

Model Risk Management Plan Guidance for Exploration and Production (E&P) Facilities

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



API Publication 761
Third Edition, February 2001

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**Health and Environmental 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 refineries.⁵ 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 E&P facilities 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 Petroleum Refineries* provides guidance to refineries.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 2000⁷⁻¹²
- revisions made by the U.S. Congress to Section 112(r) of the CAA in August 1999¹³
- 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.

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EXECUTIVE SUMMARY

The EPA RMP rule affects facilities engaged in the exploration for and production of natural gas and crude oil. Natural gas processing plants are considered a part of exploration and production (E&P) operations. The RMP rule covers facilities that handle greater than a threshold quantity (TQ) of regulated toxic or flammable substances, some of which may be present in oil and natural gas. Some aspects of E&P operations are excluded from coverage (e.g., naturally occurring hydrocarbon reservoirs, transportation pipelines, storage incident to transportation, and transportation containers that remain connected to the motive power that delivered them to the site). In addition, E&P operations involving regulated flammable substances prior to initial processing in a gas plant or refinery are exempt from the RMP rule. However, upstream surface facilities (e.g., production field separation equipment) handling regulated toxic substances (e.g., hydrogen sulfide) may be covered by the RMP rule. In addition, regulated flammable substances that are not a part of the naturally occurring hydrocarbon stream from the production field (e.g., propane used as a fuel for heating) may also be covered.

E&P gas plants are the most likely operations to be covered because of the large amounts of regulated flammable substances that exist in the plants. They may also be covered because of the presence of hydrogen sulfide if the inlet oil/gas stream is very sour or the gas processing equipment capacity is very large. Other E&P facilities upstream of the gas plant or refinery may be covered by the RMP rule if they exceed the TQ for a regulated toxic substance at any time. For example, field operations involving sour gas or oil production may be covered if the surface equipment contains $\geq 10,000$ lb of hydrogen sulfide; however, because of their relatively small confined volumes and the low concentration of hydrogen sulfide in most oil/gas streams, these facilities are unlikely to be covered.

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.

Covered E&P facilities 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 a 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” tier. E&P facilities with RMP-covered processes that are relatively distant from the public could qualify for this level’s reduced compliance requirements. RMP-covered E&P 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). Program 2 is the “streamlined” tier incorporating a 7-element “mini-PSM” program for the prevention program. RMP-covered E&P processes **not** eligible for Program 1 and **not** subject to OSHA PSM qualify for this level and its reduced compliance burden.

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 E&P facilities 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 many E&P facilities subject to the RMP rule are already covered by the PSM rule. 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 an example for preparing the prevention program and ERP portions of an RMPlan.

Operators of covered E&P facilities must also prepare and submit RMPlans to a central location from which the plans will be available to regulators, the state, 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 the consistency in the way that the plans are created and communicated. However, even with using this Guide, E&P facilities will still have many tasks to complete to achieve compliance (e.g., OCAs of site-specific scenarios, compilation of 5-year accident history data, and preparation of the RMPlan).

HOW TO USE THIS GUIDE

This Guide is primarily intended for use by E&P 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 E&P operations. Readers familiar with this type of information may decide to skip this section. Section 2 gives examples of determining whether E&P processes are covered by the RMP rule. Appendix A presents a simplified approach for determining the quantity of regulated flammable substances in distillation columns or towers. Assessing the appropriate program level for each covered E&P process is described in Section 3.

Section 4 deals with performing an OCA and compiling a 5-year history of accidental releases. Detailed advice focused on E&P processes is provided regarding how to organize and perform the analyses of worst-case and alternative release scenarios. This section would be important for anyone performing such RMP compliance work. Appendix B gives an example of vapor cloud explosion modeling using EPA's lookup table approach.

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) that is to be submitted as a part of the RMPlan. 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 is 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 suggestions related to 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.
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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.
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E&P facilities 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* document provides greater detail and more examples on RMP compliance activities, complete with compliance decision logic flow charts.

ACRONYMS

AC	Administrative controls
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
ATSU	Amine Treatment/Sweetening Unit
BLEVE	Boiling liquid expanding vapor explosion
CAA	Clean Air Act
CAS	Chemical Abstract Service
CBI	Confidential business information
CCPS	Center for Chemical Process Safety
CEC	Center for Environmental Communication
CEPPPO	Chemical Emergency Preparedness and Prevention Office
CFR	Code of Federal Regulations
CMA	Chemical Manufacturers Association
DF	Density factor
DOT	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
FBI	Federal Bureau of Investigation
FR	Federal Register
HAZCOM	Hazard communication
HAZOP	Hazard and operability
HAZWOPER	Hazardous waste and emergency operations
HR	Hazard review
IDLH	Immediately dangerous to life and health
LEPC	Local emergency planning committee
LF	Liquid factor
LFL	Lower flammability limit
LOC	Level of concern
LPG	Liquefied petroleum gas
MOC	Management of change
MRWG	Model RMP Working Group
MSDS	Material safety data sheet
NAICS	North American Industry Classification System
NCDC	National Climatic Data Center
NFPA	National Fire Protection Association
NGL	Natural gas liquid
NIOSH	National Institute for Occupational Safety and Health
NRT	National Response Team
NURF	Normally unoccupied remote facility
NWS	National Weather Service
OAQPS	Office of Air Quality and Planning Standards
OCA	Offsite consequence analysis
OCS	Outer Continental Shelf

ACRONYMS (cont'd)

OPA 90	Oil Pollution Act of 1990
OSHA	Occupational Safety and Health Administration
PHA	Process hazard analysis
PL	Public law
PM	Passive mitigation
PPE	Personal protective equipment
PSM	Process safety management
PSSR	Pre-startup safety review
RMP	Risk management program
RMP rule	Risk management program rule
RMPlan	Risk management plan
RP	Recommended Practice
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
TNT	Trinitrotoluene explosive
TQ	Threshold quantity
TTN	Technology Transfer Network
UFL	Upper flammability limit
USC	United States Code
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 a risk management program (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 an oil and gas exploration and production (E&P) facility can prepare an RMPlan. A "model" or an example of an RMPlan executive summary is provided in Appendix C. The main sections of the Guide provide suggestions on how E&P facilities 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 E&P facilities are in compliance with relevant codes, standards, and regulations. 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 information 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 the information provided in this Guide. However, it is hoped that the ideas in this Guide will be generally useful to all E&P facility operators so that the RMPlans can be prepared in an efficient way that reduces compliance costs and promotes consistency and understanding.

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. Companies should consider using guidance provided in *Guidance for Implementation of the General Duty Clause Clean Air Act Section 112(r)(1)*,¹⁸ published by EPA, and their own judgment to determine how best to comply with the general duty clause.

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, 1999⁷⁻¹⁰
- **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.¹¹ 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 E—Emergency Response |
| • Subpart B—Hazard Assessment | • Subpart F—Regulated Substances |
| • Subpart C—Program 2 Prevention Program | • Subpart G—Risk Management Plan |
| • Subpart D—Program 3 Prevention Program | • 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 an E&P facility is not 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 June 30, 2000, 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/indcx.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 a 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 at least once 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, including seven elements:

- 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 | • Pre-startup safety review |
| • Process hazard analysis | • Compliance audits |
| • Operating procedures | • Incident investigation |
| • Training | • Employee participation |
| • Mechanical integrity | • Hot work permits |
| • Management of change | • 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 EPA expects 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 the 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 coordinate their activities with the community emergency **planners/responders**. Facilities whose employees will not have to 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 **E&P** facility operators. First, the **RMP** rule applies only to "stationary sources"; transportation activities such as DOT-regulated pipelines and storage incident to transportation are **not** stationary sources and are **not** covered by the RMP rule. Moreover, EPA's amendments to the Subpart F list rule²¹ contain several additional exclusions that are important for **E&P** facilities:

1. A stationary source does not include pipelines subject to DOT oversight or regulation (the RMP rule excludes transmission lines and gathering lines whether regulated by DOT or an authorized state).
2. A stationary source does not include 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 dome caverns).
3. 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).
4. A stationary source does not include **E&P** facilities on the Outer Continental Shelf (OCS).
5. A stationary source does not include naturally occurring hydrocarbon reservoirs.

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 rule²⁰ 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,²¹ 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 an 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 in 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 Act¹³ (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;
- Permitted 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 or 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 alone by 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 a certification that a complete **RMPlan** has been submitted or a compliance schedule has been set.

Note: Confidential business information is protected under CAA §114(c) and 40 CFR Part 2. EPA has published amendments to the RMP rule⁷ 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** 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 A COMMON E&P FACILITY

To provide a context for this guidance, the following is a brief narrative description of the processes and activities found in typical E&P facilities. This is not meant to be an exhaustive compilation of E&P technology and operating configurations. Rather, the various classes of processes in which toxic and flammable substances are present are used to form the basis for the compliance examples and suggestions found in the remaining chapters.

E&P operations involve the extraction of naturally **occurring** hydrocarbons (*i.e.*, crude oil and natural gas) from underground reservoirs, the separation of the liquid and gas hydrocarbons from produced water, and the conveying of the liquid and gas streams to downstream gas and liquid processing facilities (*i.e.*, gas plants and refineries). Commonplace E&P facilities consist of the following activities:

- Hydrocarbon reservoir
- Well bore, casing, production tubing, and well site facilities
- Flow lines to field separation equipment and storage
- Field separation equipment and storage
- Gathering line and transmission pipeline networks
- Gas plants

Well tubing conveys liquids and gases from the reservoir to the surface. Reservoir pressure sometimes pushes the crude oil and natural gas from the reservoir through the well bore to the surface. When natural reservoir energy is not enough, producers use a number of methods to raise the oil and gas to the surface or to enhance recovery. Some of these methods include using gas or liquids produced at the well site, but they also may use gas or liquids returned to the well site from the natural gas processing plant.

In a technique called gas lift, oil and gas are helped to rise through the well bore by injection of natural gas into the well itself, but not the reservoir. Other operations may inject natural gas, natural gas liquids, or produced water into the reservoir to maintain or increase reservoir pressure. Finally, some operations may inject natural gas liquids in a miscible fluid to enhance recovery of oil and gas from the reservoir.

Once the produced gas and fluids reach the surface, a variety of hydrocarbon separation and treatment technology is used in field production operations to separate the fluids. Crude oil and natural gas condensate (i.e., oil from gas wells) are separated and treated at the production field for transportation by truck and pipeline to refineries for processing into products. Natural gas is also separated and treated in production field operations to prepare it for transportation by gathering lines either to transmission pipelines or to processing at gas plants. Natural gas processing plants process natural gas into natural gas liquid streams and residue natural gas and sometimes fractionate the natural gas liquid stream into natural gas liquid products (e.g., propane, butane). Some of the same treatment technologies used in the production field may also be used at gas plants (e.g., gravity separation, dehydration, treatment to remove impurities).

Note: When defining the boundaries of a stationary source consisting of a gas plant, the upstream boundary (i.e., the beginning of the gas plant) is assumed to be the inlet separation equipment receiving the field stream.

The following are several categories of liquid and gas separation and treatment technology employed both in production fields and in gas plants:

- Gas/oil/water separation
- Dehydration
 - Amine treatment/sweetening
- Gas compression
 - Atmospheric storage of separated liquids
- Utilities

The following categories of treatment and processing technology typically take place only at gas plants:

- Natural gas liquid separation/extraction
- Fractionation/stabilization
- Pressurized storage of natural gas liquids
- Loading and shipping of natural gas liquids

These E&P processes will be described in more detail in Section 2 and will form the basis for understanding how to assess coverage at E&P facilities.

2 Determining RMP Coverage at an E&P Facility

The EPA RMP rule affects facilities engaged in the exploration for and production of naturally occurring hydrocarbons. The RMP rule addresses facilities that have greater than a TQ of a regulated toxic or flammable substance. Regulated flammable substances (e.g., methane, ethane, propane) and at least one regulated toxic substance (i.e., hydrogen sulfide [H_2S]) can be present in naturally occurring hydrocarbon streams. However, many aspects of E&P facility operations may be exempt from coverage. Because of EPA's various exemptions and exclusions of substances from the calculation of TQ for a process, owners/operators of E&P facilities can expect the RMP rule to apply only to the following situations:

- For regulated flammable substances, at E&P gas plants involved with processing naturally occurring hydrocarbons. At other E&P stationary sources (i.e., well site and field equipment) RMP coverage for flammables is limited to hydrocarbons being used as fuel, independent of the naturally occurring hydrocarbon streams (e.g., propane used to fire heaters)
- For regulated toxic substances, at well sites (including the well bore), field equipment sites, and E&P gas plants (e.g., H_2S in the naturally occurring hydrocarbon stream, chlorine or ammonia for water/waste treatment, ammonia in refrigeration systems)

The following are steps that an E&P facility should consider using in determining RMP-covered processes:

1. Determine whether the subject E&P operations constitute a stationary source.
2. Determine whether any processes at the facility contain RMP-regulated substances.
3. Estimate the inventory of regulated substances in each potentially covered process. Some substances/uses in a facility are exempted by EPA from the TQ determination.
4. Compare the estimated process inventory 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 affect coverage assessment at E&P facilities. Before finalizing your assessment of RMP coverage, check with EPA to make sure that you have the latest information on the EPA RMP list rule and other regulatory developments that could affect E&P facilities. API intends to revise this Guide as conditions warrant.

2.1 IDENTIFYING E&P FACILITIES SUBJECT TO THE RMP RULE

E&P operations extend from the well bore that penetrates the hydrocarbon reservoir to well site equipment, flow lines and field equipment used to separate hydrocarbon liquids and gas from water and inert gases, gathering lines, transport pipelines, and gas plants. Many 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. EPA exempts naturally occurring hydrocarbon reservoirs, transportation pipelines, and E&P operations that take place on the OCS. Other provisions exclude certain regulated flammable substances from the TQ determination.

The effects of the exemptions are illustrated in the two schematics in Figure 2-1. Dashed lines indicate E&P operations that are exempt from the RMP rule. As shown in the schematic for flammable substances, naturally occurring hydrocarbon reservoirs, transportation pipelines subject to DOT regulation or oversight, and storage incident to transportation are exempt from the RMP rule. E&P operations involving regulated flammable substances in naturally occurring hydrocarbon streams prior to processing in a gas plant or refinery are exempt from the RMP rule.

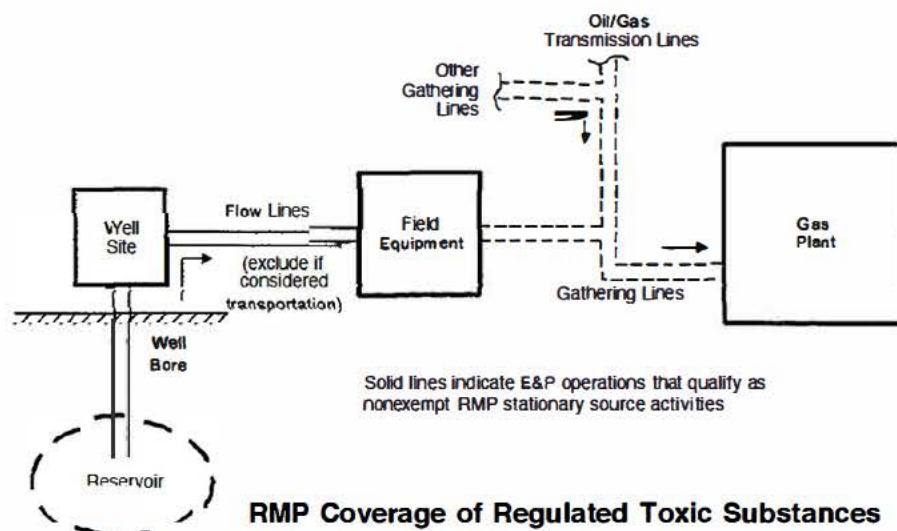
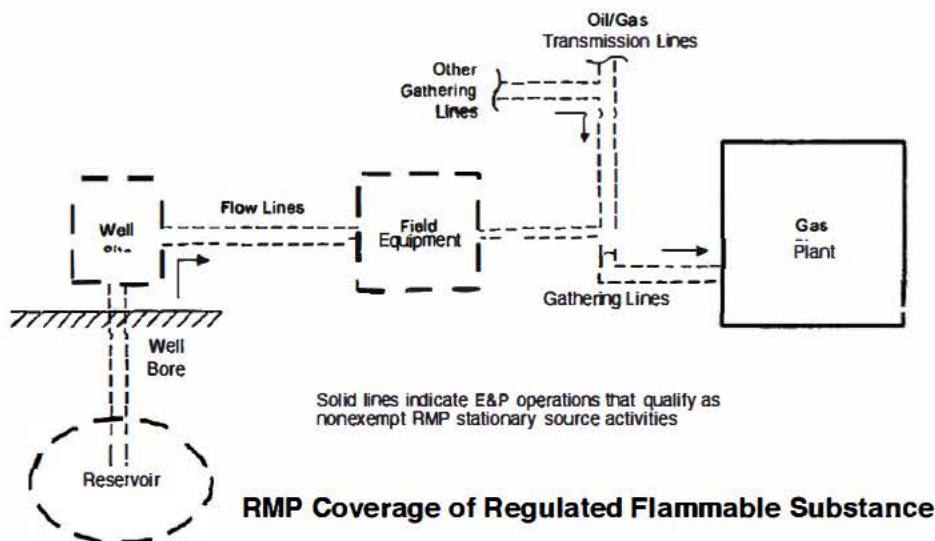
Note: On January 6, 1998, EPA published amendments to the RMP list rule²¹ providing exemptions for naturally occurring hydrocarbon reservoirs and OCS facilities. The amendments also broaden the current transportation exclusion for all DOT-regulated pipelines so that it covers jurisdictional state-regulated pipelines and pipelines that DOT has authority to regulate but chooses not to regulate (such as some field gathering lines). Flow lines are usually not considered "excluded transportation," but the regulated flammable substances they contain may not count toward the TQ determination.

Issue: EPA's "naturally occurring hydrocarbon mixture" exclusion from flammable TQ determination extends from the reservoir to the natural gas processing plant or refinery inlet. The January 6, 1998, list rule amendments²¹ do not, however, specifically exclude natural gas/hydrocarbon reinjection/pressure maintenance streams when injected from downstream outlets of the gas processing plant. Such pipelines should be evaluated to determine if they may qualify for the transportation exemption.

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(i) 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.

For regulated flammable substances, the only E&P operations that could be RMP-covered are gas plants unless well site/field equipment use processed hydrocarbons for fuel (e.g., propane).

Other E&P facilities may be covered by the RMP rule if they exceed the TQ for a regulated toxic substance at any time. The amount of a regulated toxic substance in naturally occurring hydrocarbon reservoirs is excluded. **Therefore**, an E&P operator should review well site and field equipment that **is not** considered to be storage incident to transportation for RMP coverage for regulated toxics. For example, field operations involving sour gas/liquid separation and heater-treater equipment may be covered if the equipment contains 110,000 lb of H₂S. However, because of the relatively small confined volumes and the low concentration of H₂S in most oil/gas streams, these facilities are unlikely to be affected. Gathering lines containing sour gas/liquids are not covered by the RMP rule because they are exempted transportation activities.



f:\nrb\data\jofa-rpt\1995\38195\o&p facility rmp coverage schematic.vsd Page: 2 of 2

Figure 2-1
E&P Facility Coverage Schematics

E&P gas plants processing sour gas could be affected. E&P gas plant operators should consider the gas plant from the inlet lines to the outlet lines for RMP coverage; however, many gas plants are unlikely to be covered due to the presence of H_2S , unless the inlet oil/gas stream is very sour and the gas processing equipment capacity is very large.

Note: Transportation and storage incident to transportation are not covered by the RMP rule. DOT is presently undertaking rulemaking to clarify what activities it considers to be "in the transportation process." The DOT proposal may affect the interpretation of EPA's proposed exemption for transportation pipelines. EPA excludes pipelines that are DOT-regulated, regulated under related state programs, or subject to DOT oversight authority. DOT has authority to regulate, or to choose not to regulate, gathering lines, so EPA's January 6, 1998, amendments to the RMP rule²⁷ should exclude those pipelines from RMP coverage; however, oil and gas fields may have pipelines that are **not** subject to DOT jurisdiction or oversight. Generally, DOT and state pipeline regulatory authorities consider production facility lines (flow lines) as outside of DOT oversight authority.

Potential oil and gas drilling and **workover** sources are not specifically excluded under the proposed list rule amendments. Although well bore amounts of H_2S and completion/**workover** fluids containing listed substances may be present, it is unlikely that a TQ will exist in most drilling or **workover** processes. These activities may also be excluded if the regulated substances are handled in transportation containers or storage incident to transportation.

Ultimately, E&P gas plants are the most likely E&P operations to be covered because of the large amounts of regulated flammable substances that exist in the plants. E&P sour oil or gas field operations could be covered, but it is unlikely that a TQ of regulated toxics resides in this equipment. An E&P gas plant may also be covered because of regulated toxics (e.g., ammonia, chlorine, hydrochloric acid, H_2S).

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, plants). The quantity of regulated materials in the refrigeration systems may need to be considered in the TQ determination.

2.2 IDENTIFYING REGULATED SUBSTANCES IN E&P PROCESSES

Once candidate E&P facilities that represent stationary sources are determined, the next step is to identify regulated substances in the E&P processes at these facilities. E&P facilities operate a variety of processes involving flammables and some regulated toxic substances. The E&P facility 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 E&P facility documented its technical basis for coverage under OSHA's **PSM** regulation, then this information may already exist. The E&P facility should then examine the regulated substances it has and compare the process inventory estimates to the EPA TQs.

Describing all of the various well site, field operation, and gas plant configurations used is not necessary, but describing the various types of processing activities that take place in these facilities is useful for determining the basis for coverage examples used in subsequent sections of this Guide. The following categories of equipment and processing technology are typically used both in production fields and gas processing plants.

Gas/Oil/Water Separation

Well streams containing crude oil, natural gas, water, and inert gases are conveyed through flow lines to areas containing separation equipment. Oil/water separation vessels remove most of the water from the hydrocarbon liquid stream. Three-phase separators may also be used to separate the natural gas, oil, and produced water streams. Gas/oil separator vessels remove most of the gas from the liquid stream. The liquid is typically transported to storage tanks, in some cases passing through additional equipment called "heater-treaters." The heater-treaters provide further separation of oil and produced water through the addition of heat to the stream. Gas streams at sufficient pressure are conveyed directly to sales pipelines or to E&P gas plants. Lower pressure gas streams or long distance pipeline transfers may require gas compression prior to transmission.

Dehydration

Gas streams are treated to remove water vapor. Gas dehydration is accomplished through stripping the water vapor from the gas using glycol or solid desiccants. These dehydration processes will contain regulated flammable gases and, perhaps, regulated toxics (e.g., H_2S).

Amine Treatment/Sweetening

These systems typically consist of a packed column with amine absorption of H_2S , carbon dioxide, and other substances from gas and hydrocarbon liquid streams. These systems will contain regulated flammable gases and liquids and be a likely location for regulated toxics (i.e., H_2S).

Gas Compression

Gas compression increases the pressure of the gas stream. These systems of compressors, gas scrubbers, and knockout drums contain regulated flammables and, possibly, regulated toxics. Many of these compressors operate at high pressures; however, the gas volume contained in the equipment is usually small.

Atmospheric Storage of Separated Liquids

Well site and field facilities may have atmospheric tanks that temporarily store separated liquid hydrocarbons and water. Some of this equipment may contain H_2S .

Natural Gas Liquid (NGL) Separation/Extraction

Hydrocarbon liquid streams in gas processing plants are separated in vessels and columns. Some systems use columns to extract dissolved NGLs from gas streams. This equipment contains regulated flammables.

Fractionation/Stabilization

These systems consist of fractionation columns containing regulated flammable liquids and gas. They typically will not contain any regulated toxics because these will have been removed by prior treatment steps. Some of these systems include fractionation towers operated at low temperatures (i.e., cryogenic). Propane is the typical refrigerant. This equipment contains regulated flammables, but is unlikely to contain significant amounts of regulated toxics.

Pressurized Storage, Loading, and Transmission Pipelines

Various pressure tanks are used to store liquids in an E&P gas plant. These vessels are likely to be the largest inventories of regulated flammables. Loading facilities (e.g., railcars) could be covered by the RMP rule if they contain a TQ of flammables. Pipelines are exempt from coverage because they are transportation activities. It would be rare that inlet gas tanks contain enough sour gas to have a TQ of H₂S.

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 ammonia 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 waystation 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, FR 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 nothooked 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." 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.

Utilities

Depending upon the location, some E&P facilities may have their own dedicated water/waste treatment systems. These systems could contain chlorine, sulfur dioxide, hydrochloric acid, H₂S, or ammonia. Some facilities may have cooling towers to which they add chlorine to the cooling water system to control biological growth in the cooling water system.

2.3 DETERMINING PROCESS INVENTORY OF REGULATED SUBSTANCES

Based on the information regarding which regulated substances exist in E&P processes at stationary sources, the next step is to estimate the process inventory for each regulated substance. In most cases, E&P facilities may use the definition for processes that they used in determining coverage under OSHA's PSM regulation as a starting point. Other E&P facilities will typically consist of only one process. Many E&P gas plant processes will likely contain greater than a TQ of a regulated flammable.

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 facility 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 some instances, E&P facilities have **adopted** their OSHA PSM process boundaries as their process boundaries under the RMP rule. These facilities 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 facility 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 facility 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 facility 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 2-1 summarizes the process inventory information that must be included in the registration section of the RMPlan for each RMP-covered process.

Table 2-1
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 2-1, 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.

The basis for **any** exemption involving toxic or flammable mixtures must be documented. The following is a thought process that E&P facility personnel can use to quickly evaluate whether a process contains a TQ of a regulated flammable substance (i.e., a single substance or a mixture):

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 through 4.)
2. Determine if the mixture contains a regulated flammable substance in a concentration greater than 1 wt%. If not, then the mixture does not count toward the TQ determination.
3. Determine if the mixture meets the 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 NFPA 4 criteria. See Section 2.4 of this Guide for a discussion of the NFPA 4 criteria.)
4. Determine the quantity of flammables in the vessel. As a first cut, assume the vessel is 100% full. Or, determine the level based on administrative controls.
5. Compare the total quantity 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 amounts in the vessels are less than 10,000 lb, 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 2-2 and 2-3 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 steps 1 through 7 for each 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 2-2
Pipe Length to Contain a Threshold Quantity (10,000 lb) of Methane Gas

Pressure	Density	Nominal Pipe Size (Inside Diameter)						
		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 96 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 miles
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 miles	990 ft 0.19 miles
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 miles	1,100 ft 0.21 miles	470 ft 0.09 miles

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

Pressure	Density	Nominal Pipe Size (Inside Diameter)						
		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 miles	410 ft 0.077 miles	110 ft 0.022 miles	49 ft 0.0093 miles
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 miles	400 ft 0.076 miles	110 ft 0.021 miles	49 ft 0.0092 miles
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 miles	400 ft 0.075 miles	110 ft 0.021 miles	48 ft 0.0091 miles

Continue the coverage determination process until you determine whether the process contains a TQ amount involving 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).

Most of the situations in an E&P gas plant will involve flammable gases (i.e., liquefied petroleum gas [LPG]). For these situations, consider using an ideal gas law approximation to estimate the vessel/pipe inventory assuming the lowest temperature and highest pressure that exist in the process and a molecular weight that is representative of the gas stream.

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 TQ of 10,000 lb.

Methane Calculations

Threshold Quantity (TQ) 10,000 lb

Molecular Weight (MW) $16.043 \frac{\text{lb}}{\text{lb} \cdot \text{mole}}$

Compressibility (Z)

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

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

Density (ρ)

$$\begin{aligned} \rho &= \frac{MW \cdot P}{10.73 \cdot Z \cdot T} \\ &= \frac{16.043 \frac{\text{lb}}{\text{lb} \cdot \text{mole}} \cdot (1000 + 14.7) \text{ psia}}{10.73 \frac{\text{ft}^3 \cdot \text{psia}}{\text{lb} \cdot \text{mole} \cdot ^\circ\text{R}} \cdot 0.8707 \cdot (68 + 459.7) ^\circ\text{R}} \\ &= 3.30 \frac{\text{lb}}{\text{ft}^3} \end{aligned}$$

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 CalculationsInternal 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: 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

E&P 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 the EPA mixture rule threshold (i.e., the partial pressure evaluated at operating conditions is greater than 10 mm Hg). 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 E&P facility, but that are present in some E&P process streams (e.g., H₂S), the TQ evaluation is more difficult. Field operation processes such as oil/water separators and sweetening units will likely not be large enough to have a TQ of H₂S. However, it is possible that E&P gas plant processes may have enough H₂S in process equipment to be covered.

E&P gas plant operators should look for TQ amounts of H₂S in the following process areas: amine treating units, sulfur units, and long or high volume pipelines within the plant property boundary. E&P gas plants typically use amine solutions (MEA, DEA, MDEA, etc.) to absorb acid gases, including H₂S and carbon dioxide (CO₂) 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 . The 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 acid-free 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 literature²⁷⁻³⁰ 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 an E&P facility where gaseous H_2S may be present include process streams upstream of the amine contactors, 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 1136 in EPA's Question and Answer Database¹⁴ 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 2-4 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 natural gas stream containing 10% H_2S . This table can be used as a rule of thumb in determining whether a process is covered because of H_2S .

Table 2-4
Pipe Length to Contain a Threshold Quantity (10,000 lb)
of Hydrogen Sulfide Gas (10 wt%) In a Natural Gas Stream

Pressure	Density	Nominal Pipe Size ^a (Inside Diameter)						
		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 22.82 inch	36 inch 34.50 inch
100 psig	0.343 lb/ft ³	49,000,000 ft 9,200 miles	13,000,000 ft 2,400 miles	5,700,000 ft 1,100 miles	1,500,000 ft 280 miles	370,000 ft 70 miles	100,000 ft 20 miles	45,000 ft 9 miles
500 psig	1.540 lb/ft ³	11,000,000 ft 2,000 miles	2,800,000 ft 530 miles	1,300,000 ft 240 miles	320,000 ft 1 miles	83,000 ft 16 miles	23,000 ft 4 miles	10,000 ft 2 miles
1,000 psig	3.036 lb/ft ³	5,500,000 ft 1,000 miles	1,400,000 ft 270 miles	640,000 ft 120 miles	160,000 ft 31 miles	42,000 ft 8 miles	12,000 ft 2 miles	5,100 ft < 1 mile
1,500 psig	4.531 lb/ft ³	3,700,000 ft 700 miles	950,000 ft 180 miles	430,000 ft 81 miles	110,000 ft 21 miles	28,000 ft 5 miles	7,900 ft 2 miles	3,400 ft < 1 mile

Note:	E&P facilities should look at the piping from the time it enters the property and is no longer in a transportation activity all the way through the sweetening and sulfur recovery processes to determine whether a TQ of H ₂ S exists. This estimate should be an "at any one time" analysis, and not be based on total throughput.
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E&P facilities should not forget to consider other utility systems that could contain regulated toxics (e.g., ammonia, hydrochloric acid, and 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 are not relevant to E&P operations (e.g., janitorial service items, structural components, laboratory activities under qualified supervision). See the CMA/API RMP Compliance Guideline¹⁷ for a detailed discussion of all of the RMP exemptions.

One type of exemption that is relevant to E&P facilities 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 the criteria for NFPA 4 flammables. The definition for an NFPA 4 flammable substance given in 1996 NFPA publication 704³¹ 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 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.
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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.
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Another exemption of possible significance to E&P facilities is the exemption for regulated substances in gasoline stored in a gasoline storage tank for use in internal combustion engines.

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, facilities should compare the process inventories of the regulated substances 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 a process does not exceed the TQ for RMP-regulated substances and (2) the reasons that a **process/activity** is exempt from the rule.

Note: E&P 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 an E&P facility a regulated toxic for use in cleaning or maintaining equipment. 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.

3.1 PROGRAM LEVEL ELIGIBILITY CRITERIA

EPA has established three **RMP** Program Levels. Each covered process 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(s)** that caused the process to be covered are 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 either in Program 2 or Program 3. A covered process is in Program 3 if it does not qualify for Program 1 and either (1) it is covered by OSHA's PSM regulation or (2) it is associated with one of the ten "targeted" NAICS codes. NAICS codes associated with E&P facilities are not among this list of codes. Thus, if an **E&P** facility process was not covered under OSHA's PSM standard, then the facility would have the option of assigning it a Program 2 **status**.

Note: The NAICS codes associated with **E&P** facilities are not among the list of "targeted" codes in §68.10(d)(1) of the **RMP rule**. As an example, the NAICS code for a natural gas processing plant is 211112.

Note: RMP-covered E&P facilities that are exempt under OSHA PSM are candidates for RMP Program 2. For example, **E&P** facilities that are normally unoccupied, remote facilities, or those that use regulated flammable substances solely as hydrocarbon fuels in the facility (**e.g.**, propane for comfort heating), are exempt from OSHA. Covered **E&P** facilities could choose to implement the streamlined requirements of RMP Program 2 for these types of processes.

Issue: A memorandum issued by OSHA on December 20, 1999, clarifies the oil well drilling and servicing exemption provided by the OSHA PSM standard (29 CFR 1910.119). In the memorandum, OSHA indicates that oil well drilling and servicing is distinct from production and covers activities related to the initial drilling of a well and the maintenance work necessary to maintain or enhance production. Normally, such operations are occurring if a drilling rig or truck-mounted rig or mast is **present** on the well. According to OSHA, oil well drilling and servicing includes the following activities:

- The actual drilling and associated activities of the well;
- Well completion activities (i.e., activities and methods necessary to prepare a well for the production of oil and gas);
- Well servicing (i.e., the maintenance work performed on an oil well to improve or maintain the production from a formation already producing. Usually it involves repairs to the pump, rods, gas-lift valves, tubing, packers, and so forth); and
- **Workover** activities (i.e., the performance of one or more of a variety of remedial operations on a producing oil well to **try** to increase production). Examples of **workover** operations include deepening, plugging back, pulling and resetting liners, squeeze cementing and so on.

According to OSHA, the production phase occurs after a well has been drilled, completed, and placed into operation, or after it has been returned to operation following **workover** or servicing. A completed well includes a "Christmas tree" (control valves, pressure gauges, and choke assemblies to control the flow of oil and gas), which is attached at the top of the well where pressure is expected. It is at this point, the top of the well, where the covered PSM process may begin. OSHA indicates that production activities that may be covered by the PSM standard can include, but are not limited to, the following:

- The handling and **onsite** movement of flammable gas or flammable liquids through interconnected equipment;
- The separation of oil, gas, or water by (1) high and low pressure separators, (2) gravity water separation conducted inside in-process tanks, and (3) heat **treaters**;
- The compression of the flammable gas from a lower to a higher pressure; and
- The other chemical and physical processing activities that are interconnected with, or proximate to, the PSM-covered process.

E&P facilities that satisfy the above criteria for production activities may be subject to the OSHA PSM standard. However, an **E&P** facility may qualify for the normally unoccupied remote facility (NURF) exemption under the OSHA PSM standard. For the NURF exemption to apply, the facility must be geographically remote from all other buildings, processes, or persons, and must not be within the boundaries or be contiguous to other operations of the employer. Employees may visit remote sites periodically to check operations and to perform **maintenance/operation** activities. If the NURF exemption does not apply, the E&P facility may be subject to the OSHA PSM standard. If other RMP exemptions do not apply, the E&P facility may be considered to be a Program 3 process under the RMP rule.

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 June 30, 2000, 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 E&P PROCESSES

Based on an assessment of **RMP coverage** at an E&P facility, the company should assign each RMP-covered process to an RMP program level. Some **E&P** processes may be eligible for Program 1 status. Program 1 requirements **are** significantly less detailed than Program 2 or 3 requirements. For facilities that are starting from scratch, the cost of setting up a prevention program is significant. **E&P** facilities covered under OSHA's PSM standard will already have a prevention program in place. Others not covered by OSHA PSM typically adhere to consensus codes and standards and have many, if not all, of the

Program 2 requirements already in place. Therefore, facilities should carefully evaluate the advantages and costs of achieving Program 1 eligibility for these situations. 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 **RMP** programs 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.

E&P facilities that judge the benefits of Program 1 status outweigh the costs will be able to minimize their regulatory compliance effort. The following are some 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 vessels and piping inventories in the process unit. If the

process uses only regulated flammable substances, the WCS endpoint distance may likely not extend far beyond the property boundary and may not affect a public receptor. However, if an E&P facility has more than a TQ of a regulated toxic in a covered process, the WCS endpoint distance is more likely to reach public receptors unless the plant is very distant from the community.

Note: E&P facilities that do not have more volatile toxics or that have relatively small quantities above the TQ should strongly consider performing a WCS analysis to verify Program 1 status.

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

Facilities should monitor the RMP Program Level status of covered processes. If a change occurs that alters the Program Level of the process, then the facility must update and resubmit its RMP within 6 months. (See Section 7 for additional requirements.)

Note: E&P facilities with RMP-covered processes should consider modifying their management of change and, where relevant, their capital project review systems to identify potential facility changes that could affect the RMP program levels of existing covered processes.

E&P facilities 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. Facilities 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 facility 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 an E&P facility has both Program 1 and Program 213 processes, then the facility may want to consider including the Program 1 process in its RMP management system. This would be an efficient way to "manage" the process and ensure that it continues to meet the Program 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 E&P facility and the hazard assessment information that must be provided in the RMP plan. 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 E&P facility 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 E&P facilities may have objectives other than RMP rule compliance, such as enhancing public risk communication, reducing process risk, illustrating the effectiveness of mitigation systems, or complying 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 analyses 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 an E&P facility 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 an E&P facility to support the process's eligibility for Program 1 [§68.25(a)(1)].

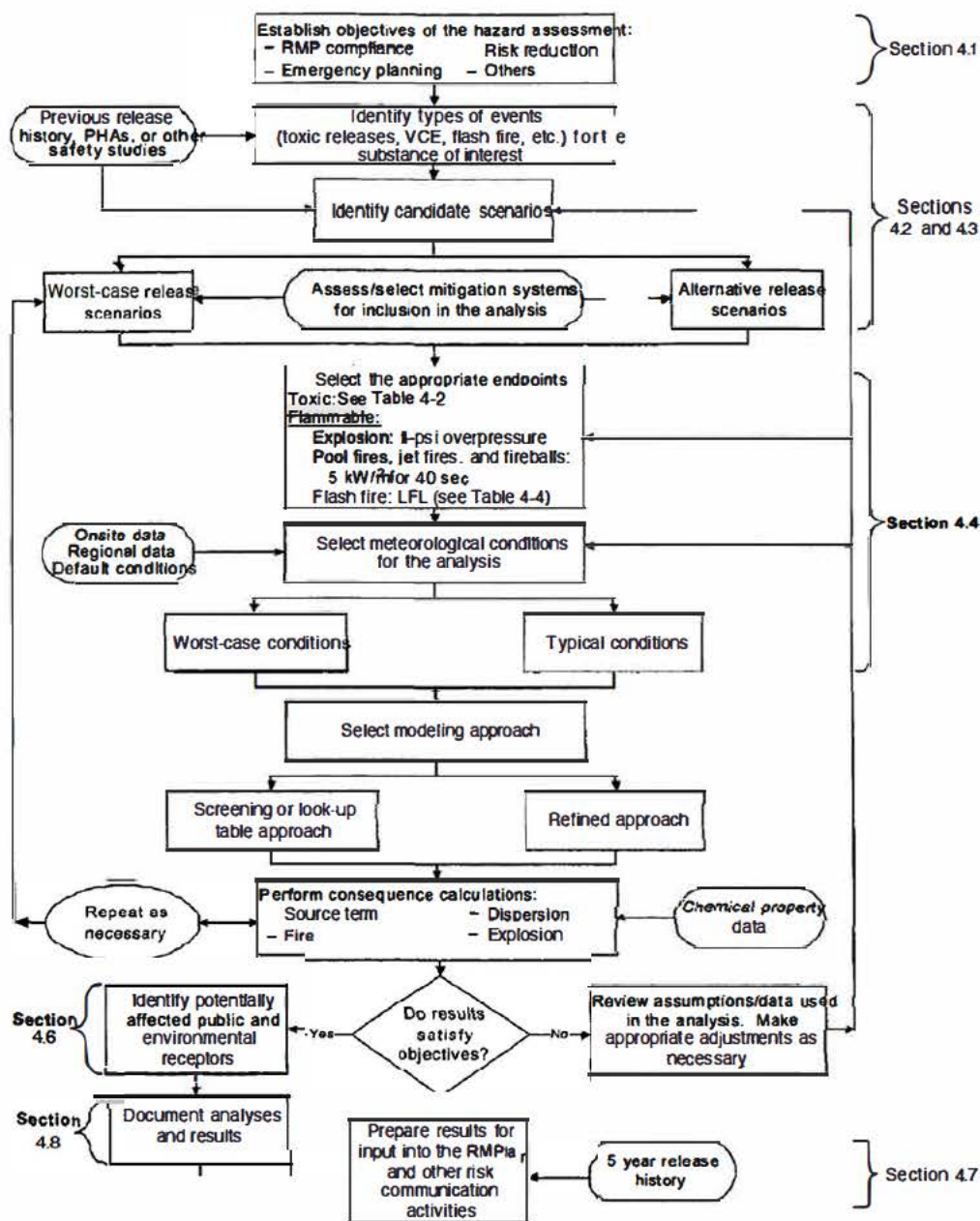


Figure 4-1
Major Steps in Performing a Hazard Assessment

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 material 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 an E&P facility 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 E&P facility boundary [§68.25(i)(2)] may potentially affect public receptors at longer distances beyond the facility 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 reservoirs or vessels, (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 an E&P facility should begin by collecting the following information:

- A site plot plan or aerial photograph of the facility 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 ft²)