2)(i) or (a)(2)(ii) of this section.

(b) Determination of worst-case release quantity. The worst-case release quantity shall be the greater of the following:
  (1) For substances in a vessel, the greatest amount held in a single vessel, taking into account administrative controls that limit the maximum quantity; or
  (2) For substances in pipes, the greatest amount in a pipe, taking into account administrative controls that limit the maximum quantity.

(c) Worst-case release scenario—toxic gases.
  (1) For regulated toxic substances that are normally gases at ambient temperature and handled as a gas or as a liquid under pressure, the owner or operator shall assume that the quantity in the vessel or pipe, as determined under paragraph (b) of this section, is released as a gas over 10 minutes. The release rate shall be assumed to be the total quantity divided by 10 unless passive mitigation systems are in place.
  (2) For gases handled as refrigerated liquids at ambient pressure:
    (i) If the released substance is not contained by passive mitigation systems or if the contained pool would have a depth of 1 cm or less, the owner or operator shall assume that the substance is released as a gas in 10 minutes;
    (ii) If the released substance is contained by passive mitigation systems in a pool with a depth greater than 1 cm, the owner or operator may assume that the quantity in the vessel or pipe, as determined under paragraph (b) of this section, is spilled instantaneously to form a liquid pool. The volatilization rate (release rate) shall be calculated at the boiling point of the substance and at the conditions specified in paragraph (d) of this section.

(d) Worst-case release scenario—toxic liquids.
  (1) For regulated toxic substances that are normally liquids at ambient temperature, the owner or operator shall assume that the quantity in the vessel or pipe, as determined under paragraph (b) of this section, is spilled instantaneously to form a liquid pool.

Subpart B—Hazard Assessment (cont'd)

(i) The surface area of the pool shall be determined by assuming that the liquid spreads to 1 centimeter deep unless passive mitigation systems are in place that serve to contain the spill and limit the surface area. Where passive mitigation is in place, the surface area of the contained liquid shall be used to calculate the volatilization rate.

(ii) If the release would occur onto a surface that is not paved or smooth, the owner or operator may take into account the actual surface characteristics.

(2) The volatilization rate shall account for the highest daily maximum temperature occurring in the past three years, the temperature of the substance in the vessel, and the concentration of the substance if the liquid spilled is a mixture or solution.

(3) The rate of release to air shall be determined from the volatilization rate of the liquid pool. The owner or operator may use the methodology in the RMP Offsite Consequence Analysis Guidance or any other publicly available techniques that account for the modeling conditions and are recognized by industry as applicable as part of current practices. Proprietary models that account for the modeling conditions may be used provided the owner or operator allows the implementing agency access to the model and describes model features and differences from publicly available models to local emergency planners upon request.

(e) Worst-case release scenario - flammable gases. The owner or operator shall assume that the quantity of the substance, as determined under paragraph (b) of this section and the provisions below, vaporizes resulting in a vapor cloud explosion. A yield factor of 10 percent of the available energy released in the explosion shall be used to determine the distance to the explosion endpoint if the model used is based on TNT equivalent methods.

(1) For regulated flammable substances that are normally gases at ambient temperature and handled as a gas or as a liquid under pressure, the owner or operator shall assume that the quantity in the vessel or pipe, as determined under paragraph (b) of this section, is released as a gas over 10 minutes. The total quantity shall be assumed to be involved in the vapor cloud explosion.

(2) For flammable gases handled as refrigerated liquids at ambient pressure:

(i) If the released substance is not contained by passive mitigation systems or if the contained pool would have a depth of one centimeter or less, the owner or operator shall assume that the total quantity of the substance is released as a gas in 10 minutes, and the total quantity will be involved in the vapor cloud explosion.

(ii) If the released substance is contained by passive mitigation systems in a pool with a depth greater than 1 centimeter, the owner or operator may assume that the quantity in the vessel or pipe, as determined under paragraph (b) of this section, is spilled instantaneously to form a liquid pool. The volatilization rate (release rate) shall be calculated at the boiling point of the substance and at the conditions specified in paragraph (d) of this section. The owner or operator shall assume that the quantity which becomes vapor in the first 10 minutes is involved in the vapor cloud explosion.

(f) Worst-case release scenario - flammable liquids. The owner or operator shall assume that the quantity of the substance, as determined under paragraph (b) of this section and the provisions below, vaporizes resulting in a vapor cloud explosion. A yield factor of 10 percent of the available energy released in the explosion shall be used to determine the distance to the explosion endpoint if the model used is based on TNT equivalent methods.

(1) For regulated flammable substances that are normally liquids at ambient temperature, the owner or operator shall assume that the entire quantity in the vessel or pipe, as determined under paragraph (b) of this section, is spilled instantaneously to form a liquid pool. For liquids at temperatures below their atmospheric boiling point, the volatilization rate shall be calculated at the conditions specified in paragraph (d) of this section.

(2) The owner or operator shall assume that the quantity which becomes vapor in the first 10 minutes is involved in the vapor cloud explosion.

Subpart B—Hazard Assessment (cont'd)

(g) Parameters to be applied. The owner or operator shall use the parameters defined in §68.22 to determine distance to the endpoints. The owner or operator may use the methodology provided in the RMP Offsite Consequence Analysis Guidance or any commercially or publicly available air dispersion modeling techniques, provided the techniques account for the modeling conditions and are recognized by industry as applicable as part of current practices. Proprietary models that account for the modeling conditions may be used provided the owner or operator allows the implementing agency access to the model and describes model features and differences from publicly available models to local emergency planners upon request.

(h) Consideration of passive mitigation. Passive mitigation systems may be considered for the analysis of worst case provided that the mitigation system is capable of withstanding the release event triggering the scenario and would still function as intended.

(i) Factors in selecting a worst-case scenario. Notwithstanding the provisions of paragraph (b) of this section, the owner or operator shall select as the worst case for flammable regulated substances or the worst case for regulated toxic substances, a scenario based on the following factors if such a scenario would result in a greater distance to an endpoint defined in §68.22(a) beyond the stationary source boundary than the scenario provided under paragraph (b) of this section:
   (1) Smaller quantities handled at higher process temperature or pressure; and
   (2) Proximity to the boundary of the stationary source.

§68.28 Alternative release scenario analysis.

(a) The number of scenarios. The owner or operator shall identify and analyze at least one alternative release scenario for each regulated toxic substance held in a covered process(es) and at least one alternative release scenario to represent all flammable substances held in covered processes.

(b) Scenarios to consider.
   (1) For each scenario required under paragraph (a) of this section, the owner or operator shall select a scenario:
      (i) That is more likely to occur than the worst-case release scenario under §68.25; and
      (ii) That will reach an endpoint offsite, unless no such scenario exists.
   (2) Release scenarios considered should include, but are not limited to, the following, where applicable:
      (i) Transfer hose releases due to splits or sudden hose uncoupling;
      (ii) Process piping releases from failures at flanges, joints, welds, valves and valve seals, and drains or bleeds;
      (iii) Process vessel or pump releases due to cracks, seal failure, or drain, bleed, or plug failure;
      (iv) Vessel overfilling and spill, or overpressurization and venting through relief valves or rupture disks; and
      (v) Shipping container mishandling and breakage or puncturing leading to a spill.

(c) Parameters to be applied. The owner or operator shall use the appropriate parameters defined in §68.22 to determine distance to the endpoints. The owner or operator may use either the methodology provided in the RMP Offsite Consequence Analysis Guidance or any commercially or publicly available air dispersion modeling techniques, provided the techniques account for the specified modeling conditions and are recognized by industry as applicable as part of current practices. Proprietary models that account for the modeling conditions may be used provided the owner or operator allows the implementing agency access to the model and describes model features and differences from publicly available models to local emergency planners upon request.

(d) Consideration of mitigation. Active and passive mitigation systems may be considered provided they are capable of withstanding the event that triggered the release and would still be functional.

(e) Factors in selecting scenarios. The owner or operator shall consider the following in selecting alternative release scenarios:
   (1) The five-year accident history provided in §68.42; and
   (2) Failure scenarios identified under §§68.50 or 68.67.

Subpart B—Hazard Assessment (cont'd)

§68.30 Defining offsite impacts—population.

(a) The owner or operator shall estimate in the RMP the population within a circle with its center at the point of the release and a radius determined by the distance to the endpoint defined in §68.22(a).

(b) Population to be defined. Population shall include residential population. The presence of institutions (schools, hospitals, prisons), parks and recreational areas, and major commercial, office, and industrial buildings shall be noted in the RMP.

(c) Data sources acceptable. The owner or operator may use the most recent Census data, or other updated information, to estimate the population potentially affected.

(d) Level of accuracy. Population shall be estimated to two significant digits.

§68.33 Defining offsite impacts—environment.

(a) The owner or operator shall list in the RMP environmental receptors within a circle with its center at the point of the release and a radius determined by the distance to the endpoint defined in §68.22(a) of this part.

(b) Data sources acceptable. The owner or operator may rely on information provided on local U.S. Geological Survey maps or on any data source containing U.S.G.S. data to identify environmental receptors.

§68.36 Review and update.

(a) The owner or operator shall review and update the offsite consequence analyses at least once every five years.

(b) If changes in processes, quantities stored or handled, or any other aspect of the stationary source might reasonably be expected to increase or decrease the distance to the endpoint by a factor of two or more, the owner or operator shall complete a revised analysis within six months of the change and submit a revised risk management plan as provided in §68.190.

§68.39 Documentation

The owner or operator shall maintain the following records on the offsite consequence analyses:

(a) For worst-case scenarios, a description of the vessel or pipeline and substance selected as worst case, assumptions and parameters used, and the rationale for selection; assumptions shall include use of any administrative controls and any passive mitigation that were assumed to limit the quantity that could be released. Documentation shall include the anticipated effect of the controls and mitigation on the release quantity and rate.

(b) For alternative release scenarios, a description of the scenarios identified, assumptions and parameters used, and the rationale for the selection of specific scenarios; assumptions shall include use of any administrative controls and any mitigation that were assumed to limit the quantity that could be released. Documentation shall include the effect of the controls and mitigation on the release quantity and rate.

(c) Documentation of estimated quantity released, release rate, and duration of release.

(d) Methodology used to determine distance to endpoints.

(e) Data used to estimate population and environmental receptors potentially affected.

§68.42 Five-year accident history.

(a) The owner or operator shall include in the five-year accident history all accidental releases from covered processes that resulted in deaths, injuries, or significant property damage on site, or known offsite deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage.

(b) Data required. For each accidental release included, the owner or operator shall report the following information:

(1) Date, time, and approximate duration of the release;

(2) Chemical(s) released;

(3) Estimated quantity released in pounds and, for mixtures containing regulated toxic substances, percentage concentration by weight of the released regulated toxic substance in the liquid mixture;

(4) Five- or six-digit NAICS code that most closely corresponds to the process;

(5) The type of release event and its source;

(6) Weather conditions, if known;

(7) On-site impacts;

Subpart B—Hazard Assessment (cont'd)

(8) Known offsite impacts;
(9) Initiating event and contributing factors if known;
(10) Whether offsite responders were notified if known; and
(11) Operational or process changes that resulted from investigation of the release.

(c) Level of accuracy. Numerical estimates may be provided to two significant digits.

Subpart C—Program 2 Prevention Program

68.48 Safety information.
68.50 Hazard review.
68.52 Operating procedures.
68.54 Training.
68.56 Maintenance.
68.58 Compliance audits.
68.60 Incident investigation.

§68.48 Safety information.

(a) The owner or operator shall compile and maintain the following up-to-date safety information related to the regulated substances, processes, and equipment:
(1) Material Safety Data Sheets that meet the requirements of 29 *CFR* 1910.1200(g);
(2) Maximum intended inventory of equipment in which the regulated substances are stored or processed;
(3) Safe upper and lower temperatures, pressures, flows, and compositions;
(4) Equipment specifications; and
(5) Codes and standards used to design, build, and operate the process.

(b) The owner or operator shall ensure that the process is designed in compliance with recognized and generally accepted good engineering practices. Compliance with Federal or state regulations that address industry-specific safe design or with industry-specific design codes and standards may be used to demonstrate compliance with this paragraph.

(c) The owner or operator shall update the safety information if a major change occurs that makes the information inaccurate.

§68.50 Hazard review.

(a) The owner or operator shall conduct a review of the hazards associated with the regulated substances, process, and procedures. The review shall identify the following:
(1) The hazards associated with the process and regulated substances;
(2) Opportunities for equipment malfunctions or human errors that could cause an accidental release;
(3) The safeguards used or needed to control the hazards or prevent equipment malfunction or human error; and
(4) Any steps used or needed to detect or monitor releases.

(b) The owner or operator may use checklists developed by persons or organizations knowledgeable about the process and equipment as a guide to conducting the review. For processes designed to meet industry standards or Federal or state design rules, the hazard review shall, by inspecting all equipment, determine whether the process is designed, fabricated, and operated in accordance with the applicable standards or rules.

(c) The owner or operator shall document the results of the review and ensure that problems identified are resolved in a timely manner.

(d) The review shall be updated at least once every five years. The owner or operator shall also conduct reviews whenever a major change in the process occurs; all issues identified in the review shall be resolved before startup of the changed process.

Subpart C—Program 2 Prevention Program (cont'd)

§68.52 Operating procedures.

(a) The owner or operator shall prepare written operating procedures that provide clear instructions or steps for safely conducting activities associated with each covered process consistent with the safety information for that process. Operating procedures or instructions provided by equipment manufacturers or developed by persons or organizations knowledgeable about the process and equipment may be used as a basis for a stationary source's operating procedures.

(b) The procedures shall address the following:
   (1) Initial startup;
   (2) Normal operations;
   (3) Temporary operations;
   (4) Emergency shutdown and operations;
   (5) Normal shutdown;
   (6) Startup following a normal or emergency shutdown or a major change that requires a hazard review;
   (7) Consequences of deviations and steps required to correct or avoid deviations; and
   (8) Equipment inspections.

(c) The owner or operator shall ensure that the operating procedures are updated, if necessary, whenever a major change occurs and prior to startup of the changed process.

§68.54 Training.

(a) The owner or operator shall ensure that each employee presently operating a process, and each employee newly assigned to a covered process have been trained or tested competent in the operating procedures provided in §68.52 that pertain to their duties. For those employees already operating a process on June 21, 1999, the owner or operator may certify in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as provided in the operating procedures.

(b) Refresher training. Refresher training shall be provided at least every three years, and more often if necessary, to each employee operating a process to ensure that the employee understands and adheres to the current operating procedures of the process. The owner or operator, in consultation with the employees operating the process, shall determine the appropriate frequency of refresher training.

(c) The owner or operator may use training conducted under Federal or state regulations or under industry-specific standards or codes or training conducted by covered process equipment vendors to demonstrate compliance with this section to the extent that the training meets the requirements of this section.

(d) The owner or operator shall ensure that operators are trained in any updated or new procedures prior to startup of a process after a major change.

§68.56 Maintenance.

(a) The owner or operator shall prepare and implement procedures to maintain the on-going mechanical integrity of the process equipment. The owner or operator may use procedures or instructions provided by covered process equipment vendors or procedures in Federal or state regulations or industry codes as the basis for stationary source maintenance procedures.

(b) The owner or operator shall train or cause to be trained each employee involved in maintaining the on-going mechanical integrity of the process. To ensure that the employee can perform the job tasks in a safe manner, each such employee shall be trained in the hazards of the process, in how to avoid or correct unsafe conditions, and in the procedures applicable to the employee's job tasks.

(c) Any maintenance contractor shall ensure that each contract maintenance employee is trained to perform the maintenance procedures developed under paragraph (a) of this section.

(d) The owner or operator shall perform or cause to be performed inspections and tests on process equipment. Inspection and testing procedures shall follow recognized and generally accepted good engineering practices. The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations, industry standards or codes, good engineering practices, and prior operating experience.

Subpart C—Program 2 Prevention Program (cont'd)

§68.58 Compliance audits.

(a) The owner or operator shall certify that they have evaluated compliance with the provisions of this subpart at least every three years to verify that the procedures and practices developed under the rule are adequate and are being followed.
(b) The compliance audit shall be conducted by at least one person knowledgeable in the process.
(c) The owner or operator shall develop a report of the audit findings.
(d) The owner or operator shall promptly determine and document an appropriate response to each of the findings of the compliance audit and document that deficiencies have been corrected.
(e) The owner or operator shall retain the two (2) most recent compliance audit reports. This requirement does not apply to any compliance audit report that is more than five years old.

§68.60 Incident investigation.

(a) The owner or operator shall investigate each incident which resulted in, or could reasonably have resulted in a catastrophic release.
(b) An incident investigation shall be initiated as promptly as possible, but not later than 48 hours following the incident.
(c) A summary shall be prepared at the conclusion of the investigation which includes at a minimum:
    (1) Date of incident;
    (2) Date investigation began;
    (3) A description of the incident;
    (4) The factors that contributed to the incident; and,
    (5) Any recommendations resulting from the investigation.
(d) The owner or operator shall promptly address and resolve the investigation findings and recommendations. Resolutions and corrective actions shall be documented.
(e) The findings shall be reviewed with all affected personnel whose job tasks are affected by the findings.
(f) Investigation summaries shall be retained for five years.

Subpart D—Program 3 Prevention Program

68.65 Process safety information.
68.67 Process hazard analysis.
68.69 Operating procedures.
68.71 Training.
68.73 Mechanical integrity.
68.75 Management of change.
68.77 Pre-startup review.
68.79 Compliance audits.
68.81 Incident investigation.
68.83 Employee participation.
68.85 Hot work permit.
68.87 Contractors.

Subpart D—Program 3 Prevention Program (cont'd)

§68.65 Process safety information.

(a) In accordance with the schedule set forth in §68.67, the owner or operator shall complete a compilation of written process safety information before conducting any process hazard analysis required by the rule. The compilation of written process safety information is to enable the owner or operator and the employees involved in operating the process to identify and understand the hazards posed by those processes involving regulated substances. This process safety information shall include information pertaining to the hazards of the regulated substances used or produced by the process, information pertaining to the technology of the process, and information pertaining to the equipment in the process.

(b) Information pertaining to the hazards of the regulated substances in the process. This information shall consist of at least the following:
- (1) Toxicity information;
- (2) Permissible exposure limits;
- (3) Physical data;
- (4) Reactivity data:
- (5) Corrosivity data;
- (6) Thermal and chemical stability data; and
- (7) Hazardous effects of inadvertent mixing of different materials that could foreseeably occur.

Note to paragraph (b): Material Safety Data Sheets meeting the requirements of 29 *CFR* 1910.1200(g) may be used to comply with this requirement to the extent they contain the information required by this subparagraph.

(c) Information pertaining to the technology of the process.
- (1) Information concerning the technology of the process shall include at least the following:
  - (i) A block flow diagram or simplified process flow diagram;
  - (ii) Process chemistry;
  - (iii) Maximum intended inventory;
  - (iv) Safe upper and lower limits for such items as temperatures, pressures, flows or compositions; and,
  - (v) An evaluation of the consequences of deviations.
- (2) Where the original technical information no longer exists, such information may be developed in conjunction with the process hazard analysis in sufficient detail to support the analysis.

(d) Information pertaining to the equipment in the process.
- (1) Information pertaining to the equipment in the process shall include:
  - (i) Materials of construction;
  - (ii) Piping and instrument diagrams (P&ID's);
  - (iii) Electrical classification;
  - (iv) Relief system design and design basis;
  - (v) Ventilation system design;
  - (vi) Design codes and standards employed;
  - (vii) Material and energy balances for processes built after June 21, 1999; and
  - (viii) Safety systems (e.g. interlocks, detection or suppression systems).
- (2) The owner or operator shall document that equipment complies with recognized and generally accepted good engineering practices.
- (3) For existing equipment designed and constructed in accordance with codes, standards, or practices that are no longer in general use, the owner or operator shall determine and document that the equipment is designed, maintained, inspected, tested, and operating in a safe manner.

Subpart D—Program 3 Prevention Program (cont'd)

§68.67 Process hazard analysis.

(a) The owner or operator shall perform an initial process hazard analysis (hazard evaluation) on processes covered by this part. The process hazard analysis shall be appropriate to the complexity of the process and shall identify, evaluate, and control the hazards involved in the process. The owner or operator shall determine and document the priority order for conducting process hazard analyses based on a rationale which includes such considerations as extent of the process hazards, number of potentially affected employees, age of the process, and operating history of the process. The process hazard analysis shall be conducted as soon as possible, but not later than June 21, 1999. Process hazards analyses completed to comply with 29 *CFR* 1910.119(e) are acceptable as initial process hazards analyses. These process hazard analyses shall be updated and revalidated, based on their completion date.

(b) The owner or operator shall use one or more of the following methodologies that are appropriate to determine and evaluate the hazards of the process being analyzed.
   (1) What-If;
   (2) Checklist;
   (3) What-If/Checklist;
   (4) Hazard and Operability Study (HAZOP);
   (5) Failure Mode and Effects Analysis (FMEA);
   (6) Fault Tree Analysis; or
   (7) An appropriate equivalent methodology.

(c) The process hazard analysis shall address:
   (1) The hazards of the process;
   (2) The identification of any previous incident which had a likely potential for catastrophic consequences.
   (3) Engineering and administrative controls applicable to the hazards and their interrelationships such as appropriate application of detection methodologies to provide early warning of releases. (Acceptable detection methods might include process monitoring and control instrumentation with alarms, and detection hardware such as hydrocarbon sensors.);
   (4) Consequences of failure of engineering and administrative controls;
   (5) Stationary source siting;
   (6) Human factors; and
   (7) A qualitative evaluation of a range of the possible safety and health effects of failure of controls.

(d) The process hazard analysis shall be performed by a team with expertise in engineering and process operations, and the team shall include at least one employee who has experience and knowledge specific to the process being evaluated. Also, one member of the team must be knowledgeable in the specific process hazard analysis methodology being used.

(e) The owner or operator shall establish a system to promptly address the team's findings and recommendations; assure that the recommendations are resolved in a timely manner and that the resolution is documented; document what actions are to be taken; complete actions as soon as possible; develop a written schedule of when these actions are to be completed; communicate the actions to operating, maintenance and other employees whose work assignments are in the process and who may be affected by the recommendations or actions.

(f) At least every five (5) years after the completion of the initial process hazard analysis, the process hazard analysis shall be updated and revalidated by a team meeting the requirements in paragraph (d) of this section, to assure that the process hazard analysis is consistent with the current process. Updated and revalidated process hazard analyses completed to comply with 29 *CFR* 1910.119(e) are acceptable to meet the requirements of this paragraph.

(g) The owner or operator shall retain process hazards analyses and updates or revalidations for each process covered by this section, as well as the documented resolution of recommendations described in paragraph (e) of this section for the life of the process.

Subpart D—Program 3 Prevention Program (cont'd)

§68.69 Operating procedures.

(a) The owner or operator shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information and shall address at least the following elements.
  (1) Steps for each operating phase:
    (i) Initial startup;
    (ii) Normal operations;
    (iii) Temporary operations;
    (iv) Emergency shutdown including the conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner;
    (v) Emergency operations;
    (vi) Normal shutdown; and,
    (vii) Startup following a turnaround, or after an emergency shutdown.
  (2) Operating limits:
    (i) Consequences of deviation; and
    (ii) Steps required to correct or avoid deviation.
  (3) Safety and health considerations:
    (i) Properties of, and hazards presented by, the chemicals used in the process;
    (ii) Precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment;
    (iii) Control measures to be taken if physical contact or airborne exposure occurs;
    (iv) Quality control for raw materials and control of hazardous chemical inventory levels; and,
    (v) Any special or unique hazards.
  (4) Safety systems and their functions.

(b) Operating procedures shall be readily accessible to employees who work in or maintain a process.

(c) The operating procedures shall be reviewed as often as necessary to assure that they reflect current operating practice, including changes that result from changes in process chemicals, technology, and equipment, and changes to stationary sources. The owner or operator shall certify annually that these operating procedures are current and accurate.

(d) The owner or operator shall develop and implement safe work practices to provide for the control of hazards during operations such as lockout/tagout; confined space entry; opening process equipment or piping; and control over entrance into a stationary source by maintenance, contractor, laboratory, or other support personnel. These safe work practices shall apply to employees and contractor employees.

§68.71 Training.

(a) Initial training.
  (1) Each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, shall be trained in an overview of the process and in the operating procedures as specified in §68.69. The training shall include emphasis on the specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks.
  (2) In lieu of initial training for those employees already involved in operating a process on June 21, 1999 an owner or operator may certify in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as specified in the operating procedures.

(b) Refresher training. Refresher training shall be provided at least every three years, and more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process. The owner or operator, in consultation with the employees involved in operating the process, shall determine the appropriate frequency of refresher training.

Subpart D—Program 3 Prevention Program (cont'd)

(c) Training documentation. The owner or operator shall ascertain that each employee involved in operating a process has received and understood the training required by this paragraph. The owner or operator shall prepare a record which contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.

§68.73 Mechanical integrity.

(a) Application. Paragraphs (b) through (f) of this section apply to the following process equipment:
  (1) Pressure vessels and storage tanks;
  (2) Piping systems (including piping components such as valves);
  (3) Relief and vent systems and devices;
  (4) Emergency shutdown systems;
  (5) Controls (including monitoring devices and sensors, alarms, and interlocks) and,
  (6) Pumps.

(b) Written procedures. The owner or operator shall establish and implement written procedures to maintain the on-going integrity of process equipment.

(c) Training for process maintenance activities. The owner or operator shall train each employee involved in maintaining the on-going integrity of process equipment in an overview of that process and its hazards and in the procedures applicable to the employee's job tasks to assure that the employee can perform the job tasks in a safe manner.

(d) Inspection and testing.
  (1) Inspections and tests shall be performed on process equipment.
  (2) Inspection and testing procedures shall follow recognized and generally accepted good engineering practices.
  (3) The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations and good engineering practices, and more frequently if determined to be necessary by prior operating experience.
  (4) The owner or operator shall document each inspection and test that has been performed on process equipment. The documentation shall identify the date of the inspection or test, the name of the person who performed the inspection or test, the serial number or other identifier of the equipment on which the inspection or test was performed, a description of the inspection or test performed, and the results of the inspection or test.

(e) Equipment deficiencies. The owner or operator shall correct deficiencies in equipment that are outside acceptable limits (defined by the process safety information in §68.65) before further use or in a safe and timely manner when necessary means are taken to assure safe operation.

(f) Quality assurance.
  (1) In the construction of new plants and equipment, the owner or operator shall assure that equipment as it is fabricated is suitable for the process application for which they will be used.
  (2) Appropriate checks and inspections shall be performed to assure that equipment is installed properly and consistent with design specifications and the manufacturer's instructions.
  (3) The owner or operator shall assure that maintenance materials, spare parts and equipment are suitable for the process application for which they will be used.

§68.75 Management of change.

(a) The owner or operator shall establish and implement written procedures to manage changes (except for "replacements in kind") to process chemicals, technology, equipment, and procedures; and, changes to stationary sources that affect a covered process.

(b) The procedures shall assure that the following considerations are addressed prior to any change:
  (1) The technical basis for the proposed change;
  (2) Impact of change on safety and health;
  (3) Modifications to operating procedures;

Subpart D—Program 3 Prevention Program (cont'd)

(4) Necessary time period for the change; and,
(5) Authorization requirements for the proposed change.

(c) Employees involved in operating a process and maintenance and contract employees whose job tasks will be affected by a change in the process shall be informed of, and trained in, the change prior to start-up of the process or affected part of the process.

(d) If a change covered by this paragraph results in a change in the process safety information required by §68.65 of this part, such information shall be updated accordingly.

(e) If a change covered by this paragraph results in a change in the operating procedures or practices required by §68.69, such procedures or practices shall be updated accordingly.

§68.77 Pre-startup review.

(a) The owner or operator shall perform a pre-startup safety review for new stationary sources and for modified stationary sources when the modification is significant enough to require a change in the process safety information.

(b) The pre-startup safety review shall confirm that prior to the introduction of regulated substances to a process:
(1) Construction and equipment is in accordance with design specifications;
(2) Safety, operating, maintenance, and emergency procedures are in place and are adequate;
(3) For new stationary sources, a process hazard analysis has been performed and recommendations have been resolved or implemented before startup; and modified stationary sources meet the requirements contained in management of change, §68.75.
(4) Training of each employee involved in operating a process has been completed.

§68.79 Compliance audits.

(a) The owner or operator shall certify that they have evaluated compliance with the provisions of this subpart at least every three years to verify that procedures and practices developed under this subpart are adequate and are being followed.

(b) The compliance audit shall be conducted by at least one person knowledgeable in the process.

(c) A report of the findings of the audit shall be developed.

(d) The owner or operator shall promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that deficiencies have been corrected.

(e) The owner or operator shall retain the two (2) most recent compliance audit reports.

§68.81 Incident investigation.

(a) The owner or operator shall investigate each incident which resulted in, or could reasonably have resulted in a catastrophic release of a regulated substance.

(b) An incident investigation shall be initiated as promptly as possible, but not later than 48 hours following the incident.

(c) An incident investigation team shall be established and consist of at least one person knowledgeable in the process involved, including a contract employee if the incident involved work of the contractor, and other persons with appropriate knowledge and experience to thoroughly investigate and analyze the incident.

(d) A report shall be prepared at the conclusion of the investigation which includes at a minimum:
(1) Date of incident;
(2) Date investigation began;
(3) A description of the incident;
(4) The factors that contributed to the incident; and,
(5) Any recommendations resulting from the investigation.

(e) The owner or operator shall establish a system to promptly address and resolve the incident report findings and recommendations. Resolutions and corrective actions shall be documented.

(f) The report shall be reviewed with all affected personnel whose job tasks are relevant to the incident findings including contract employees where applicable.

(g) Incident investigation reports shall be retained for five years.

Subpart D—Program 3 Prevention Program (cont'd)

§68.83 Employee participation.

(a) The owner or operator shall develop a written plan of action regarding the implementation of the employee participation required by this section.

(b) The owner or operator shall consult with employees and their representatives on the conduct and development of process hazards analyses and on the development of the other elements of process safety management in this rule.

(c) The owner or operator shall provide to employees and their representatives access to process hazard analyses and to all other information required to be developed under this rule.

§68.85 Hot work permit.

(a) The owner or operator shall issue a hot work permit for hot work operations conducted on or near a covered process.

(b) The permit shall document that the fire prevention and protection requirements in 29 *CFR* 1910.252(a) have been implemented prior to beginning the hot work operations; it shall indicate the date(s) authorized for hot work; and identify the object on which hot work is to be performed. The permit shall be kept on file until completion of the hot work operations.

§68.87 Contractors.

(a) Application. This section applies to contractors performing maintenance or repair, turnaround, major renovation, or specialty work on or adjacent to a covered process. It does not apply to contractors providing incidental services which do not influence process safety, such as janitorial work, food and drink services, laundry, delivery or other supply services.

(b) Owner or operator responsibilities.

(1) The owner or operator, when selecting a contractor, shall obtain and evaluate information regarding the contract owner or operator's safety performance and programs.

(2) The owner or operator shall inform contract owner or operator of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process.

(3) The owner or operator shall explain to the contract owner or operator the applicable provisions of subpart E of this part.

(4) The owner or operator shall develop and implement safe work practices consistent with §68.69(d), to control the entrance, presence, and exit of the contract owner or operator and contract employees in covered process areas.

(5) The owner or operator shall periodically evaluate the performance of the contract owner or operator in fulfilling their obligations as specified in paragraph (c) of this section.

(c) Contract owner or operator responsibilities.

(1) The contract owner or operator shall assure that each contract employee is trained in the work practices necessary to safely perform his/her job.

(2) The contract owner or operator shall assure that each contract employee is instructed in the known potential fire, explosion, or toxic release hazards related to his/her job and the process, and the applicable provisions of the emergency action plan.

(3) The contract owner or operator shall document that each contract employee has received and understood the training required by this section. The contract owner or operator shall prepare a record which contains the identity of the contract employee, the date of training, and the means used to verify that the employee understood the training.

(4) The contract owner or operator shall assure that each contract employee follows the safety rules of the stationary source including the safe work practices required by §68.69(d).

(5) The contract owner or operator shall advise the owner or operator of any unique hazards presented by the contract owner or operator's work, or of any hazards found by the contract owner or operator's work.

Subpart E—Emergency Response

§68.90 Applicability.

(a) Except as provided in paragraph (b) of this section, the owner or operator of a stationary source with Program 2 and Program 3 processes shall comply with the requirements of §68.95.

(b) The owner or operator of stationary source whose employees will not respond to accidental releases of regulated substances need not comply with §68.95 of this part provided that they meet the following:

(1) For stationary sources with any regulated toxic substance held in a process above the threshold quantity, the stationary source is included in the community emergency response plan developed under 42 U.S.C. 11003;

(2) For stationary sources with only regulated flammable substances held in a process above the threshold quantity, the owner or operator has coordinated response actions with the local fire department; and

(3) Appropriate mechanisms are in place to notify emergency responders when there is a need for a response.

§68.95 Emergency response program.

(a) The owner or operator shall develop and implement an emergency response program for the purpose of protecting public health and the environment. Such program shall include the following elements:

(1) An emergency response plan, which shall be maintained at the stationary source and contain at least the following elements:

(i) Procedures for informing the public and local emergency response agencies about accidental releases;

(ii) Documentation of proper first-aid and emergency medical treatment necessary to treat accidental human exposures; and

(iii) Procedures and measures for emergency response after an accidental release of a regulated substance;

(2) Procedures for the use of emergency response equipment and for its inspection, testing, and maintenance;

(3) Training for all employees in relevant procedures; and

(4) Procedures to review and update, as appropriate, the emergency response plan to reflect changes at the stationary source and ensure that employees are informed of changes.

(b) A written plan that complies with other Federal contingency plan regulations or is consistent with the approach in the National Response Team's Integrated Contingency Plan Guidance ("One Plan'') and that, among other matters, includes the elements provided in paragraph (a) of this section, shall satisfy the requirements of this section if the owner or operator also complies with paragraph (c) of this section.

(c) The emergency response plan developed under paragraph (a)(1) of this section shall be coordinated with the community emergency response plan developed under 42 U.S.C. 11003. Upon request of the local emergency planning committee or emergency response officials, the owner or operator shall promptly provide to the local emergency response officials information necessary for developing and implementing the community emergency response plan.

Subpart F—Regulated Substances for Accidental Release Prevention

§68.100 Purpose.

This subpart designates substances to be listed under section 112(r)(3), (4), and (5) of the Clean Air Act, as amended, identifies their threshold quantities, and establishes the requirements for petitioning to add or delete substances from the list.

§68.115 Threshold determination.

(a) A threshold quantity of a regulated substance listed in §68.130 is present at a stationary source if the total quantity of the regulated substance contained in a process exceeds the threshold.

(b) For the purposes of determining whether more than a threshold quantity of a regulated substance is present at the stationary source, the following exemptions apply:

(1) *Concentrations of a regulated toxic substance in a mixture*. If a regulated substance is present in a mixture and the concentration of the substance is below one percent by weight of the mixture, the amount of the substance in the mixture need not be considered when determining whether more than a threshold quantity is present at the stationary source. Except for oleum, toluene 2,4-diisocyanate, toluene 2,6-diisocyanate, and toluene diisocyanate (unspecified isomer), if the concentration of the regulated substance in the mixture is one percent or greater by weight, but the owner or operator can demonstrate that the partial pressure of the regulated substance in the mixture (solution) under handling or storage conditions in any portion of the process is less than 10 millimeters of mercury (mm Hg), the amount of the substance in the mixture in that portion of the process need not be considered when determining whether more than a threshold quantity is present at the stationary source. The owner or operator shall document this partial pressure measurement or estimate.

(2) *Concentrations of a regulated flammable substance in a mixture.*

(i) *General provision.* If a regulated substance is present in a mixture and the concentration of the substance is below one percent by weight of the mixture, the mixture need not be considered when determining whether more than a threshold quantity of the regulated substance is present at the stationary source. Except as provided in paragraph (b)(2)(ii) and (iii) of this section, if the concentration of the substance is one percent or greater by weight of the mixture, then, for purposes of determining whether a threshold quantity is present at the stationary source, the entire weight of the mixture shall be treated as the regulated substance unless the owner or operator can demonstrate that the mixture itself does not have a National Fire Protection Association flammability hazard rating of 4. The demonstration shall be in accordance with the definition of flammability hazard rating 4 in the NFPA 704, Standard System for the Identification of the Hazards of Materials for Emergency Response, National Fire Protection Association, Quincy, MA, 1996. Available from the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269-9101. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 *CFR* part 51. Copies may be inspected at the Environmental Protection Agency Air Docket (6102), Attn: Docket No. A-96-08, Waterside Mall, 401 M St. SW, Washington D.C.; or at the Office of Federal Register at 800 North Capitol St., NW Suite 700, Washington, D.C. Boiling point and flash points shall be defined and determined in accordance with NFPA 30, Flammable and Combustible Liquids Code, National Fire Protection Association, Quincy, MA, 1996. Available from the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269-9101. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 *CFR* part 51. Copies may be inspected at the Environmental Protection Agency Air Docket (6102), Attn: Docket No. A-96-08, Waterside Mall, 401 M St. SW, Washington D.C.; or at the Office of Federal Register at 800 North Capitol St., NW Suite 700, Washington, D.C. The owner or operator shall document the National Fire Protection Association flammability hazard rating.

Subpart F—Regulated Substances for Accidental Release Prevention (cont'd)

(ii) *Gasoline.* Regulated substances in gasoline, when in distribution or related storage for use as fuel for internal combustion engines, need not be considered when determining whether more than a threshold quantity is present at a stationary source.

(iii) *Naturally occurring hydrocarbon mixtures.* Prior to entry into a natural gas processing plant or a petroleum refining process unit, regulated substances in naturally occurring hydrocarbon mixtures need not be considered when determining whether more than a threshold quantity is present at a stationary source. Naturally occurring hydrocarbon mixtures include any combination of the following: condensate, crude oil, field gas, and produced water, each as defined in §68.3 of this part.

(3) *Articles*. Regulated substances contained in articles need not be considered when determining whether more than a threshold quantity is present at the stationary source.

(4) *Uses*. Regulated substances, when in use for the following purposes, need not be included in determining whether more than a threshold quantity is present at the stationary source:

(i) Use as a structural component of the stationary source;

(ii) Use of products for routine janitorial maintenance;

(iii) Use by employees of foods, drugs, cosmetics, or other personal items containing the regulated substance; and

(iv) Use of regulated substances present in process water or non-contact cooling water as drawn from the environment or municipal sources, or use of regulated substances present in air used either as compressed air or as part of combustion.

(5) *Activities in Laboratories*. If a regulated substance is manufactured, processed, or used in a laboratory at a stationary source under the supervision of a technically qualified individual as defined in §720.3(ee) of this chapter, the quantity of the substance need not be considered in determining whether a threshold quantity is present. This exemption does not apply to:

(i) Specialty chemical production;

(ii) Manufacture, processing, or use of substances in pilot plant scale operations; and

(iii) Activities conducted outside the laboratory.

§68.120 Petition process.

(a) Any person may petition the Administrator to modify, by addition or deletion, the list of regulated substances identified in §68.130. Based on the information presented by the petitioner, the Administrator may grant or deny a petition.

(b) A substance may be added to the list if, in the case of an accidental release, it is known to cause or may be reasonably anticipated to cause death, injury, or serious adverse effects to human health or the environment.

(c) A substance may be deleted from the list if adequate data on the health and environmental effects of the substance are available to determine that the substance, in the case of an accidental release, is not known to cause and may not be reasonably anticipated to cause death, injury, or serious adverse effects to human health or the environment.

(d) No substance for which a national primary ambient air quality standard has been established shall be added to the list. No substance regulated under Title VI of the Clean Air Act, as amended, shall be added to the list.

(e) The burden of proof is on the petitioner to demonstrate that the criteria for addition and deletion are met. A petition will be denied if this demonstration is not made.

(f) The Administrator will not accept additional petitions on the same substance following publication of a final notice of the decision to grant or deny a petition, unless new data becomes available that could significantly affect the basis for the decision.

Subpart F—Regulated Substances for Accidental Release Prevention (cont'd)

(g) Petitions to modify the list of regulated substances must contain the following:
  (1) Name and address of the petitioner and a brief description of the organization(s) that the petitioner represents, if applicable;
  (2) Name, address, and telephone number of a contact person for the petition;
  (3) Common chemical name(s), common synonym(s), Chemical Abstracts Service number, and chemical formula and structure;
  (4) Action requested (add or delete a substance);
  (5) Rationale supporting the petitioner's position; that is, how the substance meets the criteria for addition and deletion. A short summary of the rationale must be submitted along with a more detailed narrative; and
  (6) Supporting data; that is, the petition must include sufficient information to scientifically support the request to modify the list. Such information shall include:
    (i) A list of all support documents;
    (ii) Documentation of literature searches conducted, including, but not limited to, identification of the database(s) searched, the search strategy, dates covered, and printed results;
    (iii) Effects data (animal, human, and environmental test data) indicating the potential for death, injury, or serious adverse human and environmental impacts from acute exposure following an accidental release; printed copies of the data sources, in English, should be provided; and
    (iv) Exposure data or previous accident history data, indicating the potential for serious adverse human health or environmental effects from an accidental release. These data may include, but are not limited to, physical and chemical properties of the substance, such as vapor pressure; modeling results, including data and assumptions used and model documentation; and historical accident data, citing data sources.

(h) Within 18 months of receipt of a petition, the Administrator shall publish in the Federal Register a notice either denying the petition or granting the petition and proposing a listing.

§68.125 Exemptions.

Agricultural nutrients. Ammonia used as an agricultural nutrient, when held by farmers, is exempt from all provisions of this part.

§68.126 Exclusion.

Flammable Substances Used as Fuel or Held for Sale as Fuel at Retail Facilities. A flammable substance listed in Tables 3 and 4 of §68.130 is nevertheless excluded from all provisions of this part when the substance is used as a fuel or held for sale as a fuel at a retail facility.

§68.130 List of substances.

(a) Regulated toxic and flammable substances under section 112(r) of the Clean Air Act are the substances listed in Tables 1, 2, 3, and 4. Threshold quantities for listed toxic and flammable substances are specified in the tables.
(b) The basis for placing toxic and flammable substances on the list of regulated substances are explained in the notes to the list.

Subpart G—Risk Management Plan

68.150 Submission.
68.151 Assertion of claims of confidential business information.
68.152 Substantiating claims of confidential business information.
68.155 Executive summary.
68.160 Registration.
68.165 Offsite consequence analysis.
68.168 Five-year accident history.
68.170 Prevention program/Program 2.
68.175 Prevention program/Program 3.
68.180 Emergency response program.
68.185 Certification.
68.190 Updates.

Subpart G—Risk Management Plan (cont'd)

§68.150 Submission.

(a) The owner or operator shall submit a single RMP that includes the information required by §§68.155 through 68.185 for all covered processes. The RMP shall be submitted in a method and format to a central point as specified by EPA prior to June 21, 1999.

(b) The owner or operator shall submit the first RMP no later than the latest of the following dates:
   (1) June 21, 1999;
   (2) Three years after the date on which a regulated substance is first listed under §68.130; or
   (3) The date on which a regulated substance is first present above a threshold quantity in a process.

(c) Subsequent submissions of RMPs shall be in accordance with §68.190.

(d) Notwithstanding the provisions of §§68.155 to 68.190, the RMP shall exclude classified information. Subject to appropriate procedures to protect such information from public disclosure, classified data or information excluded from the RMP may be made available in a classified annex to the RMP for review by Federal and state representatives who have received the appropriate security clearances.

(e) Procedures for asserting and determining that information submitted in the RMP is entitled to protection as confidential business information are set forth in §§68.151 and 68.152.

§ 68.151 Assertion of claims of confidential business information.

(a) Except as provided in paragraph (b) of this section, an owner or operator of a stationary source required to report or otherwise provide information under this part may make a claim of confidential business information for any such information that meet the criteria set forth in 40 CFR 2.301.

(b) Notwithstanding the provisions of 40 CFR part 2, an owner or operator of a stationary source subject to this part may not claim as confidential business information the following information:
   (1) Registration data required by §68.160(b)(1) through (b)(6) and 68.160(b)(8), (b)(10) through (b)(13) and NAICS code and Program level of the process set forth in §68.160(b)(7);
   (2) Offsite consequence analysis required by §68.165(b)(4), (b)(9), (b)(10), (b)(11), and (b)(12);
   (3) Accident history data required by §68.168;
   (4) Prevention program data required by §170(b), (d), (e)(1), (f) through (k);
   (5) Prevention program data required by §175(b), (d), (e)(1), (f) through (p); and
   (6) Emergency response program data required by §68.180.

(c) Notwithstanding the procedures specified in 40 CFR part 2, an owner or operator asserting a claim of CBI with respect to information contained in its RMP, shall submit to EPA at the time it submits the RMP the following:
   (1) The information claimed confidential, provided in a format to be specified by EPA;
   (2) A sanitized (redacted) copy of the RMP with the notation "CBI" substituted for the information claimed confidential, except that a generic category or class name shall be substituted for any chemical name or identity claimed as confidential; and
   (3) The document or documents substantiating each claim of confidential business information as described in §68.152.

§ 68.152 Substantiating claims of confidential business information.

(a) An owner or operator claiming that information is confidential business information must substantiate that claim by providing documentation that demonstrates that the claim meets the substantive criteria set forth in 40 CFR 2.301.

(b) Information that is submitted as part of the substantiation may be claimed confidential by marking it as confidential business information. Information not so marked will be treated as public and may be disclosed without notice to the submitter. If information that is submitted as part of the substantiation is claimed confidential, the owner or operator must provide a sanitized and unsanitized version of the substantiation.

(c) The owner, operator, or senior official with management responsibility of the stationary source shall sign a certification that the signer has personally examined the information submitted and that based on inquiry of the persons who compiled the information, the information is true, accurate, and complete, and that those portions of the substantiation claimed as confidential business information would, if disclosed, reveal trade secrets or other confidential business information.

Subpart G—Risk Management Plan (cont'd)

§68.155 Executive summary.

The owner or operator shall provide in the RMP an executive summary that includes a brief description of the following elements:

(a) The accidental release prevention and emergency response policies at the stationary source;
(b) The stationary source and regulated substances handled;
(c) The worst-case release scenario(s) and the alternative release scenario(s), including administrative controls and mitigation measures to limit the distances for each reported scenario;
(d) The general accidental release prevention program and chemical-specific prevention steps;
(e) The five-year accident history;
(f) The emergency response program; and
(g) Planned changes to improve safety.

§68.160 Registration.

(a) The owner or operator shall complete a single registration form and include it in the RMP. The form shall cover all regulated substances handled in covered processes.
(b) The registration shall include the following data:
    (1) Stationary source name, street, city, county, state, zip code, latitude, and longitude**,** method for obtaining latitude and longitude, and description of location that latitude and longitude represent;
    (2) The stationary source Dun and Bradstreet number;
    (3) Name and Dun and Bradstreet number of the corporate parent company;
    (4) The name, telephone number, and mailing address of the owner or operator;
    (5) The name and title of the person or position with overall responsibility for RMP elements and implementation;
    (6) The name, title, telephone number, and 24-hour telephone number of the emergency contact;
    (7) For each covered process, the name and CAS number of each regulated substance held above the threshold quantity in the process, the maximum quantity of each regulated substance or mixture in the process (in pounds) to two significant digits, the five- or six-digit NAICS code that most closely corresponds to the process, and the Program level of the process;
    (8) The stationary source EPA identifier;
    (9) The number of full-time employees at the stationary source;
    (10) Whether the stationary source is subject to 29 *CFR* 1910.119;
    (11) Whether the stationary source is subject to 40 *CFR* part 355;
    (12) If the stationary source has a CAA Title V operating permit**,** the permit number;
    (13) The date of the last safety inspection of the stationary source by a Federal, state, or local government agency and the identity of the inspecting entity;
    (14) Source or parent company E-mail address (Optional);
    (15) Source homepage address (Optional);
    (16) Phone number at the source for public inquiries (Optional);
    (17) Local Emergency Planning Committee (Optional); and
    (18) OSHA Voluntary Protection Program status (Optional).

§68.165 Offsite consequence analysis.

(a) The owner or operator shall submit in the RMP information:
    (1) One worst-case release scenario for each Program 1 process; and

Subpart G—Risk Management Plan (cont'd)

(2) For Program 2 and 3 processes, one worst-case release scenario to represent all regulated toxic substances held above the threshold quantity and one worst-case release scenario to represent all regulated flammable substances held above the threshold quantity. If additional worst-case scenarios for toxics or flammables are required by §68.25(a)(2)(iii), the owner or operator shall submit the same information on the additional scenario(s). The owner or operator of Program 2 and 3 processes shall also submit information on one alternative release scenario for each regulated toxic substance held above the threshold quantity and one alternative release scenario to represent all regulated flammable substances held above the threshold quantity.

(b) The owner or operator shall submit the following data:
(1) Chemical name;
(2) Percentage weight of the chemical in a liquid mixture (toxics only);
(3) Physical state (toxics only);
(4) Basis of results (give model name if used);
(5) Scenario (explosion, fire, toxic gas release, or liquid spill and evaporation);
(6) Quantity released in pounds;
(7) Release rate;
(8) Release duration;
(9) Wind speed and atmospheric stability class (toxics only);
(10) Topography (toxics only);
(11) Distance to endpoint;
(12) Public and environmental receptors within the distance;
(13) Passive mitigation considered; and
(14) Active mitigation considered (alternative releases only).

§68.168 Five-year accident history.

The owner or operator shall submit in the RMP the information provided in §68.42(b) on each accident covered by §68.42(a).

§68.170 Prevention program/Program 2.

(a) For each Program 2 process, the owner or operator shall provide in the RMP the information indicated in paragraphs (b) through (k) of this section. If the same information applies to more than one covered process, the owner or operator may provide the information only once, but shall indicate to which processes the information applies.
(b) The five- or six-digit NAICS code that most closely corresponds to the process.
(c) The name(s) of the chemical(s) covered.
(d) The date of the most recent review or revision of the safety information and a list of Federal or state regulations or industry-specific design codes and standards used to demonstrate compliance with the safety information requirement.
(e) The date of completion of the most recent hazard review or update.
(1) The expected date of completion of any changes resulting from the hazard review;
(2) Major hazards identified;
(3) Process controls in use;
(4) Mitigation systems in use;
(5) Monitoring and detection systems in use; and
(6) Changes since the last hazard review.
(f) The date of the most recent review or revision of operating procedures.
(g) The date of the most recent review or revision of training programs;
(1) The type of training provided—classroom, classroom plus on the job, on the job; and
(2) The type of competency testing used.

Subpart G—Risk Management Plan (cont'd)

(h) The date of the most recent review or revision of maintenance procedures and the date of the most recent equipment inspection or test and the equipment inspected or tested.
(i) The date of the most recent compliance audit and the expected date of completion of any changes resulting from the compliance audit.
(j) The date of the most recent incident investigation and the expected date of completion of any changes resulting from the investigation.
(k) The date of the most recent change that triggered a review or revision of safety information, the hazard review, operating or maintenance procedures, or training.

§68.175 Prevention program/Program 3.

(a) For each Program 3 process, the owner or operator shall provide the information indicated in paragraphs (b) through (p) of this section. If the same information applies to more than one covered process, the owner or operator may provide the information only once, but shall indicate to which processes the information applies.
(b) The five- or six-digit NAICS code that most closely corresponds to the process.
(c) The name(s) of the substance(s) covered.
(d) The date on which the safety information was last reviewed or revised.
(e) The date of completion of the most recent PHA or update and the technique used.
    (1) The expected date of completion of any changes resulting from the PHA;
    (2) Major hazards identified;
    (3) Process controls in use;
    (4) Mitigation systems in use;
    (5) Monitoring and detection systems in use; and
    (6) Changes since the last PHA.
(f) The date of the most recent review or revision of operating procedures.
(g) The date of the most recent review or revision of training programs;
    (1) The type of training provided—classroom, classroom plus on the job, on the job; and
    (2) The type of competency testing used.
(h) The date of the most recent review or revision of maintenance procedures and the date of the most recent equipment inspection or test and the equipment inspected or tested.
(i) The date of the most recent change that triggered management of change procedures and the date of the most recent review or revision of management of change procedures.
(j) The date of the most recent pre-startup review.
(k) The date of the most recent compliance audit and the expected date of completion of any changes resulting from the compliance audit.
(l) The date of the most recent incident investigation and the expected date of completion of any changes resulting from the investigation.
(m) The date of the most recent review or revision of employee participation plans.
(n) The date of the most recent review or revision of hot work permit procedures.
(o) The date of the most recent review or revision of contractor safety procedures.
(p) The date of the most recent evaluation of contractor safety performance.

§68.180 Emergency response program.

(a) The owner or operator shall provide in the RMP the following information:
    (1) Do you have a written emergency response plan?
    (2) Does the plan include specific actions to be taken in response to an accidental releases of a regulated substance?
    (3) Does the plan include procedures for informing the public and local agencies responsible for responding to accidental releases?
    (4) Does the plan include information on emergency health care?

Subpart G—Risk Management Plan (cont'd)

(5) The date of the most recent review or update of the emergency response plan;
(6) The date of the most recent emergency response training for employees.

(b) The owner or operator shall provide the name and telephone number of the local agency with which emergency response activities and the emergency response plan is coordinated.

(c) The owner or operator shall list other Federal or state emergency plan requirements to which the stationary source is subject.

§68.185 Certification.

(a) For Program 1 processes, the owner or operator shall submit in the RMP the certification statement provided in §68.12(b)(4).

(b) For all other covered processes, the owner or operator shall submit in the RMP a single certification that, to the best of the signer's knowledge, information, and belief formed after reasonable inquiry, the information submitted is true, accurate, and complete.

§68.190 Updates.

(a) The owner or operator shall review and update the RMP as specified in paragraph (b) of this section and submit it in a method and format to a central point specified by EPA prior to June 21, 1999

(b) The owner or operator of a stationary source shall revise and update the RMP submitted under §68.150 as follows:
(1) Within five years of its initial submission or most recent update required by paragraphs (b)(2) through (b)(7) of this section, whichever is later;
(2) No later than three years after a newly regulated substance is first listed by EPA;
(3) No later than the date on which a new regulated substance is first present in an already covered process above a threshold quantity;
(4) No later than the date on which a regulated substance is first present above a threshold quantity in a new process;
(5) Within six months of a change that requires a revised PHA or hazard review;
(6) Within six months of a change that requires a revised offsite consequence analysis as provided in §68.36; and
(7) Within six months of a change that alters the Program level that applied to any covered process.

(c) If a stationary source is no longer subject to this part, the owner or operator shall submit a revised registration to EPA within six months indicating that the stationary source is no longer covered.

Subpart H—Other Requirements

68.200 Recordkeeping.
68.210 Availability of information to the public.
68.215 Permit content and air permitting authority or designated agency requirements.
68.220 Audits.

§68.200 Recordkeeping.

The owner or operator shall maintain records supporting the implementation of this part for five years unless otherwise provided in Subpart D of this part.

§68.210 Availability of information to the public.

(a) The RMP required under subpart G of this part shall be available to the public under 42 U.S.C. 7414(c).

(b) The disclosure of classified information by the Department of Defense or other Federal agencies or contractors of such agencies shall be controlled by applicable laws, regulations, or executive orders concerning the release of classified information.

Subpart H—Other Requirements (cont'd)

§68.215 Permit content and air permitting authority or designated agency requirements.

(a) These requirements apply to any stationary source subject to this part 68 and parts 70 or 71 of this Chapter. The 40 *CFR* part 70 or part 71 permit for the stationary source shall contain:
  (1) A statement listing this part as an applicable requirement;
  (2) Conditions that require the source owner or operator to submit:
    (i) A compliance schedule for meeting the requirements of this part by the date provided in Sec. 68.10(a) or;
    (ii) As part of the compliance certification submitted under 40 *CFR* 70.6(c)(5), a certification statement that the source is in compliance with all requirements of this part, including the registration and submission of the RMP.

(b) The owner or operator shall submit any additional relevant information requested by the air permitting authority or designated agency.

(c) For 40 *CFR* part 70 or part 71 permits issued prior to the deadline for registering and submitting the RMP and which do not contain permit conditions described in paragraph (a) of this section, the owner or operator or air permitting authority shall initiate permit revision or reopening according to the procedures of 40 *CFR* 70.7 or 71.7 to incorporate the terms and conditions consistent with paragraph (a) of this section.

(d) The state may delegate the authority to implement and enforce the requirements of paragraph (e) of this section to a state or local agency or agencies other than the air permitting authority. An up-to-date copy of any delegation instrument shall be maintained by the air permitting authority. The state may enter a written agreement with the Administrator under which EPA will implement and enforce the requirements of paragraph (e) of this section.

(e) The air permitting authority or the agency designated by delegation or agreement under paragraph (d) of this section shall, at a minimum:
  (1) Verify that the source owner or operator has registered and submitted an RMP or a revised plan when required by this part;
  (2) Verify that the source owner or operator has submitted a source certification or in its absence has submitted a compliance schedule consistent with paragraph (a)(2) of this section;
  (3) For some or all of the sources subject to this section, use one or more mechanisms such as, but not limited to, a completeness check, source audits, record reviews, or facility inspections to ensure that permitted sources are in compliance with the requirements of this part; and
  (4) Initiate enforcement action based on paragraphs (e)(1) and (e)(2) of this section as appropriate.

§68.220 Audits.

(a) In addition to inspections for the purpose of regulatory development and enforcement of the Act, the implementing agency shall periodically audit RMPs submitted under subpart G of this part to review the adequacy of such RMPs and require revisions of RMPs when necessary to ensure compliance with subpart G of this part.

(b) The implementing agency shall select stationary sources for audits based on any of the following criteria:
  (1) Accident history of the stationary source;
  (2) Accident history of other stationary sources in the same industry;
  (3) Quantity of regulated substances present at the stationary source;
  (4) Location of the stationary source and its proximity to the public and environmental receptors;
  (5) The presence of specific regulated substances;
  (6) The hazards identified in the RMP; and
  (7) A plan providing for neutral, random oversight.

(c) Exemption from audits. A stationary source with a Star or Merit ranking under OSHA's voluntary protection program shall be exempt from audits under paragraph (b)(2) and (b)(7) of this section.

(d) The implementing agency shall have access to the stationary source, supporting documentation, and any area where an accidental release could occur.

Subpart H—Other Requirements (cont'd)

(e) Based on the audit, the implementing agency may issue the owner or operator of a stationary source a written preliminary determination of necessary revisions to the stationary source's RMP to ensure that the RMP meets the criteria of subpart G of this part. The preliminary determination shall include an explanation for the basis for the revisions, reflecting industry standards and guidelines (such as AIChE/ CCPS guidelines and ASME and API standards) to the extent that such standards and guidelines are applicable, and shall include a timetable for their implementation.

(f) Written response to a preliminary determination.

(1) The owner or operator shall respond in writing to a preliminary determination made in accordance with paragraph (e) of this section. The response shall state the owner or operator will implement the revisions contained in the preliminary determination in accordance with the timetable included in the preliminary determination or shall state that the owner or operator rejects the revisions in whole or in part. For each rejected revision, the owner or operator shall explain the basis for rejecting such revision. Such explanation may include substitute revisions.

(2) The written response under paragraph (f)(1) of this section shall be received by the implementing agency within 90 days of the issue of the preliminary determination or a shorter period of time as the implementing agency specifies in the preliminary determination as necessary to protect public health and the environment. Prior to the written response being due and upon written request from the owner or operator, the implementing agency may provide in writing additional time for the response to be received.

(g) After providing the owner or operator an opportunity to respond under paragraph (f) of this section, the implementing agency may issue the owner or operator a written final determination of necessary revisions to the stationary source's RMP. The final determination may adopt or modify the revisions contained in the preliminary determination under paragraph (e) of this section or may adopt or modify the substitute revisions provided in the response under paragraph (f) of this section. A final determination that adopts a revision rejected by the owner or operator shall include an explanation of the basis for the revision. A final determination that fails to adopt a substitute revision provided under paragraph (f) of this section shall include an explanation of the basis for finding such substitute revision unreasonable.

(h) Thirty days after completion of the actions detailed in the implementation schedule set in the final determination under paragraph (g) of this section, the owner or operator shall be in violation of subpart G of this part and this section unless the owner or operator revises the RMP prepared under subpart G of this part as required by the final determination, and submits the revised RMP as required under §68.150.

(i) The public shall have access to the preliminary determinations, responses, and final determinations under this section in a manner consistent with §68.210.

(j) Nothing in this section shall preclude, limit, or interfere in any way with the authority of EPA or the state to exercise its enforcement, investigatory, and information gathering authorities concerning this part under the Act.

APPENDIX A
TABLE OF TOXIC ENDPOINTS
(as defined in §68.22 of this part)

CAS No.	Chemical Name	Toxic Endpoint (mg/L)
107-02-8	Acrolein [2-Propenal]	0.0011
107-13-1	Acrylonitrile [2-Propenenitrile]	0.076
814-68-6	Acrylyl chloride [2-Propenoyl chloride]	0.00090
107-18-6	Allyl alcohol [2-Propen-1-ol]	0.036
107-11-9	Allylamine [2-Propen-1-amine]	0.0032
7664-41-7	Ammonia (anhydrous)	0.14
7664-41-7	Ammonia (conc 20% or greater)	0.14
7784-34-1	Arsenous trichloride	0.010
7784-42-1	Arsine	0.0019
10294-34-5	Boron trichloride [Borane, trichloro-]	0.010
7637-07-2	Boron trifluoride [Borane, trifluoro-]	0.028
353-42-4	Boron trifluoride compound with methyl ether (1:1) [Boron, trifluoro[oxybis[methane]]-, T-4	0.023
7726-95-6	Bromine	0.0065
75-15-0	Carbon disulfide	0.16
7782-50-5	Chlorine	0.0087
10049-04-4	Chlorine dioxide [Chlorine oxide (ClO2)]	0.0028
67-66-3	Chloroform [Methane, trichloro-]	0.49
542-88-1	Chloromethyl ether [Methane, oxybis[chloro-]	0.00025
107-30-2	Chloromethyl methyl ether [Methane, chloromethoxy-]	0.0018
4170-30-3	Crotonaldehyde [2-Butenal]	0.029
123-73-9	Crotonaldehyde, (E)- [2-Butenal, (E)-]	0.029
506-77-4	Cyanogen chloride	0.030
108-91-8	Cyclohexylamine [Cyclohexanamine]	0.16
19287-45-7	Diborane	0.0011
75-78-5	Dimethyldichlorosilane [Silane, dichlorodimethyl-]	0.026
57-14-7	1,1-Dimethylhydrazine [Hydrazine, 1,1-dimethyl-]	0.012
106-89-8	Epichlorohydrin [Oxirane, (chloromethyl)-]	0.076
107-15-3	Ethylenediamine [1,2-Ethanediamine]	0.49
151-56-4	Ethyleneimine [Aziridine]	0.018

APPENDIX A (cont'd)

CAS No.	Chemical Name	Toxic Endpoint (mg/L)
75-21-8	Ethylene oxide [Oxirane]	0.090
7782-41-4	Fluorine	0.0039
50-00-0	Formaldehyde (solution)	0.012
110-00-9	Furan	0.0012
302-01-2	Hydrazine	0.011
7647-01-0	Hydrochloric acid (conc 37% or greater)	0.030
74-90-8	Hydrocyanic acid	0.011
7647-01-0	Hydrogen chloride (anhydrous) [Hydrochloric acid]	0.030
7664-39-3	Hydrogen fluoride/Hydrofluoric acid (conc 50% or greater) [Hydrofluoric acid]	0.016
7783-07-5	Hydrogen selenide	0.00066
7783-06-4	Hydrogen sulfide	0.042
13463-40-6	Iron, pentacarbonyl- [Iron carbonyl (Fe(CO)5), (TB-5-11)-]	0.00044
78-82-0	Isobutyronitrile [Propanenitrile, 2-methyl-]	0.14
108-23-6	Isopropyl chloroformate [Carbonochloridic acid, 1-methylethyl ester]	0.10
126-98-7	Methacrylonitrile [2-Propenenitrile, 2-methyl-]	0.0027
74-87-3	Methyl chloride [Methane, chloro-]	0.82
79-22-1	Methyl chloroformate [Carbonochloridic acid, methylester]	0.0019
60-34-4	Methyl hydrazine [Hydrazine, methyl-]	0.0094
624-83-9	Methyl isocyanate [Methane, isocyanato-]	0.0012
74-93-1	Methyl mercaptan [Methanethiol]	0.049
556-64-9	Methyl thiocyanate [Thiocyanic acid, methyl ester]	0.085
75-79-6	Methyltrichlorosilane [Silane, trichloromethyl-]	0.018
13463-39-3	Nickel carbonyl	0.00067
7697-37-2	Nitric acid (conc 80% or greater)	0.026
10102-43-9	Nitric oxide [Nitrogen oxide (NO)]	0.031
8014-95-7	Oleum (Fuming Sulfuric acid) [Sulfuric acid, mixture with sulfur trioxide]	0.010
79-21-0	Peracetic acid [Ethaneperoxoic acid]	0.0045
594-42-3	Perchloromethylmercaptan [Methanesulfenyl chloride, trichloro-]	0.0076
75-44-5	Phosgene [Carbonic dichloride]	0.00081
7803-51-2	Phosphine	0.0035
10025-87-3	Phosphorus oxychloride [Phosphoryl chloride]	0.0030

APPENDIX A (cont'd)

CAS No.	Chemical Name	Toxic Endpoint (mg/L)
7719-12-2	Phosphorus trichloride [Phosphorous trichloride]	0.028
110-89-4	Piperidine	0.022
107-12-0	Propionitrile [Propanenitrile]	0.0037
109-61-5	Propyl chloroformate [Carbonochloridic acid, propylester]	0.010
75-55-8	Propyleneimine [Aziridine, 2-methyl-]	0.12
75-56-9	Propylene oxide [Oxirane, methyl-]	0.59
7446-09-5	Sulfur dioxide (anhydrous)	0.0078
7783-60-0	Sulfur tetrafluoride [Sulfur fluoride (SF4), (T-4)-]	0.0092
7446-11-9	Sulfur trioxide	0.010
75-74-1	Tetramethyllead [Plumbane, tetramethyl-]	0.0040
509-14-8	Tetranitromethane [Methane, tetranitro-]	0.0040
7550-45-0	Titanium tetrachloride [Titanium chloride (TiCl4) (T-4)-]	0.020
584-84-9	Toluene 2,4-diisocyanate [Benzene, 2,4-diisocyanato-1-methyl-]	0.0070
91-08-7	Toluene 2,6-diisocyanate [Benzene, 1,3-diisocyanato-2-methyl-]	0.0070
26471-62-5	Toluene diisocyanate (unspecified isomer) [Benzene, 1,3-diisocyanatomethyl-]	0.0070
75-77-4	Trimethylchlorosilane [Silane, chlorotrimethyl-]	0.050
108-05-4	Vinyl acetate monomer [Acetic acid ethenyl ester]	0.26

TABLE 1 TO §68.130 – LIST OF REGULATED TOXIC SUBSTANCES AND THRESHOLD QUANTITIES FOR ACCIDENTAL RELEASE PREVENTION
[ALPHABETICAL ORDER – 77 SUBSTANCES]

Chemical Name	CAS No	Threshold Quantity (lbs)	Basis for Listing
Acrolein [2-Propenal]	107-02-8	5,000	b
Acrylonitrile [2-Propenenitrile]	107-13-1	20,000	b
Acrylyl chloride [2-Propenoyl chloride]	814-68-6	5,000	b
Allyl alcohol [2-Propen-1-ol]	107-18-6	15,000	b
Allylamine [2-Propen-1-amine]	107-11-9	10,000	b
Ammonia (anhydrous)	7664-41-7	10,000	a, b
Ammonia (conc 20% or greater)	7664-41-7	20,000	a, b
Arsenous trichloride	7784-34-1	15,000	b
Arsine	7784-42-1	1,000	b
Boron trichloride [Borane, trichloro-]	10294-34-5	5,000	b
Boron trifluoride [Borane, trifluoro-]	7637-07-2	5,000	b
Boron trifluoride compound with methyl ether (1:1) [Boron, trifluoro[oxybis[metane]]-, T-4-	353-42-4	15,000	b
Bromine	7726-95-6	10,000	a, b
Carbon disulfide	75-15-0	20,000	b
Chlorine	7782-50-5	2,500	a, b
Chlorine dioxide [Chlorine oxide (ClO2)]	10049-04-4	1,000	c
Chloroform [Methane, trichloro-]	67-66-3	20,000	b
Chloromethyl ether [Methane, oxybis[chloro-]	542-88-1	1,000	b
Chloromethyl methyl ether [Methane, chloromethoxy-]	107-30-2	5,000	b
Crotonaldehyde [2-Butenal]	4170-30-3	20,000	b
Crotonaldehyde, (E)- [2-Butenal, (E)-]	123-73-9	20,000	b
Cyanogen chloride	506-77-4	10,000	c
Cyclohexylamine [Cyclohexanamine]	108-91-8	15,000	b
Diborane	19287-45-7	2,500	b
Dimethyldichlorosilane [Silane, dichlorodimethyl-]	75-78-5	5,000	b
1,1-Dimethylhydrazine [Hydrazine, 1,1-dimethyl-]	57-14-7	15,000	b
Epichlorohydrin [Oxirane, (chloromethyl)-]	106-89-8	20,000	b
Ethylenediamine [1,2-Ethanediamine]	107-15-3	20,000	b
Ethyleneimine [Aziridine]	151-56-4	10,000	b
Ethylene oxide [Oxirane]	75-21-8	10,000	a, b
Fluorine	7782-41-4	1,000	b
Formaldehyde (solution)	50-00-0	15,000	b
Furan	110-00-9	5,000	b
Hydrazine	302-01-2	15,000	b
Hydrochloric acid (conc 37% or greater)	7647-01-0	15,000	d
Hydrocyanic acid	74-90-8	2,500	a, b
Hydrogen chloride (anhydrous) [Hydrochloric acid]	7647-01-0	5,000	a

TABLE 1 TO §68.130 (cont'd)

Chemical Name	CAS No	Threshold Quantity (lbs)	Basis for Listing
Hydrogen fluoride/Hydrofluoric acid (conc 50% or greater) [Hydrofluoric acid]	7664-39-3	1,000	a, b
Hydrogen selenide	7783-07-5	500	b
Hydrogen sulfide	7783-06-4	10,000	a, b
Iron, pentacarbonyl- [Iron carbonyl (Fe(CO)5), (TB-5-11)-]	13463-40-6	2,500	b
Isobutyronitrile [Propanenitrile, 2-methyl-]	78-82-0	20,000	b
Isopropyl chloroformate [Carbonochloridic acid, 1-methylethyl ester]	108-23-6	15,000	b
Methacrylonitrile [2-Propenenitrile, 2-methyl-]	126-98-7	10,000	b
Methyl chloride [Methane, chloro-]	74-87-3	10,000	a
Methyl chloroformate [Carbonochloridic acid, methylester]	79-22-1	5,000	b
Methyl hydrazine [Hydrazine, methyl-]	60-34-4	15,000	b
Methyl isocyanate [Methane, isocyanato-]	624-83-9	10,000	a, b
Methyl mercaptan [Methanethiol]	74-93-1	10,000	b
Methyl thiocyanate [Thiocyanic acid, methyl ester]	556-64-9	20,000	b
Methyltrichlorosilane [Silane, trichloromethyl-]	75-79-6	5,000	b
Nickel carbonyl	13463-39-3	1,000	b
Nitric acid (conc 80% or greater)	7697-37-2	15,000	b
Nitric oxide [Nitrogen oxide (NO)]	10102-43-9	10,000	b
Oleum (Fuming Sulfuric acid) [Sulfuric acid, mixture with sulfur trioxide][1]	8014-95-7	10,000	e
Peracetic acid [Ethaneperoxoic acid]	79-21-0	10,000	b
Perchloromethylmercaptan [Methanesulfenyl chloride, trichloro-]	594-42-3	10,000	b
Phosgene [Carbonic dichloride]	75-44-5	500	a, b
Phosphine	7803-51-2	5,000	b
Phosphorus oxychloride [Phosphoryl chloride]	10025-87-3	5,000	b
Phosphorus trichloride [Phosphorous trichloride]	7719-12-2	15,000	b
Piperidine	110-89-4	15,000	b
Propionitrile [Propanenitrile]	107-12-0	10,000	b
Propyl chloroformate [Carbonochloridic acid, propylester]	109-61-5	15,000	b
Propyleneimine [Aziridine, 2-methyl-]	75-55-8	10,000	b
Propylene oxide [Oxirane, methyl-]	75-56-9	10,000	b
Sulfur dioxide (anhydrous)	7446-09-5	5,000	a, b
Sulfur tetrafluoride [Sulfur fluoride (SF4), (T-4)-]	7783-60-0	2,500	b
Sulfur trioxide	7446-11-9	10,000	a, b

TABLE 1 TO §68.130 (cont'd)

Chemical Name	CAS No	Threshold Quantity (lbs)	Basis for Listing
Tetramethyllead [Plumbane, tetramethyl-]	75-74-1	10,000	b
Tetranitromethane [Methane, tetranitro-]	509-14-8	10,000	b
Titanium tetrachloride [Titanium chloride (TiCl4) (T-4)-]	7550-45-0	2,500	b
Toluene 2,4-diisocyanate [Benzene, 2,4-diisocyanato-1-methyl-][1]	584-84-9	10,000	a
Toluene 2,6-diisocyanate [Benzene, 1,3-diisocyanato-2-methyl-][1]	91-08-7	10,000	a
Toluene diisocyanate (unspecified isomer) [Benzene, 1,3-diisocyanatomethyl-][1]	26471-62-5	10,000	a
Trimethylchlorosilane [Silane, chlorotrimethyl-]	75-77-4	10,000	b
Vinyl acetate monomer [Acetic acid ethenyl ester]	108-05-4	15,000	b

[1]The mixture exemption in §68.115(b)(1) does not apply to the substance.

Basis for Listing:

[a]Mandated for listing by Congress.
[b]On EHS list, vapor pressure 10 mmHg or greater.
[c]Toxic gas.
[d]Toxicity of hydrogen chloride, potential to release hydrogen chloride, and history of accidents.
[e]Toxicity of sulfur trioxide and sulfuric acid, potential to release sulfur trioxide, and history of accidents.

TABLE 2 TO §68.130 - LIST OF REGULATED TOXIC SUBSTANCES AND THRESHOLD QUANTITIES FOR ACCIDENTAL RELEASE PREVENTION [CAS NUMBER ORDER - 77 SUBSTANCES]

CAS No.	Chemical Name	Threshold Quantity (lbs)	Basis for Listing
50-00-0	Formaldehyde (solution)	15,000	b
57-14-7	1,1-Dimethylhydrazine [Hydrazine, 1,1-dimethyl-]	15,000	b
60-34-4	Methyl hydrazine [Hydrazine, methyl-]	15,000	b
67-66-3	Chloroform [Methane, trichloro-]	20,000	b
74-87-3	Methyl chloride [Methane, chloro-]	10,000	a
74-90-8	Hydrocyanic acid	2,500	a, b
74-93-1	Methyl mercaptan [Methanethiol]	10,000	b
75-15-0	Carbon disulfide	20,000	b
75-21-8	Ethylene oxide [Oxirane]	10,000	a, b
75-44-5	Phosgene [Carbonic dichloride]	500	a, b
75-55-8	Propyleneimine [Aziridine, 2-methyl-]	10,000	b
75-56-9	Propylene oxide [Oxirane, methyl-]	10,000	b
75-74-1	Tetramethyllead [Plumbane, tetramethyl-]	10,000	b
75-77-4	Trimethylchlorosilane [Silane, chlorotrimethyl-]	10,000	b
75-78-5	Dimethyldichlorosilane [Silane, dichlorodimethyl-]	5,000	b
75-79-6	Methyltrichlorosilane [Silane, trichloromethyl-]	5,000	b
78-82-0	Isobutyronitrile [Propanenitrile, 2-methyl-]	20,000	b
79-21-0	Peracetic acid [Ethaneperoxoic acid]	10,000	b
79-22-1	Methyl chloroformate [Carbonochloridic acid, methylester]	5,000	b
91-08-7	Toluene 2,6-diisocyanate [Benzene, 1,3-diisocyanato-2-methyl-][1]	10,000	a
106-89-8	Epichlorohydrin [Oxirane, (chloromethyl)-]	20,000	b
107-02-8	Acrolein [2-Propenal]	5,000	b
107-11-9	Allylamine [2-Propen-1-amine]	10,000	b
107-12-0	Propionitrile [Propanenitrile]	10,000	b
107-13-1	Acrylonitrile [2-Propenenitrile]	20,000	b
107-15-3	Ethylenediamine [1,2-Ethanediamine]	20,000	b
107-18-6	Allyl alcohol [2-Propen-1-ol]	15,000	b
107-30-2	Chloromethyl methyl ether [Methane, chloromethoxy-]	5,000	b
108-05-4	Vinyl acetate monomer [Acetic acid ethenyl ester]	15,000	b
108-23-6	Isopropyl chloroformate [Carbonochloridic acid, 1-methylethyl ester]	15,000	b
108-91-8	Cyclohexylamine [Cyclohexanamine]	15,000	b
109-61-5	Propyl chloroformate [Carbonochloridic acid, propylester]	15,000	b
110-00-9	Furan	5,000	b
110-89-4	Piperidine	15,000	b
123-73-9	Crotonaldehyde, (E)- [2-Butenal, (E)-]	20,000	b
126-98-7	Methacrylonitrile [2-Propenenitrile, 2-methyl-]	10,000	b
151-56-4	Ethyleneimine [Aziridine]	10,000	b

TABLE 2 TO §68.130 (cont'd)

CAS No.	Chemical Name	Threshold Quantity (lbs)	Basis for Listing
302-01-2	Hydrazine	15,000	b
353-42-4	Boron trifluoride compound with methyl ether (1:1) [Boron, trifluoro[oxybis[metane]]-, T-4-	15,000	b
506-77-4	Cyanogen chloride	10,000	c
509-14-8	Tetranitromethane [Methane, tetranitro-]	10,000	b
542-88-1	Chloromethyl ether [Methane, oxybis[chloro-]	1,000	b
556-64-9	Methyl thiocyanate [Thiocyanic acid, methyl ester]	20,000	b
584-84-9	Toluene 2,4-diisocyanate [Benzene, 2,4-diisocyanato-1-methyl-][1]	10,000	a
594-42-3	Perchloromethylmercaptan [Methanesulfenyl chloride, trichloro-]	10,000	b
624-83-9	Methyl isocyanate [Methane, isocyanato-]	10,000	a, b
814-68-6	Acrylyl chloride [2-Propenoyl chloride]	5,000	b
4170-30-3	Crotonaldehyde [2-Butenal]	20,000	b
7446-09-5	Sulfur dioxide (anhydrous)	5,000	a, b
7446-11-9	Sulfur trioxide	10,000	a, b
7550-45-0	Titanium tetrachloride [Titanium chloride (TiCl4) (T-4)-]	2,500	b
7637-07-2	Boron trifluoride [Borane, trifluoro-]	5,000	b
7647-01-0	Hydrochloric acid (conc 37% or greater)	15,000	d
7647-01-0	Hydrogen chloride (anhydrous) [Hydrochloric acid]	5,000	a
7664-39-3	Hydrogen fluoride/Hydrofluoric acid (conc 50% or greater) [Hydrofluoric acid]	1,000	a, b
7664-41-7	Ammonia (anhydrous)	10,000	a, b
7664-41-7	Ammonia (conc 20% or greater)	20,000	a, b
7697-37-2	Nitric acid (conc 80% or greater)	15,000	b
7719-12-2	Phosphorus trichloride [Phosphorous trichloride]	15,000	b
7726-95-6	Bromine	10,000	a, b
7782-41-4	Fluorine	1,000	b
7782-50-5	Chlorine	2,500	a, b
7783-06-4	Hydrogen sulfide	10,000	a, b
7783-07-5	Hydrogen selenide	500	b
7783-60-0	Sulfur tetrafluoride [Sulfur fluoride (SF4), (T-4)-]	2,500	b
7784-34-1	Arsenous trichloride	15,000	b
7784-42-1	Arsine	1,000	b
7803-51-2	Phosphine	5,000	b
8014-95-7	Oleum (Fuming Sulfuric acid) [Sulfuric acid, mixture with sulfur trioxide][1]	10,000	e
10025-87-3	Phosphorus oxychloride [Phosphoryl chloride]	5,000	b
10049-04-4	Chlorine dioxide [Chlorine oxide (ClO2)]	1,000	c
10102-43-9	Nitric oxide [Nitrogen oxide (NO)]	10,000	b
10294-34-5	Boron trichloride [Borane, trichloro-]	5,000	b
13463-39-3	Nickel carbonyl	1,000	b

TABLE 2 TO §68.130 (cont'd)

CAS No.	Chemical Name	Threshold Quantity (lbs)	Basis for Listing
13463-40-6	Iron, pentacarbonyl- [Iron carbonyl (Fe(CO)5), (TB-5-11)-]	2,500	b
19287-45-7	Diborane	2,500	b
26471-62-5	Toluene diisocyanate (unspecified isomer) [Benzene, 1,3-diisocyanatomethyl-][1]	10,000	a

[1]The mixture exemption in §68.115(b)(1) does not apply to the substance.

Basis for Listing:

[a]Mandated for listing by Congress.
[b]On EHS list, vapor pressure 10 mmHg or greater.
[c]Toxic gas.
[d]Toxicity of hydrogen chloride, potential to release hydrogen chloride, and history of accidents.
[e]Toxicity of sulfur trioxide and sulfuric acid, potential to release sulfur trioxide, and history of accidents.

TABLE 3 TO §68.130 - LIST OF REGULATED FLAMMABLE SUBSTANCES[1] AND THRESHOLD QUANTITIES FOR ACCIDENTAL RELEASE PREVENTION
[ALPHABETICAL ORDER - 63 SUBSTANCES]

Chemical Name	CAS No.	Threshold Quantity (lbs)	Basis for Listing
Acetaldehyde	75-07-0	10,000	g
Acetylene [Ethyne]	74-86-2	10,000	f
Bromotrifluorethylene [Ethene, bromotrifluoro-]	598-73-2	10,000	f
1,3-Butadiene	106-99-0	10,000	f
Butane	106-97-8	10,000	f
1-Butene	106-98-9	10,000	f
2-Butene	107-01-7	10,000	f
Butene	25167-67-3	10,000	f
2-Butene-cis	590-18-1	10,000	f
2-Butene-trans [2-Butene, (E)]	624-64-6	10,000	f
Carbon oxysulfide [Carbon oxide sulfide (COS)]	463-58-1	10,000	f
Chlorine monoxide [Chlorine oxide]	7791-21-1	10,000	f
2-Chloropropylene [1-Propene, 2-chloro-]	557-98-2	10,000	g
1-Chloropropylene [1-Propene, 1-chloro-]	590-21-6	10,000	g
Cyanogen [Ethanedinitrile]	460-19-5	10,000	f
Cyclopropane	75-19-4	10,000	f
Dichlorosilane [Silane, dichloro-]	4109-96-0	10,000	f
Difluoroethane [Ethane, 1,1-difluoro-]	75-37-6	10,000	f
Dimethylamine [Methanamine, N-methyl-]	124-40-3	10,000	f
2,2-Dimethylpropane [Propane, 2,2-dimethyl-]	463-82-1	10,000	f
Ethane	74-84-0	10,000	f
Ethyl acetylene [1-Butyne]	107-00-6	10,000	f
Ethylamine [Ethanamine]	75-04-7	10,000	f
Ethyl chloride [Ethane, chloro-]	75-00-3	10,000	f
Ethylene [Ethene]	74-85-1	10,000	f
Ethyl ether [Ethane, 1,1'-oxybis-]	60-29-7	10,000	g
Ethyl mercaptan [Ethanethiol]	75-08-1	10,000	g
Ethyl nitrite [Nitrous acid, ethyl ester]	109-95-5	10,000	f
Hydrogen	1333-74-0	10,000	f
Isobutane [Propane, 2-methyl]	75-28-5	10,000	f
Isopentane [Butane, 2-methyl-]	78-78-4	10,000	g
Isoprene [1,3-Butadiene, 2-methyl-]	78-79-5	10,000	g
Isopropylamine [2-Propanamine]	75-31-0	10,000	g
Isopropyl chloride [Propane, 2-chloro-]	75-29-6	10,000	g
Methane	74-82-8	10,000	f
Methylamine [Methanamine]	74-89-5	10,000	f
3-Methyl-1-butene	563-45-1	10,000	f
2-Methyl-1-butene	563-46-2	10,000	g
Methyl ether [Methane, oxybis-]	115-10-6	10,000	f
Methyl formate [Formic acid, methyl ester]	107-31-3	10,000	g

TABLE 3 TO §68.130 (cont'd)

Chemical Name	CAS No.	Threshold Quantity (lbs)	Basis for Listing
2-Methylpropene [1-Propene, 2-methyl-]	115-11-7	10,000	f
1,3-Pentadiene	504-60-9	10,000	f
Pentane	109-66-0	10,000	g
1-Pentene	109-67-1	10,000	g
2-Pentene, (E)-	646-04-8	10,000	g
2-Pentene, (Z)-	627-20-3	10,000	g
Propadiene [1,2-Propadiene]	463-49-0	10,000	f
Propane	74-98-6	10,000	f
Propylene [1-Propene]	115-07-1	10,000	f
Propyne [1-Propyne]	74-99-7	10,000	f
Silane	7803-62-5	10,000	f
Tetrafluoroethylene [Ethene, tetrafluoro-]	116-14-3	10,000	f
Tetramethylsilane [Silane, tetramethyl-]	75-76-3	10,000	g
Trichlorosilane [Silane, trichloro-]	10025-78-2	10,000	g
Trifluorochloroethylene [Ethene, chlorotrifluoro-]	79-38-9	10,000	f
Trimethylamine [Methanamine, N,N-dimethyl-]	75-50-3	10,000	f
Vinyl acetylene [1-Buten-3-yne]	689-97-4	10,000	f
Vinyl chloride [Ethene, chloro-]	75-01-4	10,000	a, f
Vinyl ethyl ether [Ethene, ethoxy-]	109-92-2	10,000	g
Vinyl fluoride [Ethene, fluoro-]	75-02-5	10,000	f
Vinylidene chloride [Ethene, 1,1-dichloro-]	75-35-4	10,000	g
Vinylidene fluoride [Ethene, 1,1-difluoro-]	75-38-7	10,000	f
Vinyl methyl ether [Ethene, methoxy-]	107-25-5	10,000	f

[1]A flammable substance when used as a fuel or held for sale as a fuel at a retail facility is excluded from all provisions of this part (see §68.126).

Basis for Listing:

[a]Mandated for listing by Congress.
[f]Flammable gas.
[g]Volatile flammable liquid.

TABLE 4 TO §68.130 - LIST OF REGULATED FLAMMABLE SUBSTANCES[1] AND THRESHOLD QUANTITIES FOR ACCIDENTAL RELEASE PREVENTION
[CAS NUMBER ORDER - 63 SUBSTANCES]

CAS No.	Chemical Name	Threshold Quantity (lbs)	Basis for Listing
60-29-7	Ethyl ether [Ethane, 1,1'-oxybis-]	10,000	g
74-82-8	Methane	10,000	f
74-84-0	Ethane	10,000	f
74-85-1	Ethylene [Ethene]	10,000	f
74-86-2	Acetylene [Ethyne]	10,000	f
74-89-5	Methylamine [Methanamine]	10,000	f
74-98-6	Propane	10,000	f
74-99-7	Propyne [1-Propyne]	10,000	f
75-00-3	Ethyl chloride [Ethane, chloro-]	10,000	f
75-01-4	Vinyl chloride [Ethene, chloro-]	10,000	a, f
75-02-5	Vinyl fluoride [Ethene, fluoro-]	10,000	f
75-04-7	Ethylamine [Ethanamine]	10,000	f
75-07-0	Acetaldehyde	10,000	g
75-08-1	Ethyl mercaptan [Ethanethiol]	10,000	g
75-19-4	Cyclopropane	10,000	f
75-28-5	Isobutane [Propane, 2-methyl]	10,000	f
75-29-6	Isopropyl chloride [Propane, 2-chloro-]	10,000	g
75-31-0	Isopropylamine [2-Propanamine]	10,000	g
75-35-4	Vinylidene chloride [Ethene, 1,1-dichloro-]	10,000	g
75-37-6	Difluoroethane [Ethane, 1,1-difluoro-]	10,000	f
75-38-7	Vinylidene fluoride [Ethene, 1,1-difluoro-]	10,000	f
75-50-3	Trimethylamine [Methanamine, N,N-dimethyl-]	10,000	f
75-76-3	Tetramethylsilane [Silane, tetramethyl-]	10,000	g
78-78-4	Isopentane [Butane, 2-methyl-]	10,000	g
78-79-5	Isoprene [1,3-Butadiene, 2-methyl-]	10,000	g
79-38-9	Trifluorochloroethylene [Ethene, chlorotrifluoro-]	10,000	f
106-97-8	Butane	10,000	f
106-98-9	1-Butene	10,000	f
106-99-0	1,3-Butadiene	10,000	f
107-00-6	Ethyl acetylene [1-Butyne]	10,000	f
107-01-7	2-Butene	10,000	f
107-25-5	Vinyl methyl ether [Ethene, methoxy-]	10,000	f
107-31-3	Methyl formate [Formic acid, methyl ester]	10,000	g
109-66-0	Pentane	10,000	g
109-67-1	1-Pentene	10,000	g
109-92-2	Vinyl ethyl ether [Ethene, ethoxy-]	10,000	g
109-95-5	Ethyl nitrite [Nitrous acid, ethyl ester]	10,000	f
115-07-1	Propylene [1-Propene]	10,000	f
115-10-6	Methyl ether [Methane, oxybis-]	10,000	f
115-11-7	2-Methylpropene [1-Propene, 2-methyl-]	10,000	f

TABLE 4 TO §68.130 (cont'd)

CAS No.	Chemical Name	Threshold Quantity (lbs)	Basis for Listing
116-14-3	Tetrafluoroethylene [Ethene, tetrafluoro-]	10,000	f
124-40-3	Dimethylamine [Methanamine, N-methyl-]	10,000	f
460-19-5	Cyanogen [Ethanedinitrile]	10,000	f
463-49-0	Propadiene [1,2-Propadiene]	10,000	f
463-58-1	Carbon oxysulfide [Carbon oxide sulfide (COS)]	10,000	f
463-82-1	2,2-Dimethylpropane [Propane, 2,2-dimethyl-]	10,000	f
504-60-9	1,3-Pentadiene	10,000	f
557-98-2	2-Chloropropylene [1-Propene, 2-chloro-]	10,000	g
563-45-1	3-Methyl-1-butene	10,000	f
563-46-2	2-Methyl-1-butene	10,000	g
590-18-1	2-Butene-cis	10,000	f
590-21-6	1-Chloropropylene [1-Propene, 1-chloro-]	10,000	g
598-73-2	Bromotrifluorethylene [Ethene, bromotrifluoro-]	10,000	f
624-64-6	2-Butene-trans [2-Butene, (E)]	10,000	f
627-20-3	2-Pentene, (Z)-	10,000	g
646-04-8	2-Pentene, (E)-	10,000	g
689-97-4	Vinyl acetylene [1-Buten-3-yne]	10,000	f
1333-74-0	Hydrogen	10,000	f
4109-96-0	Dichlorosilane [Silane, dichloro-]	10,000	f
7791-21-1	Chlorine monoxide [Chlorine oxide]	10,000	f
7803-62-5	Silane	10,000	f
10025-78-2	Trichlorosilane [Silane, trichloro-]	10,000	g
25167-67-3	Butene	10,000	f

[1]A flammable substance when used as a fuel or held for sale as a fuel at a retail facility is excluded from all provisions of this part (see §68.126).

Basis for Listing:

[a]Mandated for listing by Congress.
[f]Flammable gas.
[g]Volatile flammable liquid.

APPENDIX G

Worksheets for Facilitating Compliance with the RMP Rule

This appendix contains several worksheets to help companies document compliance with the RMP rule. Specifically, this appendix contains instructions and worksheets for documenting the following:

- The quantities of regulated substances or mixtures in RMP-covered processes (pp. G-3 to G-6)
- The program level of a covered process (pp. G-7 to G-8)
- Candidate worst-case and alternative release scenarios for the offsite consequence analyses (pp. G-9 to G-14)

INSTRUCTIONS FOR COMPLETING THE PROCESS/VESSEL QUANTITY WORKSHEET

The process/vessel quantity worksheet should be completed once ***for each covered process*** at the facility. Begin by identifying the individual vessels that are believed to contain the greatest quantities of RMP-regulated toxic and flammable materials in the process. The term ***vessel*** means a ***single*** storage tank, a railcar connected to process equipment, a separator, a column or tower, a pipe, etc. For both toxic and flammable materials, vessels containing liquid should be the primary focus; vapor inventories can probably be neglected except for very high pressure portions of the process. Hydrogen sulfide is the exception. As indicated in Section 2 of this Guide, only molecular hydrogen sulfide gas needs to be counted when determining the total inventory of hydrogen sulfide in a process.

Vessel description

A description of the vessel type (i.e., storage, railcar, separator, column, pipe) and the equipment number assigned to the vessel.

RMP-regulated materials in vessel

A listing of ***each*** RMP-listed substance contained in the vessel and a characterization of the remaining nonregulated materials in the vessel. For example, a vessel may contain the following RMP-listed substances: pentane, isopentane, and 1-pentene. The remaining nonregulated materials include: C6, C7, C8, and higher.

For mixtures, if ***each*** RMP-listed substance is < 1 wt%, then the mixture is exempt. For flammable mixtures, the mixture must satisfy the NFPA 4 criteria (flash point < 73°F and boiling point < 100°F) to be included in the threshold quantity determination. End product gasoline (distributed to gas stations) is exempt because it meets the NFPA 3 criteria.

For toxic mixtures, the partial pressure of the RMP toxic substance must be greater than 10 mm of Hg to be included in the threshold quantity determination.

Quantity of materials in vessel (lb)

For RMP-listed toxic materials, enter (1) the mass of the pure substance in the vessel and (2) the total mass of all remaining materials in the vessel. For flammable mixtures containing RMP-listed substances, enter (1) the total mixture mass that meets the > 1 wt% and NFPA 4 criteria and (2) the total mass of all remaining materials in the vessel. The mass should include the sum of the liquid and vapor phases in the vessel (e.g., a separator). You may want to multiply the liquid mass by 1.05 to conservatively account for vapor that may be present.

Approximate % of each material in vessel

A crude estimate of the mass % of each material in the vessel. For the nonregulated materials (C6, C7, etc.) just provide a mass % for the total. For example:

hydrogen sulfide (2%)
isopentane (6%)
pentane (10%)
C6 and higher (82%)

Administrative controls (if any)	List any written procedural mechanisms for hazard control that are accounted for to limit the total quantity of materials in the vessel.
Normal pressure (psig)	Normal pressure within the vessel.
Normal temperature/ maximum temperature (EF)	The normal and maximum temperatures within the vessel.
Major assumptions	Any assumptions regarding liquid levels, vapor quantities, etc., made in estimating the vessel quantities.

After completing the worksheet for a given process, simply sum the quantities of the common regulated toxic substances in the process and compare the total quantity to the corresponding TQ for the toxic substance to determine if the process is covered by the RMP rule. If the total quantity of a specific RMP-regulated toxic substance exceeds the TQ for the toxic substance, then the process is subject to the RMP rule requirements. The total quantity of each regulated toxic material exceeding the TQ must then be reported in the RMPlan for the covered process. The same procedure applies to pure (i.e., non-mixture) regulated flammable substances in the process, except that the TQ for regulated flammable substances is 10,000 lb.

For regulated flammable mixtures in a process, several approaches may be used to determine the inventory for the process. The simplest approach is to sum the quantity of all flammable mixtures in the process for comparison against the 10,000-lb TQ for regulated flammable materials. If the total mixture quantity exceeds the 10,000-lb TQ, then the process is subject to the RMP rule requirements. The total flammable mixture mass (including the regulated and nonregulated materials in the mixture) must then be reported in the RMPlan for the covered process. In addition, the specific regulated flammable materials that could be in the mixture must be specified by name (no mass fractions are required to be reported in the RMPlan). The specific regulated flammable materials that could be in the mixture are determined by simply looking at each flammable mixture in the process worksheet and listing the unique regulated flammable substances, considering the mixtures collectively. Consider the following flammable mixtures contained in separate vessels in the ***same*** process:

> ***Mixture 1:*** A vessel containing greater than 1 wt% isopentane, isobutane, and normal pentane and a variety of heavier hydrocarbons (C6 and higher). The mixture meets the NFPA 4 criteria, and the total mass of all materials in the vessel is 65,000 lb.
>
> ***Mixture 2:*** A vessel containing greater than 1 wt% isobutane and normal butane. The mixture meets the NFPA 4 criteria, and the total mass of all materials in the vessel is 100,000 lb.

The total flammable mixture mass in the process is 165,000 lb. This exceeds the 10,000-lb TQ for regulated flammable substances. Therefore, the process is subject to the RMP rule. In the RMPlan, the process inventory would be reported as a flammable mixture containing isopentane, isobutane, normal pentane, and normal butane with a total process inventory of 170,000 lb (two significant figures).

A more detailed approach may involve determining the total flammable mixture quantity for each flammable mixture that contains the same regulated flammable materials. Each unique flammable mixture quantity would then be compared to the 10,000-lb TQ to determine if the process is covered by the RMP rule. Then each unique flammable mixture that exceeds the 10,000-lb TQ would be reported separately in the RMPlan along with the names of the regulated flammable substances in each mixture. This approach requires more effort in documenting the RMPlan and is ***not*** likely to result in fewer processes being subject to the RMP rule.

Process/Vessel Quantity Worksheet (Complete Once for Each Process)

Vessel description	RMP-regulated chemicals in vessel	Quantity of materials in vessel (lb)	Approximate % of each material in vessel	Administrative controls (if any)	Pressure (psig)	Normal temperature/ maximum temperature (EF)	Major assumptions

INSTRUCTIONS FOR COMPLETING THE PROGRAM LEVEL ELIGIBILITY WORKSHEET

The program level eligibility worksheet provides a means for documenting the program level associated with each RMP-covered process at the facility. The worksheet may be completed for each process and contains four major sections. The information provided in each section is somewhat self-explanatory. Therefore, limited instructions are provided for completing the worksheet.

The first section "Process Information" documents the company name, facility name, the name of the person performing the assessment, the process name and description, and the RMP-regulated substance(s) contained in the process (may be determined using the process/vessel quantity worksheet provided in this Appendix).

The second section "Program 1 Eligibility Assessment" contains a series of true/false statements that assess if the specific process satisfies the Program 1 eligibility criteria. The worst-case scenario distance(s) associated with the process and the distance(s) to the nearest public receptor must be known or determined to make the Program 1 assessment. If the program is eligible for Program 1, then proceed to the last section of the worksheet "Final Program Level Assignment." Otherwise, proceed to the next section of the worksheet.

The third section "Program 3 Eligibility Assessment" determines if the Program 3 eligibility criteria are satisfied, given that the process ***does not*** meet the Program 1 requirements. This section should be completed only if the process does not satisfy the Program 1 criteria. If the Program 1 and 3 criteria are not met, then the process is eligible for Program 2. After making the Program 3 or Program 2 determination, proceed to the last section of the worksheet "Final Program Level Assignment."

The last section "Final Program Level Assignment" documents the program level that is actually assigned to the process. The RMP rule allows you to assign to a process a program level that is equal to or higher than the program level that the process is eligible for. For example, a process may be eligible for Program 1 but is assigned Program 3 status because all of the other processes at the facility are Program 3 processes. The costs in maintaining the Program 1 status for the single process may outweigh the benefits associated with the Program 1 status. See Section 3.2 of this Guide for a discussion of the advantages and disadvantages of Program 1 vs. Program 2 or 3 processes. ***Note:*** The implementing agency for the RMP rule will hold you accountable for the requirements associated with program level that you assign to the process. Therefore, if the process is eligible for the Program 1 requirements, but you assign the process Program 3 status in the RMPlan, then the implementing agency will audit the process against the Program 3 requirements.

PROGRAM LEVEL ELIGIBILITY WORKSHEET

PROCESS INFORMATION

- Company name:_____ Date:_____
- Facility name:_____
- Name of the individual(s) who completed this form:_____
- Process name:_____
- Process description:_____
- RMP-regulated substance(s) contained in the process:_____

PROGRAM 1 ELIGIBILITY ASSESSMENT

1. No accidental releases of the above regulated substances (in the past 5 years) resulted in offsite death, injury, or response or restoration activities to an environmental receptor. ❑ True ❑ False
   List the date of the most recent accident meeting the above criterion: _____
2. All worst-case release scenario endpoint distances for this process are less than the distance to the nearest receptor. ❑ True ❑ False
   Worst-case endpoint distance(s) (miles): _____
   Distance to the nearest public receptor (miles):_____
3. Emergency response procedures have been coordinated with local emergency planning and response organizations. ❑ True ❑ False
   List organizations that the procedures are coordinated with:_____

If the responses to ALL THREE statements above are "True," then this process is eligible for Program 1. Proceed to the Final Program Level Assignment below. Otherwise, proceed to the Program 3 Eligibility Assessment below.

PROGRAM 3 ELIGIBILITY ASSESSMENT

1. Is the process covered by the OSHA PSM rule (29 *CFR* 1910.119)? ❑ Yes ❑ No
2. Is the process NAICS code one of the targeted NAICS codes? ❑ Yes ❑ No
   If "Yes," then indicate the NAICS code assigned to the process:

❑ 32211 (pulp mills)	❑ 325199 (other organics)
❑ 325181 (chlor-alkali)	❑ 325311 (nitrogen fertilizers)
❑ 325188 (industrial inorganics)	❑ 32532 (agricultural chemicals)
❑ 325211 (plastics and resins)	❑ 32411 (petroleum refineries)
❑ 32511 (petrochemicals)	❑ 325192 (other cyclic crude and intermediate manufacturing)

If the answer to EITHER of the above questions is "Yes," then this process must be considered a Program 3 process. Otherwise, this process is eligible for Program 2. Proceed to the Final Program Level Assignment below.

FINAL PROGRAM LEVEL ASSIGNMENT

- Program level that the process is eligible for: ❑ Program 1 ❑ Program 2 ❑ Program 3
- Program level assigned to the process: ❑ Program 1 ❑ Program 2 ❑ Program 3
- If assigned program level is greater than the eligible program level, document the rationale for the program level assignment:_____

INSTRUCTIONS FOR COMPLETING THE WORST-CASE RELEASE SCENARIO WORKSHEET

These instructions guide you through the process of completing the worst-case release scenario worksheet for each candidate worst-case scenario (WCS) at your facility. The worksheet helps document the WCS events considered by your facility and the rationale for the WCS event(s) that are reported in the RMPlan. The worksheet is comprised of six sections. Instructions for completing each section are summarized below.

Section 1: Company/Facility Data

Items 1 through 6 help document the facility and the personnel involved in identifying the candidate WCS event. The information is self-explanatory, so detailed instructions are not provided for this section.

Section 2: Chemical Information

7. Chemical name: *For releases of pure toxic or flammable substances,* record the name of the RMP-regulated substance involved in the release. *For mixtures or common water solutions of toxic substances,* record the name of the RMP-regulated toxic substance of interest in the mixture. *For mixtures of flammable substances,* record the names of the RMP-regulated flammable substances with the highest mass fractions in the mixture.

8. Is the chemical contained in a mixture?: Indicate if the RMP-regulated chemical is contained in a mixture.

9. If the chemical is contained in a mixture, indicate its mass fraction: *For mixtures or common water solutions of toxic substances,* record the mass fraction of the RMP-regulated toxic substance of interest in the mixture. For example, for a 28 wt% aqueous ammonia solution, the mass fraction is 0.28. *For mixtures of flammable substances,* record the mass fractions of the RMP-regulated flammable substances with highest mass fractions.

10. If the chemical is contained in a mixture, list the other chemicals in the mixture: Record the other chemicals contained in the mixture. For example, if the mixture is a 28 wt% aqueous ammonia solution, then water would be listed as the other chemical in the mixture. As another example, if the mixture contains 75 wt% isobutane and 25 wt% isopentane, then isobutane would be recorded in Item 7, the mass fraction of 0.75 would be recorded in Item 9, and isopentane would be recorded in Item 10 as the other chemical in the mixture.

Section 3: Worst-case Release Scenario Description

11. Narrative description of the release: Provide a description of the release, including the type of equipment associated with the release (vessel, column, pipe, etc.).

12. Total quantity assumed to be released (lb): Provide an estimate of the maximum quantity (in lb) of toxic or flammable substances assumed to be released in the WCS. *For mixtures or common water solutions of toxic substances,* record the amount of the RMP-regulated toxic substance of interest released in the WCS. For example, a worst-case release of 100,000 lb of a 28 wt% aqueous ammonia solution will cause 28,000 lb of ammonia to be released. *For mixtures of flammable substances,* record the total mass of all flammable materials in the mixture.

13. Administrative controls (if any) assumed to limit the total quantity released: Provide a description of any administrative controls assumed to limit the quantity released in the WCS. An *administrative control* is defined in the RMP rule as a "written procedural mechanism for hazard control."

14. Duration of the release from the vessel or pipe: Indicate the duration of the release from the primary containment (i.e., vessel or pipe) for the WCS. For a release of a toxic or flammable gas or pressurized liquefied gas, the release duration from primary containment must be 10 min. For a release of a toxic or flammable liquid, the release duration from primary containment is instantaneous. For toxic or flammable refrigerated liquefied gases, the release duration from primary containment is either (1) instantaneous, if the spill is contained and has a depth greater than 1 cm or (2) 10 min, if the spill is not contained or the spill depth is 1 cm or less.

15. Duration of pool evaporation, if applicable (min): Indicate the duration of the evaporating pool if the release is a toxic or flammable liquid or a refrigerated liquefied gas (that forms a contained pool).

16. Physical state of the chemical: Indicate the physical state of the regulated substance contained in the vessel or pipe. Examples of *pressurized liquefied gases* are liquid chlorine and liquid propane stored at ambient temperature and at a pressure greater than atmospheric pressure. An example of a *refrigerated liquid* is refrigerated liquid ammonia stored at its normal boiling point of -28 °F and at a pressure equal to atmospheric pressure. An example of a *nonrefrigerated liquid* is acrylonitrile stored at ambient temperature and atmospheric pressure.

17. Storage/process conditions: Indicate the pressure and temperature of the material in the storage/process vessel or pipe. The RMP rule requires that the material be released at the maximum process temperature or the maximum ambient temperature that has occurred in the past 3 years, whichever is higher.

Section 4: Passive Mitigation Systems

18. Passive mitigation systems accounted for in the analysis: Describe the passive mitigation systems, if any, accounted for in the analysis of the WCS. For dikes or berms, indicate the surface area (in ft^2), the capacity (in ft^3), and the surface type (gravel, soil, concrete, etc.) of the dike/berm. The RMP rule only allows passive mitigation to be considered when evaluating the WCS. No active mitigation systems may be considered for the WCS event.

Section 5: Modeling Approach

19. List modeling approach used: List the software or other consequence analysis modeling approach used to perform the offsite consequence analysis of the WCS.

Section 6: Results

20. Endpoint: Indicate the endpoint associated with the WCS event. See Section 4.4.1 of this Guide for endpoints that must be used for WCS events.

21. Distance to endpoint (miles): The distance to the endpoint as determined by the modeling approach indicated in Item 19.

WORST-CASE RELEASE SCENARIO WORKSHEET

COMPANY/FACILITY DATA

1. Company name:_____ 2. Date:_____
3. Facility name:_____
4. Name of the individual(s) who completed this form:_____
5. Telephone of individual who completed this worksheet:_____
6. Street address of the facility:_____

CHEMICAL INFORMATION

7. Chemical name: _____
8. Is the chemical contained in a mixture? ❑ Yes ❑ No
9. If the chemical is contained in a mixture, indicate its mass fraction:_____
10. If the chemical is contained in a mixture, list the other chemicals in the mixture:_____

WORST-CASE RELEASE SCENARIO DESCRIPTION

11. Narrative description of the release:_____
12. Total quantity assumed to be released (lb):_____
13. Administrative controls (if any) assumed to limit the total quantity released:_____
14. Duration of the release from the vessel or pipe: ❑ 10 minutes OR ❑ instantaneous
15. Duration of pool evaporation, if applicable (min):_____
16. Physical state of the chemical: ❑ Gas ❑ Pressurized liquefied gas
    ❑ Refrigerated liquid ❑ Nonrefrigerated liquid
17. Storage/process conditions Pressure _____ psig OR ❑ ambient pressure
    Temperature _____ °F OR ❑ ambient temperature

PASSIVE MITIGATION SYSTEMS

18. Passive mitigation systems accounted for in the analysis:_____

MODELING APPROACH

19. List modeling approach used:_____

RESULTS

20. Endpoint:_____ 21. Distance to endpoint (miles):_____

INSTRUCTIONS FOR COMPLETING THE ALTERNATIVE RELEASE SCENARIO WORKSHEET

These instructions guide you through the process of completing the alternative release scenario (ARS) worksheet for each candidate ARS at your facility. The worksheet helps document the ARS events considered by your facility and the rationale for the ARS event(s) that are reported in the RMPlan. The worksheet is comprised of six sections. Instructions for completing each section are summarized below.

Section 1: Company/Facility Data

Items 1 through 6 help document the facility and the personnel involved in identifying the candidate ARS event. The information is self-explanatory, so detailed instructions are not provided for this section.

Section 2: Chemical Information

7. Chemical name: *For releases of pure toxic or flammable substances,* record the name of the RMP-regulated substance involved in the release. *For mixtures or common water solutions of toxic substances,* record the name of the RMP-regulated toxic substance of interest in the mixture. *For mixtures of flammable substances,* record the names of the RMP-regulated flammable substances with the highest mass fractions.

8. Is the chemical contained in a mixture?: Indicate if the RMP-regulated chemical is contained in a mixture.

9. If the chemical is contained in a mixture, indicate its mass fraction: *For mixtures or common water solutions of toxic substances,* record the mass fraction of the RMP-regulated toxic substance of interest in the mixture. For example, for a 28 wt% aqueous ammonia solution, the mass fraction is 0.28. *For mixtures of flammable substances,* record the mass fractions of the RMP-regulated flammable substances with highest mass fractions.

10. If the chemical is contained in a mixture, list the other chemicals in the mixture: Record the other chemicals contained in the mixture. For example, if the mixture is a 28 wt% aqueous ammonia solution, then water would be listed as the other chemical in the mixture. As another example, if the mixture contains 75 wt% isobutane and 25 wt% isopentane, then isobutane would be recorded in Item 7, the mass fraction of 0.75 would be recorded in Item 9, and isopentane would be recorded in Item 10 as the other chemical in the mixture.

Section 3: Alternative Release Scenario Description

11. Narrative description of the release: Provide a description of the release, including the type of equipment associated with the release (vessel, column, pipe, unloading/loading hose, etc.). Indicate the hole size (for leak events) or the pipe/hose diameter (for rupture events) associated with the ARS.

12. Rationale for selection of the release event: Indicate the rationale for your selection of the ARS.

13. Total quantity assumed to be released (lb) or the release rate (lb/min): Provide an estimate of the quantity (in lb) or the release rate (lb/min) of toxic or flammable

substances assumed to be released in the ARS. *For mixtures or common water solutions of toxic substances,* record the amount (in lb) or the release rate (in lb/min) of the RMP-regulated toxic substance of interest released in the ARS. For example, a release rate of 100 lb/min of a 28 wt% aqueous ammonia solution will result in a release of 28 lb/min of ammonia. *For mixtures of flammable substances,* record the total amount (in lb) or the total release rate (in lb/min) of all flammable materials in the mixture.

14. Duration of the primary release (min) and the basis for the release duration: Indicate the duration of the release from the primary containment and your rationale for the release duration for the ARS.

15. Duration of pool evaporation, if applicable (min): Indicate the duration of the evaporating pool if the release is a toxic or flammable liquid or a refrigerated liquefied gas (that forms a contained pool).

16. Physical state of the chemical: Indicate the physical state of the regulated substance contained in the vessel or pipe. Examples of *pressurized liquefied gases* are liquid chlorine and liquid propane stored at ambient temperature and at a pressure greater than atmospheric pressure. An example of a *refrigerated liquid* is refrigerated liquid ammonia stored at its normal boiling point of -28 °F and at a pressure equal to atmospheric pressure. An example of a *nonrefrigerated liquid* is acrylonitrile stored at ambient temperature and atmospheric pressure.

17. Storage/process conditions: Indicate the pressure and temperature of the material in the process. The RMP rule allows you to select the pressure and temperature that are most appropriate for the ARS event being analyzed.

Section 4: Passive/Active Mitigation Systems

18. Passive and/or active mitigation systems accounted for in the analysis: Describe the passive and/or active mitigation systems, if any, accounted for in the analysis of the ARS. For dikes or berms, indicate the surface area (in ft^2), the capacity (in ft^3), and the surface type (gravel, soil, concrete, etc.) of the dike/berm. The RMP rule allows active and passive mitigation to be considered when evaluating the ARS.

Section 5: Modeling Approach

19. List modeling approach used: List the software or other consequence analysis modeling approach used to perform the offsite consequence analysis of the ARS.

Section 6: Results

20. Endpoint: Indicate the endpoint associated with the ARS event. See Section 4.4.1 of this Guide for endpoints that must be used for ARS events.

21. Distance to endpoint (miles): The distance to the endpoint as determined by the modeling approach indicated in Item 19.

ALTERNATIVE RELEASE SCENARIO WORKSHEET

COMPANY/FACILITY DATA

1. Company name:_____ 2. Date:_____
3. Facility name:_____
4. Name of the individual(s) who completed this worksheet:_____
5. Telephone of individual(s) who completed this worksheet:_____
6. Street address of the facility:_____

CHEMICAL INFORMATION

7. Chemical name: _____
8. Is the chemical contained in a mixture? ❑ Yes ❑ No
9. If the chemical is contained in a mixture, indicate its mass fraction:_____
10. If the chemical is contained in a mixture, list the other chemicals in the mixture:_____

ALTERNATIVE RELEASE SCENARIO DESCRIPTION

11. Narrative description of the release:_____
12. Rationale for selection of the release event: ❑ accident history ❑ PHA or hazard review ❑ Other_____
13. Total quantity assumed to be released (lb) or the release rate (lb/min):_____
14. Duration of the primary release (min) and the basis for the release duration:_____
15. Duration of pool evaporation, if applicable (min):_____
16. Physical state of the chemical: ❑ Gas ❑ Pressurized liquefied gas ❑ Refrigerated liquid ❑ Nonrefrigerated liquid
17. Storage/process conditions Pressure _____ psig OR ❑ ambient pressure
    Temperature _____ °F OR ❑ ambient temperature

PASSIVE/ACTIVE MITIGATION SYSTEMS

18. Passive and/or active mitigation systems accounted for in the analysis:_____

MODELING APPROACH

19. List modeling approach used:_____

RESULTS

20. Endpoint:_____ 21. Distance to endpoint (miles):_____

APPENDIX H

EPA's RMP Audit Checklist

The following checklist is taken from Annex C of *Guidance for Auditing Risk Management Plans/Programs Under Clean Air Act Section 112(r)*, EPA 550-B99-008, August 1999. The full document may be obtained from EPA's web site at: http://www.epa.gov/ceppo/.

ANNEX C: AUDIT CHECKLIST

Process audited: _____

Auditor: _____

Instructions: This checklist may be used for verification of RMP and Program compliance (Check boxes coding: Y=Yes, N=No, P=Partial, A=Not Applicable)

Note: Compliance Objectives appear in the order they appear in the RMP rule

COMPLIANCE OBJECTIVES	NOTES

1. RISK MANAGEMENT PROGRAM AND PLAN (SUBPART A)

Applicability [68.1]

❑	1.1.	Does the owner or operator of the stationary source have more than a threshold quantity of a regulated substance in a process? [68.10(a)]
❑	1.2.	Has the process had, in the five years prior to submission of the RMP, an accidental release of a regulated substance where exposure to the substance, its reaction products, overpressure generated by an explosion involving the substance, or radiant heat generated by a fire involving the substance led to any of the following off-site: (i) Death; (ii) Injury; or (iii) Response or restoration activities for an exposure of an environmental receptor? [68.10(b)(1)]
❑	1.3.	Is the distance to a toxic or flammable endpoint for a worst-case release assessment less than the distance to any public receptor? [68.10(b)(2)]
❑	1.4.	Has the owner or operator coordinated emergency response procedures between the stationary source and local emergency planning and response organizations? [68.10(b)(3)]
❑	1.5.	Is the covered process subject to OSHA PSM standard, 29 CFR 1910.119? [68.10(d)(2)]
❑	1.6.	Is the covered process in one of the NAICS codes listed in 40 CFR §68.10(d)(1)? [68.10(d)(1)]

Auditor may need to re-answer 1.5 and 1.6 for multiple processes in comments section.

COMPLIANCE OBJECTIVES | NOTES

General Requirements [68.12]

☐	1.7.	Has the owner or operator submitted a single RMP, which included a registration that reflects all covered processes, as provided in 68.150 to 68.185? [68.12(a)]
	1.8.	For Program 1 processes audited, has the owner or operator: [68.12(b)]
☐	1.8.1.	Analyzed the worst-case release scenario for the process(es), as provided in 68.25; [68.12(b)(1)]
☐	1.8.2.	Documented that the nearest public receptors is beyond the distance to an endpoint defined in 68.22(a); and [68.12(b)(1)]
☐	1.8.3.	Included the scenario(s) in the RMP as provided in 68.165? [68.12(b)(1)]
☐	1.8.4.	Completed the five-year accident history for the process as provided in 68.42 [68.12(b)(2)]; and
☐	1.8.5.	Included the history in the RMP as provided in 68.168? [68.12(b)(2)]
☐	1.8.6.	Ensured that response actions have been coordinated with local emergency planning and response agencies? [68.12(b)(3)]
☐	1.8.7.	Included the appropriate certification statement for Program 1 processes? [68.12(b)(4)]
	1.9.	For Program 2 processes, has the owner or operator: [68.12(c)]
☐	1.9.1.	Developed and implemented a management system as provided in 68.15? [68.12(c)(1)]
☐	1.9.2.	Conducted a hazard assessment as provided in 68.20 through 68.42? [68.12(c)(2)]
☐	1.9.3.	Implemented the Program 2 prevention steps provided in 68.48 through 68.60 or implemented the Program 3 prevention steps provided in 68.65 through 68.87? [68.12(c)(3)]
☐	1.9.4.	Developed and implemented an emergency response program as provided in 68.90 to 68.95? [68.12(c)(4)]
☐	1.9.5.	Submitted, as part of the RMP, the data on prevention program elements for Program 2 processes as provided in 68.170? [68.12(c)(5)]

COMPLIANCE OBJECTIVES

NOTES

1.10. For Program 3 processes, has the owner or operator: [68.12(d)]

❑ 1.10.1. Developed and implemented a management system as provided in 68.15? [68.12(d)(1)]

❑ 1.10.2. Conducted a hazard assessment as provided in 68.20 through 68.42? [68.12(d)(2)]

❑ 1.10.3. Implemented the prevention requirements provided in 68.65 through 68.87? [68.12(d)(3)]

❑ 1.10.4. Developed and implemented an emergency response program as provided in 68.90 to 68.95? [68.12(d)(4)]

❑ 1.10.5. Submitted, as part of the RMP, the data on prevention program elements for Program 3 processes as provided in 68.175? [68.12(d)(5)]

Management [68.15]

Has the owner or operator:

❑ 1.11. Developed a management system to oversee the implementation of the risk management program elements? [68.15(a)]

❑ 1.12. Assigned a qualified person or position that has the overall responsibility for the development, implementation, and integration of the risk management program elements? [68.15(b)]

❑ 1.13. Documented other persons responsible for implementing individual requirements of the risk management program and defined the lines of authority through an organization chart or similar document? [68.15(c)]

General Findings / Conclusions:

COMPLIANCE OBJECTIVES | NOTES

Documentation obtained to support Findings / Conclusions:

2. RMP SUBMISSION (SUBPART G) 68.150 - 68.190

☐ 2.1. Did the owner or operator submit an RMP on or before June 21, 1999? Postmark date of initial submission: [68.10, 68.10(a)(1), 68.150(a) & (b)]

If submission was after June 21, 1999, was submittal required because: [68.10 & 68.150(b)]

☐ 2.1.1. Initial listing of a regulated substance under 68.130 after June 21, 1999 [68.10(a)(2) & 68.150(b)(2)]

☐ 2.1.2. A regulated substance was first present at the stationary source above the threshold quantity in a process [68.10(a)(3) & 68.150(b)(2)]

☐ 2.2. Has the owner or operator revised and updated the RMP within 5 years of initial submission? Date of the last revision and update [68.190(a)]:

2.3. If required, has the owner or operator submitted a revised RMP for any of the following: [68.190(b)]

☐ 2.3.1. Within 3 years after EPA first listed a newly regulated substance? [68.190(b)(2)]

☐ 2.3.2. No later than the date on which a new regulated substance is first present in an already covered process above a threshold quantity? [68.190(b)(3)]

☐ 2.3.3. No later than the date on which a regulated substance is first present above a threshold quantity in a new process? [68.190(b)(4)]

☐ 2.3.4. Within six months of a change that requires a revised PHA or hazard review? [68.190(b)(5)]

COMPLIANCE OBJECTIVES		NOTES
☐	2.3.5. Within six months of a change that requires a revised off-site consequence analysis as provided in 68.36? [68.190(b)(6)]	
☐	2.3.6. Within six months of a change that alters the Program level that applied to any covered process? [68.190(b)(7)]	
☐	2.4. Has the owner or operator included information submitted as CBI in the RMP? [68.150(d)]	
☐	2.4.1. If so, were the provisions of 68.151 and 68.152 followed ?	

RMP: Executive Summary

	2.5. Has the owner or operator included a brief description of the following elements in the executive summary of the RMP: [68.155]	
☐	2.5.1. The accidental release prevention and emergency response policies at the stationary source? [68.155(a)]	
☐	2.5.2. The stationary source and regulated substances handled? [68.155(b)]	
☐	2.5.4. The worst-case release and alternative release scenario(s), including administrative controls and mitigation measures to limit the distances for each reported scenario? [68.155(c)]	
☐	2.5.5. The general accidental release prevention program and chemical-specific prevention steps? [68.155(d)]	
☐	2.5.6. The five-year accident history? [68.155(e)]	
☐	2.5.7. The emergency response program? [68.155(f)]	
☐	2.5.8. Planned changes to improve safety? [68.155(g)]	

COMPLIANCE OBJECTIVES

NOTES

RMP: Registration

❑	2.6.	Has the owner or operator included a single registration form in the RMP which covers all regulated substances handled in covered processes? [68.160(a)]
	2.7.	Does the registration include the following data: [68.160(b)]
❑	2.7.1.	Stationary source name, full address, Dun and Bradstreet number; longitude and latitude with method and description? [68.160(b)(1) & (2)]
❑	2.7.2.	Corporate parent company name and Dun and Bradstreet number? [68.160(b)(3)]
❑	2.7.3.	The name, telephone number, and mailing address of the owner or operator? [68.160(b)(4)]
❑	2.7.4.	The name and title of the person or position with overall responsibility for RMP elements and implementation? [68.160(b)(5)]
❑	2.7.5.	The name, title, telephone number, and 24-hour number of the emergency contact? [68.160(b)(6)]
❑	2.7.6.	For each covered process, the name and CAS number of each regulated substance held above the threshold quantity in the process, the maximum quantity of each regulated substance or mixture in the process, the NAICS code, and the Program level of the process? [68.160(b)(7)]
❑	2.7.7.	The stationary source EPA identifier? [68.160(b)(8)]
❑	2.7.8.	The number of full-time employees at the stationary source? [68.160(b)(9)]
❑	2.7.9.	Whether the stationary source is subject of 29 CFR §1910.119, OSHA's Process Safety Management Standard? [68.160(b)(10)]
❑	2.7.10.	Whether the stationary source is subject to 40 CFR Part 355, the Emergency Planning Requirements of the Emergency Planning and Community Right-to-Know Act? [68.160(b)(11)]
❑	2.7.11.	If the stationary source has a CAA Title V operating permit, its permit number? [68.160(b)(12)]

COMPLIANCE OBJECTIVES		NOTES
❑	2.7.12. The date of the last safety inspection of the stationary source by a Federal, state, or local government agency and the identity of the inspecting entity? [68.160(b)(13)]	

RMP: Off-site Consequence Analysis

	2.8. Does the RMP include the following: [68.165(a)]	
❑	2.8.1. One worst-case release scenario for each Program 1 process? [68.165(a)(1)]	
❑	2.8.2. For Program 2 and 3 processes, one worst-case release scenario to represent all regulated toxic substances held above the threshold quantity and one worst-case release scenario to represent all regulated flammable substances held above the threshold quantity? [68.165(a)(2)]	
❑	2.8.3. For Program 2 and 3 processes, were additional worst-case scenarios also submitted, if required by 68.25(a)(2)(iii)? [68.165(a)(2)]	
❑	2.8.4. For Program 2 and 3 processes, was information submitted on one alternative scenario for each regulated toxic substance held above the threshold quantity and one alternative scenario to represent all regulated flammable substances held above the threshold? [68.165(a)(2)]	
	2.9 Does the RMP include the following information for each submitted release scenario: [68.165(b)]	
❑	2.9.1. Scenario type (explosion, fire, toxic gas release, or liquid spill and vaporization)? [68.165(b)(5)]	
❑	2.9.2. Chemical name of released substance? [68.165(b)(1)]	
❑	2.9.3. Percentage weight of the chemical in a liquid mixture (toxics only)? [68.165(b)(2)]	
❑	2.9.4. Physical state of substance (toxics only)? [68.165(b)(3)]	
❑	2.9.5. Basis of results (model name if used)? [68.165(b)(4)]	

COMPLIANCE OBJECTIVES | NOTES

- ❑ 2.9.6. Quantity released in pounds? [68.165(b)(6)]
- ❑ 2.9.7. Release rate? [68.165(b)(7)]
- ❑ 2.9.8. Release duration? [68.165(b)(8)]
- ❑ 2.9.9. Wind speed and atmospheric stability class (toxics only)? [68.165(b)(9)]
- ❑ 2.9.10. Topography (toxics only)? [68.165(b)(10)]
- ❑ 2.9.11. Distance to endpoint? [68.165(b)(11)]
- ❑ 2.9.12. Public and environmental receptors within the distance? [68.165(b)(12)]
- ❑ 2.9.13. Passive mitigation considered? [68.165(b)(13)]
- ❑ 2.9.14. Active mitigation considered (alternative releases scenarios only)? [68.165(b)(14)]

RMP: Five-year accident history

- ❑ 2.10. Has the owner or operator provided the five-year accident history information in 68.42 on each accident covered by 68.42? [68.168]

2.11. Does the RMP include the following information for each reported accidental release: [68.42(b)]

- ❑ 2.11.1. Date, time, and approximate duration of the release? [68.42(b)(1)]
- ❑ 2.11.2. Chemical(s) released? [68.42(b)(2)]
- ❑ 2.11.3. Estimated quantity released in pounds and percentage weight in a mixture (toxics)? [68.42(b)(3)]
- ❑ 2.11.4. NAIES code for the process? [68.42(b)(4)]

COMPLIANCE OBJECTIVES		NOTES
❑	2.11.5. The type of release event and its source? [68.42(b)(5)]	
❑	2.11.6. Weather conditions (if known)? [68.42(b)(6)]	
❑	2.11.7. On-site impacts? [68.42(b)(7)]	
❑	2.11.8. Known offsite impacts? [68.42(b)(8)]	
❑	2.11.9. Initiating event and contributing factors (if known)? [68.42(b)(9)]	
❑	2.11.10. Whether offsite responders were notified (if known)? [68.42(b)(10)]	
❑	2.11.11. Operational or process changes that resulted from investigation of the release? [68.42(b)(11)]	

RMP: Prevention program / Program 2 [68.17]

	2.12. Has the owner or operator included the following information for each covered process in Program 2? [68.170(a)]	
❑	2.12.1. The NAICS code for the process? [68.170(b)]	
❑	2.12.2. The name(s) of the chemical(s) covered? [68.170(c)]	
❑	2.12.3. The date of the most recent review or revision of the safety information and a list of Federal or state regulations or industry-specific design codes and standards used to demonstrate compliance with the safety information requirement. [68.170(d)]	
❑	2.12.4. The date of completion of the most recent hazard review or update? [68.170(e)]	
❑	2.12.4.1. The expected date of completion of any changes resulting from the hazard review or update? [68.170(e)(1)]	

COMPLIANCE OBJECTIVES	NOTES

- ❑ 2.12.4.2. Major hazards identified? [68.170(e)(2)]
- ❑ 2.12.4.3. Process controls in use? [68.170(e)(3)]
- ❑ 2.12.4.4. Mitigation systems in use? [68.170(e)(4)]
- ❑ 2.12.4.5. Monitoring and detection systems in use? [68.170(e)(5)]
- ❑ 2.12.4.6. Changes since the last hazard review? [68.170(e)(6)]
- ❑ 2.12.5. The date of the most recent review or revision of operating procedures? [68.170(f)]
- ❑ 2.12.6. The date of the most recent review or revision of training programs? [68.170(g)]
- ❑ 2.12.6.1 The type of training provided--classroom, classroom plus on the job, on the job? [68.170(g)(1)]
- ❑ 2.12.6.2. The type of competency testing used? [68.170(g)(2)]
- ❑ 2.12.7. The date of the most recent review or revision of maintenance procedures and the date of the most recent equipment inspection or test and the equipment inspected or tested? [68.170(h)]
- ❑ 2.12.8. The date of the most recent compliance audit and the expected date of completion of any changes resulting from the compliance audit? [68.170(i)]
- ❑ 2.12.9. The date of the most recent incident investigation and the expected date of completion of any changes resulting from the investigation? [68.170(j)]
- ❑ 2.12.10. The date of the most recent change that triggered a review or revision of safety information, hazard review, operating or maintenance procedures, or training? [68.170(k)]

RMP: Prevention program / Program 3 [68.175]

2.13. Has the owner or operator included in the RMP information addressing 68.175(b) to 68.175(p)? [68.175(a)]

COMPLIANCE OBJECTIVES

NOTES

❑	2.13.1.	The NAICS code for the process? [68.175(b)]
❑	2.13.2.	The name(s) of the substance(s) covered? [68.175(c)]
❑	2.13.3.	The date on which the safety information was last reviewed or revised? [68.175(d)]
❑	2.13.4.	The date of completion of the most recent process hazard analysis (PHA) or update and the technique used? [68.175(e)]
❑	2.13.4.1.	The expected date of completion of any changes resulting from the PHA? [68.175(e)(1)]
❑	2.13.4.2.	Major hazards identified? [68.175(e)(2)]
❑	2.13.4.3.	Process controls in use? [68.175(e)(3)]
❑	2.13.4.4.	Mitigation systems in use? [68.175(e)(4)]
❑	2.13.4.5.	Monitoring and detection systems in use? [68.175(e)(5)]
❑	2.13.4.6.	Changes since the last PHA? [68.175(e)(6)]
❑	2.13.5.	The date of the most recent review or revision of operating procedures? [68.175(f)]
❑	2.13.6.	The date of the most recent review or revision of training programs? [68.175(g)]
❑	2.13.6.1.	The type of training provided--classroom, classroom plus on the job, on the job? [68.175(g)(1)]
❑	2.13.6.2.	The type of competency testing used? [68.175(g)(2)]
❑	2.13.7.	The date of the most recent review of revision of maintenance procedures and the date of the most recent equipment inspection or test and the equipment inspected of tested? [68.175(h)]

COMPLIANCE OBJECTIVES

NOTES

- ❑ 2.13.8. The date of the most recent change that triggered management of change procedures and the date of the most recent review or revision of management of change procedures? [68.175(i)]
- ❑ 2.13.9. The date of the most recent pre-startup review? [68.175(j)]
- ❑ 2.13.10. The date of the most recent compliance audit and the expected date of completion of any changes resulting from the compliance audit? [68.175(k)]
- ❑ 2.13.11. The date of the most recent incident investigation and the expected date of completion of any changes resulting from the investigation? [68.175(l)]
- ❑ 2.13.12. The date of the most recent review or revision of employee participation plans? [68.175(m)]
- ❑ 2.13.13. The date of the most recent review or revision of hot work permit procedures? [68.175(n)]
- ❑ 2.13.14. The date of the most recent review or revision of contractor safety procedures? [68.175(o)]
- ❑ 2.13.15. The date of the most recent evaluation of contractor safety performance? [68.175(p)]

RMP: Emergency Response Program [68.18]

2.14. Has the owner or operator included the following information in the RMP on the emergency response program: [68.18]

- ❑ 2.14.1. Does a written emergency response plan exist? [68.180(a)(1)]
- ❑ 2.14.2. Does the plan include specific actions to be taken in response to an accidental releases of a regulated substance? [68.180(a)(2)]
- ❑ 2.14.3. Does the plan include procedures for informing the public and local agencies responsible for responding to accidental releases? [68.180(a)(3)]
- ❑ 2.14.4. Does the plan include information on emergency health care? [68.180(a)(4)]
- ❑ 2.14.5. Date of the most recent review of update of emergency response plan? [68.180(a)(5)]

COMPLIANCE OBJECTIVES		NOTES
❑	2.14.6. Date of the most recent emergency response training for employees? [68.180(a)(6)]	
❑	2.15. Has the owner or operator provided the name and telephone number of the local agency with which emergency response activities and the emergency response plan is coordinated? [68.180(b)]	
❑	2.16. Has the owner or operator listed other Federal or state emergency plan requirements to which the stationary source is subject? [68.180(c)]	

RMP: Certification [68.185]

	2.17. Has the owner or operator: [68.185]	
❑	2.18. For Program 1 processes, submitted the certification statement in 68.12(b)(4)? [68.185(a)]	
❑	2.19. For Program 2 or 3 processes, submitted the appropriate certification statement that to the best of the signer's knowledge, information, and belief formed after reasonable inquiry, the information submitted is true, accurate, and complete? [68.185(b)]	

General Findings / Conclusions:

Documentation obtained to support Findings / Conclusions:

COMPLIANCE OBJECTIVES | NOTES

3. HAZARD ASSESSMENT (SUBPART B) 68.20 - 68.42

Hazard Assessment: Applicability [68.2]

❑ 3.1. Has the owner or operator prepared a worst-case release scenario analysis as provided in 68.25 and completed the five-year accident history as provided in 68.42? [68.2]

Hazard Assessment: Offsite consequence analysis parameters [68.22]

Has the owner or operator:

3.2. Used the following endpoints for offsite consequence analysis for a worst-case scenario: [68.22(a)]

❑ 3.2.1. For toxics: the endpoints provided in Appendix A of 40 CFR Part 68? [68.22(a)(1)]

❑ 3.2.2. For flammables: an explosion resulting in an overpressure of 1 psi? [68.22(a)(2)(i)]

3.3. Used the following endpoints for offsite consequence analysis for an alternative release scenario: [68.22(a)]

❑ 3.3.1. For toxics: the endpoints provided in Appendix A of 40 CFR Part 68? [68.22(a)(1)]

❑ 3.3.2. For flammables: an explosion resulting in an overpressure of 1 psi? [68.22(a)(2)(i)]

❑ 3.3.3. For flammables: a fire resulting in a radiant heat/exposure of 5 kw/m2 for 40 seconds? [68.22(a)(2)(ii)]

❑ 3.3.4. For flammables: a concentration resulting in a lower flammability limit, as provided in NFPA documents or other generally recognized sources? [68.22(a)(2)(iii)]

❑ 3.4. Used appropriate wind speeds and stability classes for the release analysis? [68.22(b)]

❑ 3.5. Used appropriate ambient temperature and humidity values for the release analysis? [68.22(c)]

❑ 3.6. Used appropriate values for the height of the release for the release analysis? [68.22(d)]

❑ 3.7. Used appropriate surface roughness values for the release analysis? [68.22(e)]

COMPLIANCE OBJECTIVES

NOTES

- ❑ 3.8. Do tables and models, used for dispersion analysis of toxic substances, appropriately account for dense or neutrally buoyant gases? [68.22(f)]

- ❑ 3.9. Were liquids, other than gases liquefied by refrigeration only, considered to be released at the highest daily maximum temperature, based on data for the previous three years appropriate for a stationary source, or at process temperature, whichever is higher? [68.22(g)]

Hazard Assessment: Worst-case release scenario analysis [68.25]

Has the owner or operator of Program 1 processes:

- ❑ 3.10. Analyzed and reported in the RMP one worst-case scenario for each Program 1 process? [68.25(a)(1)]

Has the owner or operator of Program 2 or 3 processes:

- ❑ 3.11. Analyzed and reported in the RMP one worst-case release scenario estimated to create the greatest distance to an endpoint resulting from an accidental release of a regulated toxic substance from covered processes under worst-case conditions? [68.25(a)(2)(i)]

- ❑ 3.12. Analyzed and reported in the RMP one worst-case release scenario estimated to create the greatest distance to an endpoint resulting from an accidental release of a regulated flammable substance from covered processes under worst-case conditions? [68.25(a)(2)(ii)]

- ❑ 3.13. Analyzed and reported in the RMP additional worst-case release scenarios for a hazard class if the a worst-case release from another covered process at the stationary source potentially affects public receptors different from those potentially affected by the worst-case release scenario developed under 68.25(a)(2)(i) or 68.25(a)(2)(ii)? [68.25(a)(2)(iii)]

Has the owner or operator:

3.14. Determined the worst-case release quantity to be the greater of the following: [68.25(b)]

COMPLIANCE OBJECTIVES

NOTES

❑ 3.14.1. If released from a vessel, the greatest amount held in a single vessel, taking into account administrative controls that limit the maximum quantity ? [68.25(b)(1)]

❑ 3.14.2. If released from a pipe, the greatest amount held in the pipe, taking into account administrative controls that limit the maximum quantity? [68.25(b)(2)]

Has the owner or operator:

For toxic substances that are normally gases at ambient temperature and handled as a gas or liquid under pressure:

❑ 3.15. Assumed the whole quantity in the vessel or pipe would be released as a gas over 10 minutes? [68.25(c)(1)]

❑ 3.16. Assumed the release rate to be the total quantity divided by 10, if there are no passive mitigation systems in place? [68.25(c)(1)]

Has the owner or operator:

For toxic gases handled as refrigerated liquids at ambient pressure:

❑ 3.17. Assumed the substance would be released as a gas in 10 minutes, if not contained by passive mitigation systems or if the contained pool would have a depth of 1 cm or less? [68.25(c)(2)(i)]

❑ 3.18. [Optional for owner / operator] Assumed the quantity in the vessel or pipe would be spilled instantaneously to form a liquid pool, if the released substance would be contained by passive mitigation systems in a pool with a depth greater than 1 cm? [68.25(c)(2)(ii)]

❑ 3.19. Calculated the volatilization rate at the boiling point of the substance and at the conditions specified in 68.25(d)? [68.25(c)(2)(ii)]

Has the owner or operator:

For toxic substances that are normally liquids at ambient temperature:

❑ 3.20. Assumed the quantity in the vessel or pipe would be spilled instantaneously to form a liquid pool? [68.25(d)(1)]

❑ 3.21. Determined the surface area of the pool by assuming that the liquid spreads to 1 cm deep, if there is no passive mitigation system in place that would serve to contain the spill and limit the surface area, or if passive mitigation is in place, the surface area of the contained liquid shall be used to calculate the volatilization rate? [68.25(d)(1)(i)]

COMPLIANCE OBJECTIVES

NOTES

- ❑ 3.22. Taken into account the actual surface characteristics, if the release would occur onto a surface that is not paved or smooth? [68.25(d)(1)(ii)]
- ❑ 3.23. Determined the volatilization rate by accounting for the highest daily maximum temperature in the past three years, the temperature of the substance in the vessel, and the concentration of the substance if the liquid spilled is a mixture or solution? [68.25(d)(2)]
- ❑ 3.24. Determined the rate of release to air from the volatilization rate of the liquid pool? [68.25(d)(3)]
- ❑ 3.25. Determined the rate of release to air by using the methodology in the RMP Offsite Consequence Analysis Guidance, any other publicly available techniques that account for the modeling conditions and are recognized by industry as applicable as part of current practices, or proprietary models that account for the modeling conditions may be used provided the owner or operator allows the implementing agency access to the model and describes model features and differences from publicly available models to local emergency planners upon request. [68.25(d)(3)]

Has the owner or operator:

For flammables:

- ❑ 3.26.1. Assumed the quantity in a vessel(s) of flammable gas held as a gas or liquid under pressure or refrigerated gas released to an undiked area vaporizes resulting in a vapor cloud explosion? [68.25(e)]
- ❑ 3.26.2. For refrigerated gas released to a contained area or liquids released below their atmospheric boiling point, assumed the quantity volatilized in 10 minutes results in a vapor cloud. [68.25(f)]
- ❑ 3.27. Assumed a yield factor of 10% of the available energy is released in the explosion for determining the distance to the explosion endpoint, if the model used is based on TNT-equivalent methods? [68.25(e)]

Has the owner or operator:

- ❑ 3.28. Used the parameters defined in 68.22 to determine distance to the endpoints? [68.25(g)]

COMPLIANCE OBJECTIVES | NOTES

❑	3.29.	Determined the rate of release to air by using the methodology in the RMP Offsite Consequence Analysis Guidance, any other publicly available techniques that account for the modeling conditions and are recognized by industry as applicable as part of current practices, or proprietary models that account for the modeling conditions may be used provided the owner or operator allows the implementing agency access to the model and describes model features and differences from publicly available models to local emergency planners upon request. [68.25(g)]
❑	3.29.1	What modeling technique did the owner or operator use? [68.25(g)]
❑	3.30.	Ensured that the passive mitigation system, if considered, is capable of withstanding the release event triggering the scenario and will still function as intended? [68.25(h)]
❑	3.31.	Considered also the following factors in selecting the worst-case release scenarios: [68.25(i)]
❑	3.31.1.	Smaller quantities handled at higher process temperature or pressure? [68.25(i)(1)]
❑	3.31.2.	Proximity to the boundary of the stationary source? [68.25(i)(2)]

Hazard Assessment: Alternative release scenario analysis [68.28]

Has the owner or operator:

❑	3.32.	Identified and analyzed at least one alternative release scenario for each regulated toxic substance held in a covered process(es) and at least one alternative release scenario to represent all flammable substances held in covered processes? [68.28(a)]
	3.33.	Selected a scenario: [68.28(b)]
❑	3.33.1.	That is more likely to occur than the worst-case release scenario under 68.25? [68.28(b)(1)(i)]
❑	3.33.2.	That will reach an endpoint off-site, unless no such scenario exists? [68.28(b)(1)(ii)]
	3.34.	Considered release scenarios which included, but are not limited to, the following: [68.28(b)(2)]

COMPLIANCE OBJECTIVES

NOTES

❑	3.34.1.	Transfer hose releases due to splits or sudden hose uncoupling? [68.28(b)(2)(i)]
❑	3.34.2.	Process piping releases from failures at flanges , joints, welds, valves and valve seals, and drains or bleeds? [68.28(b)(2)(ii)]
❑	3.34.3.	Process vessel or pump releases due to cracks, seal failure, or drain, bleed, or plug failure? [68.28(b)(2)(iii)]
❑	3.34.4.	Vessel overfilling and spill, or overpressurization and venting through relief valves or rupture disks? [68.28(b)(2)(iv)]
❑	3.34.5.	Shipping container mishandling and breakage or puncturing leading to a spill? [68.28(b)(2)(v)]
❑	3.35.	Used the parameters defined in 68.22 to determine distance to the endpoints? [68.28(c)]
❑	3.36.	Determined the rate of release to air by using the methodology in the RMP Offsite Consequence Analysis Guidance, any other publicly available techniques that account for the modeling conditions and are recognized by industry as applicable as part of current practices, or proprietary models that account for the modeling conditions may be used provided the owner or operator allows the implementing agency access to the model and describes model features and differences from publicly available models to local emergency planners upon request. [68.28(c)]
❑	3.37.	Ensured that the passive and active mitigation systems, if considered, are capable of withstanding the release event triggering the scenario and will be functional? [68.28(d)]
	3.38.	Considered the following factors in selecting the alternative release scenarios: [68.25(e)]
❑	3.38.1.	The five-year accident history provided in 68.42? [68.25(e)(1)]
❑	3.38.2.	Failure scenarios identified under 68.50 or 68.67? [68.25(e)(2)]

COMPLIANCE OBJECTIVES | NOTES

Hazard Assessment: Defining off-site impacts -- population [68.3]

Has the owner or operator:

- ❑ 3.39. Estimated population that would be included in the distance to the endpoint in the RMP based on a circle with the point of release at the center? [68.30(a)]
- ❑ 3.40. Identified the presence of institutions, parks and recreational areas, major commercial, office, and industrial buildings in the RMP? [68.30(b)]
- ❑ 3.41. Used most recent Census data, or other updated information to estimate the population? [68.30(c)]
- ❑ 3.42. Estimated the population to two significant digits? [68.30(d)]

Hazard Assessment: Defining off-site impacts -- environment [68.33]

Has the owner or operator:

- ❑ 3.43. Identified environmental receptors that would be included in the distance to the endpoint based on a circle with the point of release at the center? [68.33(a)]
- ❑ 3.44. Relied on information provided on local U.S.G.S. maps, or on any data source containing U.S.G.S. data to identify environmental receptors? [Source may have used LandView to obtain information] [68.33(b)]

Hazard Assessment: Review and update [68.36]

Has the owner or operator:

- ❑ 3.45. Reviewed and updated the off-site consequence analyses at least once every five years? [68.36(a)]
- ❑ 3.46. Completed a revised analysis and submit a revised RMP within six months of a change in processes, quantities stored or handled, or any other aspect that might reasonably be expected on increase or decrease the distance to the endpoint by a factor of two or more? [68.36(b)]

COMPLIANCE OBJECTIVES | NOTES

Hazard Assessment: Documentation [68.39]

Has the owner or operator maintained records of the following:

- ❑ 3.47. For worst-case scenarios: a description of the vessel or pipeline and substance selected, assumptions and parameters used, the rationale for selection, and anticipated effect of the administrative controls and passive mitigation on the release quantity and rate? [68.39(a)]
- ❑ 3.48. For alternative release scenarios: a description of the scenarios identified, assumptions and parameters used, the rationale for the selection of specific scenarios, and anticipated effect of the administrative controls and mitigation on the release quantity and rate? [68.39(b)]
- ❑ 3.49. Documentation of estimated quantity released, release rate, and duration of release? [68.39(c)]
- ❑ 3.50. Methodology used to determine distance to endpoints? [68.39(d)]
- ❑ 3.51. Data used to estimate population and environmental receptors potentially affected? [68.39(e)]

Hazard Assessment: Five-year accident history [68.42]

- ❑ 3.52. Has the owner or operator included all accidental releases from covered processes that resulted in deaths, injuries, or significant property damage on site, or known offsite deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage? [68.42(a)]

3.53. Has the owner or operator reported the following information for each accidental release: [68.42(b)]

- ❑ 3.53.1. Date, time, and approximate duration of the release? [68.42(b)(1)]
- ❑ 3.53.2. Chemical(s) released? [68.42(b)(2)]
- ❑ 3.53.3. Estimated quantity released in pounds and percentage weight in a mixture (toxics)? [68.42(b)(3)]

COMPLIANCE OBJECTIVES		NOTES
❑	3.53.4. NAICS code for the process? [68.42(b)(4)]	
❑	3.53.5. The type of release event and its source? [68.42(b)(5)]	
❑	3.53.6. Weather conditions (if known)? [68.42(b)(6)]	
❑	3.53.7. On-site impacts? [68.42(b)(7)]	
❑	3.53.8. Known offsite impacts? [68.42(b)(8)]	
❑	3.53.9. Initiating event and contributing factors (if known)? [68.42(b)(9)]	
❑	3.53.10. Whether offsite responders were notified (if known)? [68.42(b)(10)]	
❑	3.53.11. Operational or process changes that resulted from investigation of the release? [68.42(b)(11)]	

General Findings / Conclusions:

Documentation obtained to support Findings / Conclusions:

COMPLIANCE OBJECTIVES | NOTES

4. PROGRAM 2 PREVENTION PROGRAM (SUBPART C) [68.48 - 68.60]

Program 2 Prevention - Safety information [68.48]

Has the owner or operator:

4.1. Compiled and maintained the following up-to-date safety information, related to the regulated substances, processes, and equipment: [68.48(a)]

- ☐ 4.1.1. Material Safety Data Sheets (MSDS) that meet the requirements of the OSHA Hazard Communication Standard [29 CFR 1910.1200(g)]? [68.48(a)(1)]
- ☐ 4.1.2. Maximum intended inventory of equipment in which the regulated substances are stored or processed? [68.48(a)(2)]
- ☐ 4.1.3. Safe upper and lower temperatures, pressures, flows, and compositions? [68.48(a)(3)]
- ☐ 4.1.4. Equipment specifications? [68.48(a)(4)]
- ☐ 4.1.5. Codes and standards used to design, build, and operate the process? [68.48(a)(5)]
- ☐ 4.2. Ensured the process is designed in compliance with recognized and generally accepted good engineering practices? [68.48(b)]
- ☐ 4.3. Updated information if a major change has occurred that made the information inaccurate? [68.48(c)]

Program 2 Prevention - Hazard review [68.5]

- ☐ 4.4. Has the owner or operator conducted a review of the hazards associated with the regulated substances, processes, and procedures? [68.50(a)]

4.5. Did the review identify:

COMPLIANCE OBJECTIVES | NOTES

- ☐ 4.5.1. The hazards associated with the process and regulated substances? [68.50(a)(1)]
- ☐ 4.5.2. Opportunities for equipment malfunctions or human errors that could cause an accidental release? [68.50(a)(2)]
- ☐ 4.5.3. The safeguards used or needed to control the hazards or prevent equipment malfunctions or human error? [68.50(a)(3)]
- ☐ 4.5.4. Any steps used or needed to detect or monitor releases? [68.50(a)(4)]

Has the owner or operator:

- ☐ 4.6. Determined by inspecting all equipment that the processes are designed, fabricated, and operated in accordance with applicable standards or rules, if designed to meet industry standards or Federal or state design rules? [68.50(b)]
- ☐ 4.7. Documented the results of the review? [68.50(c)]
- ☐ 4.8. Ensured that problems identified were resolved in a timely manner? [68.50(c)]
- ☐ 4.9. Updated the review at least once every five years or whenever a major change in the processes occurred? [68.50(d)]
- ☐ 4.10. Resolved all issues identified in the review before startup of the changed process? [68.50(d)]

Program 2 Prevention - Operating procedures [68.52]

- ☐ 4.11. Has the owner or operator prepared written operating procedures that provide clear instructions or steps for safely conducting activities associated with each covered process consistent with the safety information for that process? Operating procedures or instructions provided by equipment manufacturers or developed by persons or organizations knowledgeable about the process and equipment may be used as a basis for a stationary source's operating procedures. [68.52(a)]

4.12. Do the procedures address the following: [68.52(b)]

- ☐ 4.12.1. Initial startup? [68.52(b)(1)]

COMPLIANCE OBJECTIVES		NOTES
❑	4.12.2. Normal operations? [68.52(b)(2)]	
❑	4.12.3. Temporary operations? [68.52(b)(3)]	
❑	4.12.4. Emergency shutdown and operations? [68.52(b)(4)]	
❑	4.12.5. Normal shutdown? [68.52(b)(5)]	
❑	4.12.6. Startup following a normal or emergency shutdown or a major change that requires a hazard review? [68.52(b)(6)]	
❑	4.12.7. Consequences of deviations and steps required to correct or avoid deviations? [68.52(b)(7)]	
❑	4.12.8. Equipment inspections? [68.52(b)(8)]	
❑	4.13. Has the owner or operator ensured that the operating procedures have been updated, if necessary, whenever a major change occurred and prior to startup of the changed process? [68.52(c)	

COMPLIANCE OBJECTIVES | NOTES

Program 2 Prevention - Training [68.54]

Has the owner or operator:

- ❑ 4.14. Certified that each employee presently operating a process, and each employee newly assigned to a covered process have been trained or tested competent in the operating procedures provided in § 68.52 that pertain to their duties? For those employees already operating a process on June 21, 1999, the owner or operator may certify in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as provided in the operating procedures. [68.54(a)]
- ❑ 4.15. Provided refresher training at least every three years, or more often if necessary, to each employee operating a process, to ensure that the employee understands and adheres to the current operating procedures of the process? [68.54(b)]
- ❑ 4.16. Determined, in consultation with the employees operating the process, the appropriate frequency of refresher training? [68.54(b)]
- ❑ 4.17. Certified that each employee was trained in any updated or new procedures prior to startup of a process after a major change? [68.54(d)]

Program 2 Prevention - Maintenance [68.56]

Has the owner or operator:

- ❑ 4.18. Prepared and implemented procedures to maintain the on-going mechanical integrity of the process equipment? [68.56(a)]
- ❑ 4.19. Trained or caused to be trained each employee, involved in maintaining the on-going mechanical integrity of the process, in the hazards of the process, in how to avoid or correct unsafe conditions, and in the procedures applicable to the employee's job tasks? [68.56(b)]
- ❑ 4.20. Has every maintenance contractor ensured that each contract maintenance employee is trained to perform the maintenance procedures developed? [68.56(c)]

COMPLIANCE OBJECTIVES

NOTES

❑	4.21.	Has the owner or operator performed or caused to be performed inspections and tests on process equipment that follow recognized and generally accepted engineering practices? [68.56(d)]

Program 2 Prevention - Compliance audits [68.58]

❑	4.22.	Has the owner or operator certified that compliance audits are conducted at least every three years to verify that the procedures and practices are adequate and are being followed? [68.58(a)]
❑	4.23.	Has compliance audit been conducted by at least one person knowledgeable in the process? [68.58(b)]
❑	4.24.	Has the owner operator developed a report of the audits findings? [68.58(c)]
❑	4.25.	Has the owner or operator promptly determined and documented an appropriate response to each of the findings of the audit and documented that deficiencies had been corrected? [68.58(d)]
❑	4.26.	Has the owner or operator retained the two most recent compliance audit reports, unless more than five years old? [68.58(e)]

Program 2 Prevention - Incident investigation [68.6]

❑	4.27.	Has the owner or operator investigated each incident which resulted in, or could reasonably have resulted in a catastrophic release? [68.60(a)]
❑	4.28.	Were all incident investigations initiated not later than 48 hours following the incident? [68.60(b)]
	4.29.	Was a summary prepared at the conclusion of every investigation, which included: [68.60(c)]
❑	4.29.1.	Date of incident? [68.60(c)(1)]

COMPLIANCE OBJECTIVES		NOTES
❑	4.29.2. Date investigation began? [68.60(c)(2)]	
❑	4.29.3. A description of incident? [68.60(c)(3)]	
❑	4.29.4. The factors that contributed to the incident? [68.60(c)(4)]	
❑	4.29.5. Any recommendations resulting from the investigation? [68.60(c)(5)]	
❑	4.30. Has the owner or operator promptly addressed and resolved the investigation findings and recommendations, and are the resolutions and corrective actions documented? [68.60(d)]	
❑	4.31. Has the owner or operator reviewed the finding with all affected personnel whose job tasks are affected by the findings? [68.60(e)]	
❑	4.32. Has the owner or operator retained investigation summaries for five years? [68.60(f)]	

General Findings / Conclusions:

Documentation obtained to support Findings / Conclusions:

COMPLIANCE OBJECTIVES | NOTES

5. PROGRAM 3 PREVENTION PROGRAM (SUBPART D) [68.65 - 68.87]

Program 3 Prevention - Process safety information [68.65]

☐	5.1.	Has the owner or operator compiled written process safety information, which includes information pertaining to the hazards of the regulated substances used or produced by the process, information pertaining to the technology of the process, and information pertaining to the equipment in the process, before conducting any process hazard analysis required by the rule? [68.65(a)]
	5.2.	Does the process safety information contain the following for hazards of the substances: [68.65(b)]
☐	5.2.1.	Toxicity information? [68.65(b)(1)]
☐	5.2.2.	Permissible exposure limits? [68.65(b)(2)]
☐	5.2.3.	Physical data? [68.65(b)(3)]
☐	5.2.4.	Reactivity data? [68.65(b)(4)]
☐	5.2.5.	Corrosivity data? [68.65(b)(5)]
☐	5.2.6.	Thermal and chemical stability data? [68.65(b)(6)]
☐	5.2.7.	Hazardous effects of inadvertent mixing of materials that could foreseeably occur? [68.65(b)(7)]
	5.3.	Does the process safety information contain the following for technology of the process: [68.65(c)(1)]
☐	5.3.1.	A block flow diagram or simplified process flow diagram? [68.65(c)(1)(i)]

COMPLIANCE OBJECTIVES

NOTES

☐	5.3.2.	Process chemistry? [68.65(c)(1)(ii)]
☐	5.3.3.	Maximum intended inventory? [68.65(c)(1)(iii)]
☐	5.3.4.	Safe upper and lower limits for such items as temperatures, pressures, flows or compositions? [68.65(c)(1)(iv)]
☐	5.3.5.	An evaluation of the consequences of deviations? [68.65(c)(1)(v)]
	5.4.	Does the process safety information contain the following for the equipment in the process: [68.65(d)(1)]
☐	5.4.1.	Materials of construction? [68.65(d)(1)(i)]
☐	5.4.2.	Piping and instrument diagrams? [68.65(d)(1)(ii)]
☐	5.4.3.	Electrical classification? [68.65(d)(1)(iii)]
☐	5.4.4.	Relief system design and design basis? [68.65(d)(1)(iv)]
☐	5.4.5.	Ventilation system design? [68.65(d)(1)(v)]
☐	5.4.6.	Design codes and standards employed? [68.65(d)(1)(vi)]
☐	5.4.7.	Material and energy balances for processes built after June 21, 1999? [68.65(d)(1)(vii)]
☐	5.4.8.	Safety systems? [68.65(d)(1)(viii)]
☐	5.5.	Has the owner or operator documented that equipment complies with recognized and generally accepted good engineering practices? [68.65(d)(2)]
☐	5.6.	Has the owner or operator determined and documented that existing equipment, designed and constructed in accordance with codes, standards, or practices that are no longer in general use, is designed, maintained, inspected, tested, and operating in a safe manner? [68.65(d)(3)]

COMPLIANCE OBJECTIVES

NOTES

Program 3 Prevention - Process hazard analysis [68.67]

☐	5.7.	Has the owner or operator performed an initial process hazard analysis (PHA), and has this analysis identified, evaluated, and controlled the hazards involved in the process? [68.67(a)]
☐	5.8.	Has the owner or operator determined and documented the priority order for conducting PHAs, and was it based on a appropriate rationales? [68.67(a)]
☐	5.9.	Has the owner or operator used one or more of the following technologies: [68.67(b)]
☐	5.9.1.	What-If? [68.67(b)(1)]
☐	5.9.2.	Checklist? [68.67(b)(2)]
☐	5.9.3.	What-If/Checklist? [68.67(b)(3)]
☐	5.9.4.	Hazard and Operability Study (HAZOP)? [68.67(b)(4)]
☐	5.9.5.	Failure Mode and Effects Analysis (FMEA)? [68.67(b)(5)]
☐	5.9.6.	Fault Tree Analysis? [68.67(b)(6)]
☐	5.9.7.	An appropriate equivalent methodology? [68.67(b)(7)]
	5.10.	Did the PHA address: [68.67(c)]
☐	5.10.1.	The hazards of the process? [68.67(c)(1)]
☐	5.10.2.	Identification of any incident which had a likely potential for catastrophic consequences? [68.67(c)(2)]

COMPLIANCE OBJECTIVES

NOTES

- ❑ 5.10.3. Engineering and administrative controls applicable to hazards and interrelationships? [68.67(c)(3)]
- ❑ 5.10.4. Consequences of failure of engineering and administrative controls? [68.67(c)(4)]
- ❑ 5.10.5. Stationary source siting? [68.67(c)(5)]
- ❑ 5.10.6. Human factors? [68.67(c)(6)]
- ❑ 5.10.7. An evaluation of a range of the possible safety and health effects of failure of controls? [68.67(c)(7)]
- ❑ 5.11. Was the PHA performed by a team with expertise in engineering and process operations and did the team include appropriate personnel? [68.67(d)]
- ❑ 5.12. Has the owner or operator established a system to promptly address the team's findings and recommendations; assured that the recommendations are resolved in a timely manner and documented; documented what actions are to be taken; completed actions as soon as possible; developed a written schedule of when these actions are to be completed; and communicated the actions to operating, maintenance and other employees whose work assignments are in the process and who may be affected by the recommendations? [68.67(e)]
- ❑ 5.13. Has the PHA been updated and revalidated by a team every five years after the completion of the initial PHA to assure that the PHA is consistent with the current process? [68.67(f)]
- ❑ 5.14. Has the owner or operator retained PHAs and updates or revalidations for each process covered, as well as the resolution of recommendations for the life of the process? [68.67(g)]

Program 3 Prevention - Operating procedures [68.69]

- ❑ 5.15. Has the owner or operator developed and implemented written operating procedures that provide instructions or steps for conducting activities associated with each covered process consistent with the safety information? [68.69(a)]
- 5.16. Do the procedures address the following: [68.69(a)]

COMPLIANCE OBJECTIVES

NOTES

	5.16.1.	Steps for each operating phase: [68.69(a)(1)]
☐	5.16.1.1.	Initial startup? [68.69(a)(1)(i)]
☐	5.16.1.2.	Normal operations? [68.69(a)(1)(ii)]
☐	5.16.1.3.	Temporary operations? [68.69(a)(1)(iii)]
☐	5.16.1.4.	Emergency shutdown including the conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner? [68.69(a)(1)(iv)]
☐	5.16.1.5.	Emergency operations? [68.69(a)(1)(v)]
☐	5.16.1.6.	Normal shutdown? [68.69(a)(1)(vi)]
☐	5.16.1.7.	Startup following a turnaround, or after emergency shutdown? [68.69(a)(1)(vii)]
	5.16.2.	Operating limits: [68.69(a)(2)]
☐	5.16.2.1.	Consequences of deviations? [68.69(a)(2)(i)]
☐	5.16.2.2.	Steps required to correct or avoid deviation? [68.69(a)(2)(ii)]
	5.16.3.	Safety and health considerations: [68.69(a)(3)]
☐	5.16.3.1.	Properties of, and hazards presented by, the chemicals used in the process? [68.69(a)(3)(i)]
☐	5.16.3.2.	Precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment? [68.69(a)(3)(ii)]

COMPLIANCE OBJECTIVES | NOTES

- ❑ 5.16.3.3. Control measures to be taken if physical contact or airborne exposure occurs? [68.69(a)(3)(iii)]
- ❑ 5.16.3.4. Quality control for raw materials and control of hazardous chemical inventory levels? [68.69(a)(3)(iv)]
- ❑ 5.16.3.5. Any special or unique hazards? [68.69(a)(3)(v)]
- ❑ 5.16.4. Safety systems and their functions? [68.69(a)(4)]
- ❑ 5.17. Are operating procedures readily accessible to employees who are involved in a process? [68.69(b)]
- ❑ 5.18. Has the owner or operator certified annually that the operating procedures are current and accurate and that procedures have been reviewed as often as necessary? [68.69(c)]
- ❑ 5.19. Has the owner or operator developed and implemented safe work practices to provide for the control of hazards during specific operations, such as logout/tagout? [68.69(d)]

Program 3 Prevention - Training [68.71]

- ❑ 5.20. Has each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, been initially trained in an overview of the process and in the operating procedures? [68.71(a)(1)]
- ❑ 5.21. Did initial training include emphasis on safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks?

[68.71(a)(2) allows in lieu of initial training for those employees already involved in operating a process on June 21, 1999 an owner or operator may certify in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as specified in the operating procedures] [68.71(a)(1)

- ❑ 5.22. Has refresher training been provided at least every three years, or more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process? [68.71(b)
- ❑ 5.23. Has owner or operator ascertained and documented in a record that each employee involved in operating a process has received and understood the training required? [68.71(c)]

COMPLIANCE OBJECTIVES

NOTES

❑ 5.24. Does the prepared record contain the identity of the employee, the date of training, and the means used to verify that the employee understood the training? [68.71(c)]

Program 3 Prevention - Mechanical integrity [68.73]

❑ 5.25. Has the owner or operator established and implemented written procedures to maintain the on-going integrity of the process equipment listed in 68.73(a)? [68.73(b)]

❑ 5.26. Has the owner or operator trained each employee involved in maintaining the on-going integrity of process equipment? [68.73(c)]

Has the owner or operator:

❑ 5.27. Performed inspections and tests on process equipment? [68.73(d)(1)]

❑ 5.28. Followed recognized and generally accepted good engineering practices for inspection and testing procedures? [68.73(d)(2)]

❑ 5.29. Ensured the frequency of inspections and tests of process equipment is consistent with applicable manufacturers' recommendations, good engineering practices, and prior operating experience? [68.73(d)(3)]

❑ 5.30. Documented each inspection and test that had been performed on process equipment, which identifies the date of the inspection or test, the name of the person who performed the inspection or test, the serial number or other identifier of the equipment on which the inspection or test was performed, a description of the inspection or test performed, and the results of the inspection or test? [68.73(d)(4)]

❑ 5.31. Corrected deficiencies in equipment that were outside acceptable limits defined by the process safety information before further use or in a safe and timely manner when necessary means were taken to assure safe operation? [68.73(e)]

❑ 5.32. Assured that equipment as it was fabricated is suitable for the process application for which it will be used in the construction of new plants and equipment? [68.73(f)(1)]

COMPLIANCE OBJECTIVES | NOTES

❑	5.33.	Performed appropriate checks and inspections to assure that equipment was installed properly and consistent with design specifications and the manufacturer's instructions? [68.73(f)(2)]
❑	5.34.	Assured that maintenance materials, spare parts and equipment were suitable for the process application for which they would be used? [68.73(f)(3)]

Program 3 Prevention - Management of change [68.75]

❑	5.35.	Has the owner or operator established and implemented written procedures to manage changes to process chemicals, technology, equipment, and procedures, and changes to stationary sources that affect a covered process? [68.75(a)]
	5.36.	Do procedures assure that the following consideration are addressed prior to any change: [68.75(b)]
❑	5.36.1.	The technical basis for the proposed change? [68.75(b)(1)]
❑	5.36.2.	Impact of change on safety and health? [68.75(b)(2)]
❑	5.36.3.	Modifications to operating procedures? [68.75(b)(3)]
❑	5.36.4.	Necessary time period for the change? [68.75(b)(4)]
❑	5.36.5.	Authorization requirements for the proposed change? [68.75(b)(5)]
❑	5.37.	Were employees, involved in operating a process and maintenance, and contract employees, whose job tasks would be affected by a change in the process, informed of, and trained in, the change prior to start-up of the process or affected part of the process? [68.75(c)]
❑	5.37.	If a change resulted in a change in the process safety information, was such information updated accordingly? [68.75(d)]
❑	5.38.	If a change resulted in a change in the operating procedures or practices, had such procedures or practices been updated accordingly? [68.75(e)]

COMPLIANCE OBJECTIVES		NOTES
Program 3 Prevention - Pre-startup review [68.77]		
☐	5.39. Has the owner or operator performed a pre-startup safety review for new stationary sources and for modified stationary sources when the modification was significant enough to require a change in the process safety information,? [68.77(a)]	
	5.40. Did the pre-startup safety review confirm that prior to the introduction of regulated substances to a process: [68.77(b)]	
☐	5.40.1. Construction and equipment was in accordance with design specifications? [68.77(b)(1)]	
☐	5.40.2. Safety, operating, maintenance, and emergency procedures were in place and were adequate? [68.77(b)(2)]	
☐	5.40.3. For new stationary sources, a process hazard analysis had been performed and recommendations had been resolved or implemented before startup? [68.77(b)(3)]	
☐	5.40.4. Modified stationary sources meet the requirements contained in management of change? [68.77(b)(3)]	
☐	5.40.5. Training of each employee involved in operating a process had been completed? [68.77(b)(4)]	
Program 3 Prevention - Compliance audits [68.79]		
☐	5.41. Has the owner or operator certified that the stationary source has evaluated compliance with the provisions of the prevention program at least every three years to verify that the developed procedures and practices are adequate and are being followed? [68.79(a)]	
☐	5.42. Has the audit been conducted by at least one person knowledgeable in the process? [68.79(b)]	
☐	5.43. Are the audits findings documented in report? [68.79(c)]	

COMPLIANCE OBJECTIVES	NOTES

☐	5.44.	Has the owner or operator promptly determined and documented an appropriate response to each of the findings of the audit and documented that deficiencies had been corrected? [68.79(d)]
☐	5.45.	Has the owner or operator retained the two most recent compliance audit reports? [68.79(e)]

Program 3 Prevention - Incident investigation [68.81]

☐	5.46.	Has the owner or operator investigated each incident which resulted in, or could reasonably have resulted in a catastrophic release of a regulated substance? [68.81(a)]
☐	5.47.	Were all incident investigations initiated not later than 48 hours following the incident? [68.81(b)]
☐	5.48.	Was an incident investigation team established and did it consist of at least one person knowledgeable in the process involved, including a contract employee if the incident involved work of the contractor, and other persons with appropriate knowledge and experience to thoroughly investigate and analyze the incident? [68.81(c)]
☐	5.49.	Was a report prepared at the conclusion of every investigation? [68.81(d)]
	5.50.	Does every report include: [68.81(d)]
☐	5.51.1.	Date of incident? [68.81(d)(1)]
☐	5.51.2.	Date investigation began? [68.81(d)(2)]
☐	5.51.3.	A description of the incident? [68.81(d)(3)]
☐	5.51.4.	The factors that contributed to the incident? [68.81(d)(4)]
☐	5.51.5.	Any recommendations resulting from the investigation? [68.81(d)(5)]
☐	5.52.	Has the owner or operator established a system to address and resolve the report findings and recommendations, and are the resolutions and corrective actions documented? [68.81(e)]

COMPLIANCE OBJECTIVES

NOTES

❑ 5.53. Was the report reviewed with all affected personnel whose job tasks are relevant to the incident findings including contract employees where applicable? [68.81(f)]

Program 3 Prevention - Employee participation [68.83]

Has the owner or operator:

❑ 5.54. Developed a written plan of action regarding the implementation of the employee participation required by this section? [68.83(a)]

❑ 5.55. Consulted with employees and their representatives on the conduct and development of process hazards analyses and on the development of the other elements of process safety management in chemical accident prevention provisions? [68.83(b)]

❑ 5.56. Provided to employees and their representatives access to process hazard analyses and to all other information required to be developed under chemical accident prevention rule? [68.83(c)]

Program 3 Prevention - Hot work permit [68.85]

❑ 5.57. Has the owner or operator issued a hot work permit for each hot work operation conducted on or near a covered process? [68.85(a)]

❑ 5.58. Does the permit document that the fire prevention and protection requirements in 29 CFR 1910.252(a) have been implemented prior to beginning the hot work operations? [68.85(b)]

❑ 5.59. Does the permit indicate the date(s) authorized for hot work and the object on which hot works to be performed? [68.85(b)]

❑ 5.60. Are the permits being kept on file until completion of the hot work operations? [68.85(b)]

COMPLIANCE OBJECTIVES | NOTES

Program 3 Prevention - Contractors [68.87]

Has the owner or operator: [68.87(b)]

- ❑ 5.61. Obtained and evaluated information regarding the contract owner or operator's safety performance and programs when selecting a contractor,? [68.87(b)(1)]
- ❑ 5.62. Informed contract owner or operator of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process? [68.87(b)(2)]
- ❑ 5.63. Explained to the contract owner or operator the applicable provisions of emergency response program? [68.87(b)(3)]
- ❑ 5.64. Developed and implemented safe work practices consistent with §68.69(d), to control the entrance, presence, and exit of the contract owner or operator and contract employees in covered process areas? [68.87(b)(4)]

General Findings / Conclusions:

_____

_____

Documentation obtained to support Findings / Conclusions:

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_____

6. EMERGENCY RESPONSE (SUBPART E) 68.90 - 68.95

Emergency Response - Applicability [68.9]

- ❑ 6.1. Has the owner or operator of a stationary source developed an emergency response program, unless the source need not comply? [68.90(a)]

If the employees of the stationary source will not respond to accidental releases of regulated substances:

COMPLIANCE OBJECTIVES

NOTES

❑	6.2.	For stationary sources with any regulated toxic substance held in a process above the threshold quantity, is the stationary source included in the community emergency response plan developed under EPCRA? [68.90(b)(1)]
❑	6.3.	For stationary sources with only regulated flammable substances held in a process above the threshold quantity, has the owner or operator coordinated response actions with the local fire department? [68.90(b)(2)]
❑	6.4.	Are appropriate mechanisms in place to notify emergency responders when there is a need for a response? [68.90(b)(3)]

Emergency Response - Applicability [68.9]

❑	6.5.	Has the owner or operator developed and implemented an emergency response program for the purpose of protecting public health and the environment? [68.95(a)]
	6.6.	Does the program include the following elements: [68.95(a)]
❑	6.6.1.	An emergency response plan which is maintained at the stationary source? [68.95(a)(1)]
❑	6.6.2.	Procedures for the use of emergency response equipment and for its inspection, testing, and maintenance? [68.95(a)(2)]
❑	6.6.3.	Training for all employees in relevant procedures? [68.95(a)(3)]
❑	6.6.4.	Procedures to review and update, as appropriate, the emergency response plan to reflect changes at the stationary source and ensure that employees are informed of changes? [68.95(a)(4)]
	6.7.	Does the emergency response plan contain the following elements: [68.95(a)(1)]
❑	6.7.1.	Procedures for informing the public and local emergency response agencies about accidental releases? [68.95(a)(1)(i)]
❑	6.7.2.	Documentation of proper first-aid and emergency medical treatment necessary to treat accidental human exposures? [68.95(a)(1)(ii)]

COMPLIANCE OBJECTIVES		NOTES
❑	6.7.3. Procedures and measures for emergency response after an accidental release of a regulated substance? [68.95(a)(1)(iii)]	
❑	6.8. Did the owner or operator use a written plan that complies with other Federal contingency plan regulations or is consistent with the approach in the National Response Team's Integrated Contingency Plan Guidance (''One Plan'')? If so, does the plan include the elements provided in paragraph (a) of 68.95, and also complies with paragraph (c) of 68.95? [68.95(b)]	
❑	6.9. Has the emergency response plan been coordinated with the community emergency response plan developed under EPCRA? [68.95(c)]	
❑	6.10. Has the owner or operator provided to the local emergency response officials information necessary for developing and implementing the community emergency response plan requested by the LEPC or emergency response officials? [68.95(c)]	

General Findings / Conclusions:

_____

_____

Documentation obtained to support Findings / Conclusions:

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APPENDIX I

Onsite Documentation Checklist for Facilitating Compliance with the RMP Rule

This appendix provides examples of documentation that a facility may find useful or, in some cases necessary, to support compliance with the RMP rule requirements. The documentation listed in this appendix is divided into three categories, as defined below:

- **Required —** documentation that is specifically mandated by the RMP rule
- **Practical Necessity —** documentation that is not specifically mandated by the RMP rule but would be necessary for proving compliance to an RMP auditor
- **Convenience —** documentation that is not required by the RMP rule but that helps facilitate and maintain RMP compliance at the facility

Documentation to Support Compliance with EPA's RMP Rule (40 CFR 68)

Description of Documentation	Required	Practical Necessity	Convenience
General RMP Documentation			
1. A written implementation plan, budget document, or memo outlining RMP compliance intentions			Y
2. A manual describing the risk management program for the facility, including a description of the management system used to "oversee the implementation of the RMP elements"		Y	
3. A listing of general RMP training given to plant employees or seminar attendance to help prepare them to implement the RMP rule			Y
4. The basis for coverage under the RMP rule, including the calculations that support the quantity of regulated substances in processes at the stationary source, the methods and assumptions made in determining the process quantities, the basis for the process boundaries, and any exemptions accounted for in the determination of the process quantities or in defining the boundaries of the stationary source		Y	
5. The basis for the Program Levels assigned to each RMP-covered process		Y	
6. A plant organization chart that describes the RMP-related roles and responsibilities (Program 2 and 3 processes only)	Y		
Hazard Assessment Documentation			
7. The technical basis for the OCA information (WCS and ARS events) in the RMPlan, including: • A description of the WCS and ARS release scenarios, the regulated substance(s) involved in the release scenarios, and the rationale for selection of the scenarios; • The assumptions and parameters used in the OCA; • A description of any administrative controls and mitigation systems assumed to limit the quantity that could be released; • A description of the anticipated effects of controls and mitigation systems on the total quantity released and the release rate; • The estimated quantity released, the release rate, and the release duration; • A description of the methodology used to determine the distance to the endpoint (toxic or flammable, applicable); and • The data used to estimate the population and environmental receptors potentially affected by the WCS and ARS events	Y		
8. The technical basis for including or excluding accidental releases in the 5-year accident history		Y	
9. The basis for the dollar ($) amount used for screening of accidental releases for significant onsite property damage in the 5-year accident history		Y	
Prevention Program Documentation — Employee Participation			
10. Written plan describing implementation of this provision	Y		
11. Minutes of meetings during which employees and their representatives were consulted about the development of the PSM program		Y	
12. Various PSM documents listed below that name employees as authors, participants, reviewers, etc.			Y

Documentation to Support Compliance with EPA's RMP Rule (40 CFR 68) (cont'd)

Description of Documentation	Required	Practical Necessity	Convenience
Prevention Program Documentation — Process Safety Information			
13. MSDSs	Y		
14. Laboratory reports concerning tests of the thermal stability or reactivity associated with covered chemicals			Y
15. Up-to-date information that describes the subject process, its operating limits, maximum intended inventories, safety systems, and consequences of deviations (e.g., troubleshooting information)	Y		
16. Updated P&IDs, interlock descriptions, electrical classification drawings	Y		
17. Design files for equipment, including references to codes and standards used, technical basis for relief device design, etc.	Y		
18. Written documentation that asserts the plant's judgment that the associated equipment complies with generally recognized engineering practices, or documentation of tests, inspections, operating history, etc., that shows that the equipment is safe for its intended duty	Y		
Prevention Program Documentation — Process Hazards Analysis			
19. Prioritization of covered processes for the purposes of scheduling PHAs that list the factors considered in selecting the order	Y		
20. Descriptions of how the plant intends to plan, perform, document, use, and retain PHAs		Y	
21. Descriptions of how the plant uses particular PHA techniques			Y
22. PHA reports	Y		
23. Memos or reports stating plant management's response to suggestions from PHA reports	Y		
24. Schedules for tracking progress and completing accepted PHA recommendations	Y		
25. Lists of "qualified" PHA team leaders. Lists of PHA-related training courses taken			Y
26. Minutes of meetings or logbooks that provide evidence of communicating the results of PHA reports to affected employees		Y	
Prevention Program Documentation — Operating Procedures			
27. Written instructions for operating the covered process in all anticipated modes of operation	Y		
28. Annual certifications that the procedures are current and accurate	Y		
29. Written description of the process the plant uses to create and update operating procedures, including the names of people and their responsibilities			Y
Prevention Program Documentation — Training			
30. Description of the initial training program. Lists of topics covered in training courses or other methods used to provide initial training		Y	
31. Checklists of operating tasks to be demonstrated by employees who undergo on-the-job training			Y
32. Memos specifically "grandfathering" employees for certain operating jobs	Y		
33. Descriptions of refresher training plans, methods, and contents		Y	
34. Evidence of how employees were consulted about the appropriate frequency for their refresher training (e.g., training surveys)		Y	
35. Records of training for every person involved in operating the process, including the means used to determine that the individual understood the training	Y		

Documentation to Support Compliance with EPA's RMP Rule (40 CFR 68) (cont'd)

Description of Documentation	Required	Practical Necessity	Convenience
Prevention Program Documentation — Contractors			
36. Copies of information that employer's have used during the contractor selection process to evaluate contractors' safety programs and performance		Y	
37. Criteria or forms used to document how such a contractor safety review was used in the selection process		Y	
38. Generic contractor safety manual provided to all contractors bidding on or performing work in a covered process area		Y	
39. Lists of safe work practices that contractors are required to follow while performing work in the covered facility	Y		
40. Examples of written information provided to contractors concerning the specific hazards associated with the covered process		Y	
41. Booklets, badges, or cards that are used to help control the entrance and exit of contractors into covered process areas			Y
42. Lists of emergency action plan information provided to each contractor employee so they will know what to do in the event of an emergency			Y
43. Forms, criteria, or other means used to document the periodic auditing of contractor work practices to ensure that contractors are satisfying the regulatory requirements (e.g., training)		Y	
44. Log of contractor injuries/illnesses for covered process areas	Y		
45. Memos, data, or other records to indicate that appropriate action was taken when contractor safety infractions were discovered		Y	
Prevention Program Documentation — Pre-startup Safety Reviews			
46. Procedures, forms, or checklists used to perform PSSRs		Y	
47. Examples of completed PSSR forms with plant management's authorization to start up, ensuring that the provisions of this paragraph are satisfied		Y	
Prevention Program Documentation — Mechanical Integrity			
48. Written procedures for mechanical integrity activities	Y		
49. Description of the maintenance training program. Lists of topics covered in training courses, apprenticeship program, or other methods used to provide training		Y	
50. Checklists of maintenance tasks to be demonstrated by employees who undergo on-the-job training			Y
51. Memos specifically "grandfathering" maintenance employees			Y
52. Descriptions of refresher training plans, methods, and contents			Y
53. Records of training for maintenance personnel, including the means used to determine whether the individuals understood the training		Y	
54. Inspection and testing records for equipment in the covered process	Y		
55. Quality assurance procedures and/or records for new equipment and for maintenance materials, spare parts, and equipment		Y	
56. Manufacturers' installation and repair manuals			Y
Prevention Program Documentation — Hot Work Permit			
57. Hot work permit procedures		Y	
58. Example hot work permit forms	Y		
59. Completed hot work permits			Y

Documentation to Support Compliance with EPA's RMP Rule (40 CFR 68) (cont'd)

Description of Documentation	Required	Practical Necessity	Convenience
Prevention Program Documentation — Management of Change			
60. Procedures for managing change	Y		
61. Completed "request for change" forms		Y	
62. Minutes of change review meetings or memos containing change review analyses			Y
63. Minutes of meetings or other evidence of communicating the results of changes to affected employees		Y	
Prevention Program Documentation — Incident Investigation			
64. Procedures for performing incident investigations			Y
65. Completed incident investigation reports or data summaries	Y		
66. Procedures for resolving recommendations and tracking their implementation	Y		
67. Minutes of meetings or other evidence of communicating the results of incident reports to affected employees		Y	
Prevention Program Documentation — Compliance Audits			
68. Procedures, forms, and checklists for performing compliance audits		Y	
69. Compliance audit reports	Y		
Emergency Response Program Documentation			
70. Emergency response plan, including how emergency response actions have been coordinated with the community emergency response plan	Y		
71. Procedures for the use, inspection, testing, and maintenance of emergency response equipment	Y		
72. Training records that show training of employees in relevant procedures	Y		
73. Procedures for reviewing and updating the emergency response plan	Y		
74. Documentation of meetings conducted with the LEPC, local emergency response agencies, community advisory panels, or others in developing the community emergency response plan			Y
75. Records of onsite drills and/or community emergency response exercises			Y
Risk Management Plan Documentation			
76. Basis for any information considered to be CBI			Y
77. Basis for the compliance dates presented in the RMPlan			Y

Additional copies are available through Global Engineering Documents at (800) 854-7179 or (303) 397-7956

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