Regulatory Impact Analysis

Accidental Release Prevention Requirements:
Risk Management Programs
Under the Clean Air Act, Section 112(r)(7)

U.S. Environmental Protection Agency (EPA)
Office of Land and Emergency Management (OLEM)
Office of Emergency Management (OEM)
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ACRONYMS

Acronym	Definition
CSB	Chemical Safety Board
EO	Executive Order
EPCRA	Emergency Planning and Community Right to Know Act
FEMA	Federal Emergency Management Agency
FTE	Full Time Equivalent
IST	Inherently Safer Technology
LEPC	Local Emergency Planning Committee
NAICS	North American Industrial Classification System
OCA	Offsite Consequence Analysis
OSHA	Occupational Safety and Health Administration
P1	Program Level 1
P2	Program Level 2
P3	Program Level 3
PHA	Process Hazard Analysis
PSM	Process Safety Management
RFI	Request for Information
RIA	Regulatory Impact Analysis
RMP	Risk Management Plan
SDS	Safety Data Sheets
SERC	State Emergency Response Commissions
STAA	Safer Technology and Alternatives Analysis
TEPC	Tribal Emergency Planning Committee
TERC	Tribal Emergency Response Commissions
TQ	Threshold Quantity

EXECUTIVE SUMMARY

INTRODUCTION

In response to catastrophic chemical facility incidents in the United States, President Obama issued EO 13650, "Improving Chemical Facility Safety and Security," on August 1, 2013. The EO establishes the Chemical Facility Safety and Security Working Group (Working Group), co-chaired by the Secretary of Homeland Security, the Administrator of EPA, and the Secretary of Labor or their designated representatives at the Assistant Secretary level or higher, and comprised of senior representatives of other Federal departments, agencies, and offices.[1] The EO requires the Working Group to carry out a number of tasks whose overall goal is to prevent chemical accidents, such as the explosion that occurred at the West Fertilizer facility in West, Texas, on April 17, 2013, which killed 15 people, most of whom were first responders, caused multiple injuries, and resulted in extensive building damage to the town.[2]

Section 6(a)(i) of EO 13650 requires the Working Group to develop options for improved chemical facility safety and security that identify "improvements to existing risk management practices through agency programs, private sector initiatives, Government guidance, outreach, standards, and regulations." Section 6(c) of EO 13650 requires the Administrator of EPA to review the Risk Management Program. As part of this effort to solicit comments and information from the public regarding potential changes to EPA's RMP regulations (40 CFR part 68), on July 31, 2014, EPA published a "Request for Information" notice or "RFI" (79 FR 44604).

EPA believes that the RMP regulations have been effective in preventing and mitigating chemical accidents in the United States; however, EPA is proposing revisions in order to further protect human health and the environment from chemical hazards through advancement of process safety management (PSM) based on lessons learned. These revisions are a result of a review of the existing Risk Management Program and information gathered from the RFI and EO listening sessions, and are proposed under the statutory authority provided by section 112(r) of the Clean Air Act (CAA) as amended (42 U.S.C. 7412(r)).

DESCRIPTION OF PROPOSED RULE AND ALTERNATIVES

The RIA analyzed the proposed new requirements and revisions to existing requirements as well as several alternatives for each.

[1] The White House. Executive Order – Improving Chemical Facility Safety and Security. August, 2013. https://www.whitehouse.gov/the-press-office/2013/08/01/executive-order-improving-chemical-facility-safety-and-security

[2] CSB. January 2016. Final Investigation Report, West Fertilizer Company Fire and Explosion, West, TX, April 17, 2013. REPORT 2013-02-I-TX. http://www.csb.gov/west-fertilizer-explosion-and-fire-/

Third-Party Audits—(proposed revisions apply to existing §§68.58 and 68.79 and new §§68.59 and 68.80)

The existing rule requires Program 2 and Program 3 processes to conduct a compliance audit at least once every 3 years. The proposed rule would require facilities to contract with an independent third-party to conduct the next scheduled compliance audit following an RMP reportable accident or after an implementing agency determines that certain circumstances exist that suggest a heightened risk for an accident. The third-party would have to be someone with whom the facility does not have an existing or recent relationship and who meets specific qualification criteria. The proposed alternative is the low cost one and would apply only for Program 2 and Program 3 processes after an RMP reportable accident or at the request of the implementing agency. The medium cost alternative would apply every three years for all compliance audits conducted for all P3 processes. The high cost alternative would apply every three years for all compliance audits conducted for Program 2 and Program 3 processes.

Root Cause Analysis—(proposed revisions apply to §§68.60 and 68.81)

The proposed rule would require facilities to conduct a root cause analysis as part of an incident investigation following an RMP reportable accident or an incident that could reasonably have resulted in an RMP reportable accident (i.e., "near miss"). A root cause analysis is a formal process to identify underlying reasons for failures that lead to accidental releases. These analyses usually require someone trained in the technique. The low cost alternative would apply the provision only to RMP reportable accidents or near misses in P3 processes. The proposed option is the higher cost alternative and would apply to RMP reportable accidents or near misses involving Program 2 and Program 3 processes.

Safer Technology and Alternatives Analysis (STAA)—(proposed revisions apply to §68.67)

Under the proposed rule, facilities in NAICS codes 322 (paper manufacturing), 324 (petroleum and coal products manufacturing), and 325 (chemical manufacturing) with P3 processes would be required to conduct a STAA for each process as part of their PHA, which occurs every 5 years. The STAA requirement includes two parts: the initial analysis to identify alternatives, and a feasibility study to determine the costs and assess the reasonableness of implementing technology alternatives. The proposed rule is the low cost alternative, which would apply to all facilities with P3 processes in NAICS codes 322, 324, and 325. The medium cost alternative would apply the requirement to all P3 processes. The high cost alternative would apply the requirement to all P3 processes and require facilities to implement feasible safer technology and alternatives.

Coordination Activities—(proposed revisions apply to §§68.90, new 68.93, and 68.95)

Under the proposed rule, all facilities with Program 2 or Program 3 processes would be required to coordinate with local response agencies annually to determine response needs and ensure that response resources and capabilities are in place to respond to an accidental release of a regulated substance. The owner or operator would also be required to document coordination activities. The proposed rule also includes a provision enabling the Local Emergency Planning Committee (LEPC) or local emergency response official to require that the RMP-facility owner or operator comply with the

emergency response program requirements of §68.95. Section 68.95 requires the owner or operator to develop an emergency response program that includes an emergency response plan, procedures for use, inspection and maintenance of response equipment, training for responding employees, and procedures to review and update the program. As a result of improved coordination between facility owners and operators and local emergency response officials, EPA believes that some facilities that are currently designated as non-responding facilities may become responding facilities (i.e., develop an emergency response program in accordance with §68.95).

Alternatives to this provision are similar to the proposed requirements. One alternative would eliminate the option for local officials to require that a facility owner or operator comply with the requirements of §68.95. This alternative, although the costs analyzed are the same as the proposed option, may result in lower actual costs as local officials' ability to require compliance with §68.95 may increase the likelihood of current non-responding facilities converting to responding facilities. These costs of converting are estimated in a sensitivity analysis in this RIA. A second alternative is a high cost alternative and would require all facilities with Program 2 or Program 3 processes to comply with §68.95, regardless of local response capability. This would be analogous to the requirements under the Oil Pollution Prevention regulation (40 CFR Part 112) where all facilities subject to the Facility Response Plan provisions at §112.20 are required to prepare and implement an emergency response plan for oil discharges into navigable waters or adjoining shorelines.

Exercises—(proposed revisions apply to new §68.96)

Notification Exercises. All facilities with Program 2 or Program 3 processes would be required to conduct a notification exercise annually to ensure that the emergency contact list is complete, accurate, and up-to-date.

Tabletop and Field Exercises. The proposed rule would require responding facilities to conduct annual exercises of their emergency response plans and invite local emergency response officials to participate. Under the low cost alternative, facilities would conduct tabletop exercises annually. Under the proposed option, which is the medium cost alternative, facilities would conduct a full field exercise at least once every five years, and tabletop exercises annually in the interim years. Facilities with an RMP reportable accident would also have to conduct a full field exercise within a year of an RMP reportable accident, but this may not impose any additional burden under the medium alternative as it would count as the required field exercise for the next 5-year period. Under the high cost alternative, facilities would conduct full field exercises annually.

Information Disclosure—(proposed revisions apply to new §68.205 and existing §68.210)

The proposed rule would require all facilities to disclose certain chemical hazard information to the public. The facility or its parent company, if applicable, would have to make the information available in an easily accessible manner, which might be presenting information on a company website, posting the information at public libraries, publishing it in local papers, or other means appropriate for particular

communities and facilities. The information to be disclosed includes names of regulated substances at the facility; Safety Data Sheets (SDS); accident history information; emergency response program information; and LEPC or local response agency contact information.

In addition, facility owners or operators would be required to provide, upon request, to the LEPC or other local response agencies information on all of the following that apply to the facility: regulated substances; five-year RMP reportable accident history; summaries of compliance audit reports; summaries of incident investigation reports; summaries of implementation of inherently safer technology (IST); and information on emergency response exercises, including schedules for upcoming exercises. Facilities owners or operators would be required to update this information annually.

Public Meetings—(proposed revisions apply to §68.210)

The proposed rule would require facilities to hold a public meeting for the local community within 30 days of an RMP reportable accident. The medium cost alternative would require P2 and P3 facilities to hold a public meeting at least once every 5 years and within 30 days of an RMP reportable accident. The high cost alternative would require all facilities (i.e., including P1 facilities) to hold a public meeting at least once every 5 years and within 30 days of an RMP reportable accident.

SUMMARY OF COSTS

Approximately 12,500 facilities have filed current RMPs with EPA and are potentially affected by the proposed rule changes. These facilities range from petroleum refineries and large chemical manufacturers to water and wastewater treatment systems; chemical and petroleum wholesalers and terminals; food manufacturers, packing plants, and other cold storage facilities with ammonia refrigeration systems; agricultural chemical distributors; midstream gas plants; and a limited number of other sources that use RMP-regulated substances.

Exhibit A presents the number of facilities according to the latest RMP reporting as of February 2015 by industrial sector and chemical use.

Exhibit A: Number of Affected Facilities by Sector

Sector	NAICS Codes	Total Facilities	Chemical Uses
Administration of environmental quality programs (i.e., governments)	924	1,923	Use chlorine and other chemicals for treatment
Agricultural chemical distributors/wholesalers	111, 112, 115, 42491	3,667	Store ammonia for sale; some in NAICS 111 and 115 use ammonia as a refrigerant
Chemical manufacturing	325	1,465	Manufacture, process, store
Chemical wholesalers	4246	333	Store for sale
Food and beverage manufacturing	311, 312	1,476	Use mostly ammonia as a refrigerant
Oil and gas extraction	211	741	Intermediate processing (mostly regulated flammable substances and flammable mixtures)
Other	44, 45, 48, 54, 56, 61, 72	247	Use chemicals for wastewater treatment, refrigeration, store chemicals for sale
Other manufacturing	313, , 326, 327, 33	384	Use various chemicals in manufacturing process, waste treatment
Other wholesale	423, 424	302	Use mostly ammonia as a refrigerant
Paper manufacturing	322	70	Use various chemicals in pulp and paper manufacturing
Petroleum and coal products manufacturing	324	156	Manufacture, process, store (mostly regulated flammable substances and flammable mixtures)
Petroleum wholesalers	4247	276	Store for sale (mostly regulated flammable substances and flammable mixtures)
Utilities	221 (except 22131, 22132)	343	Use chlorine (mostly for water treatment)
Warehousing and storage	493	1,056	Use mostly ammonia as a refrigerant
Water/wastewater Treatment Systems	22131, 22132	102	Use chlorine and other chemicals
Total		**12,542**	

Exhibit B presents a summary of the costs estimated in the analysis. EPA estimates annualized costs of $158.3 million at a 3% discount rate, and $161.0 million at a 7% discount rate. Total undiscounted costs are $1.58 billion over the ten year time period, or $1.4 billion and $1.1 billion when discounted at 3 and 7 percent, respectively. Exhibit B presents some elements that are beyond the proposed rule provisions, such as rule familiarization.

Exhibit B: Summary of Costs (Millions, 2014 dollars)

Cost Elements	Total Undiscounted	Total Discounted (3%)	Total Discounted (7%)	Annualized (3%)*	Annualized (7%)
Third-Party Audits	$49.6	$42.3	$34.8	$5.0	$5.0
Root Cause Analysis	$8.4	$7.2	$5.9	$0.8	$0.8
Safer Technology and Alternatives	$347.9	$296.8	$244.3	$34.8	$34.8
Coordination	$62.7	$53.4	$44.0	$6.3	$6.3
New Responders °	$311.1	$281.6	$250.3	$33.0	$35.6
Notification Drills	$13.8	$11.8	$9.7	$1.4	$1.4
Exercise Costs	$606.6	$517.4	$426.0	$60.7	$60.7
LEPC Disclosure	$129.2	$100.2	$82.5	$11.7	$11.7
Public Disclosure	$39.8	$33.9	$27.9	$4.0	$4.0
Public Meetings	$4.0	$3.4	$2.8	$0.4	$0.4
Rule Familiarization	$2.4	$2.3	$2.2	$0.3	$0.3
Total Cost+	**$1,575.**	**$1,350.2**	**$1,130.5**	**$158.3**	**$161.0**

* When annual costs for different years are equal to one another across the analysis time period, the annualized costs calculated using different discount rates (e.g., 3 and 7 percent) are equal.

° Reflects costs for some facilities to convert from "non-responding" to "responding" as a result of improved coordination with local emergency response officials

+ Values may not sum due to rounding

SUMMARY OF POTENTIAL BENEFITS

EPA had no data to project the specific impact of each proposed rule element on the probability and magnitude of chemical accidents. Indeed, the frequency and severity of the accidents themselves would be challenging to predict. However, a review of the RMP accident data and other data sources suggested that chemical accidents impose substantial costs on firms, employees, emergency responders, the community, and the broader economy. This RIA constructs and presents data for a 10-year baseline period, summarizing RMP accident impacts and when possible monetizing them. The average annual cost of RMP accidents during the baseline was $274 million. However, the monetized impacts omit many important categories of accident impacts including lost productivity, the costs of emergency response, transaction costs, property value impacts in the surrounding community (that overlap with other benefit categories), and environmental impacts. Also not reflected in the 10-year baseline costs are the impacts of non-RMP accidents at RMP facilities and any potential impacts of rare high consequence catastrophes. A final omission is related to the information disclosure provision. Reducing the probability of chemical accidents and the severity of their impacts, and improving information disclosure by chemical facilities, as the proposed provisions intend, would provide benefits to potentially affected members of society.

Exhibit C summarizes all of the benefit categories qualitatively described in this RIA. There are four broad benefit categories related to accident prevention and mitigation including prevention of RMP

accidents, mitigation of RMP accidents, prevention and mitigation of non-RMP accidents at RMP facilities, and prevention of major catastrophes. The exhibit explains each and identifies ten associated specific benefit categories, ranging from avoided fatalities to avoided emergency response costs. Exhibit C also highlights and explains the information disclosure benefit category and identifies two specific benefits associated with it: improved efficiency of property markets and allocation of emergency resources.

Exhibit C: Summary of Social Benefits of Proposed Rule Provisions

Broad Benefit Category	Explanation	Specific Benefit Categories
Accident Prevention	Prevention of future RMP facility accidents	• Reduced Fatalities • Reduced Injuries • Reduced Property Damage • Fewer People Sheltered in Place • Fewer Evacuations • Avoided Lost Productivity • Avoided Emergency Response Costs • Avoided Transaction Costs • Avoided Property Value Impacts* • Avoided Environmental Impacts
Accident Mitigation	Mitigation of future RMP facility accidents	
Non-RMP accident prevention and mitigation	Prevention and mitigation of future non-RMP accidents at RMP facilities	
Avoided Catastrophes	Prevention of rare but extremely high consequence events	
Information Disclosure	Provision of information to the public and LEPCs	• Improved efficiency of property markets • Improved resource allocation

* These impacts partially overlap with several other categories, such as reduced health and environmental impacts

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CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 History

Serious chemical accidents occurring in the 1970s and 1980s, including accidents in Bhopal, India, Seveso, Italy, and Pasadena, Texas led to a series of legislative reforms relating to chemical safety in industrialized countries.[3][4] In the United States, the Emergency Planning and Community Right to Know Act (EPCRA) was enacted in 1986 to promote community emergency planning and preparedness and provide local responders and the public with information about the chemical hazards in their community (42 U.S.C. 11002 et seq.). In 1990, sections 112(r) and 304 of the Clean Air Act were enacted to help prevent severe chemical facility accidents. Section 304 required the Occupational Safety and Health Administration (OSHA) to publish a chemical process safety standard to prevent accidental releases of chemicals that could pose a threat to employees. Section 112(r) required the Environmental Protection Agency (EPA) to publish Accidental Release Prevention Program regulations to prevent chemical releases or minimize their consequences if they occur.

Section 112(r) required EPA to develop a list of at least 100 regulated substances which, in the case of an accidental release, are known to cause or may reasonably be anticipated to cause death, injury, or serious adverse effects to human health or the environment (42 U.S.C 7412(r)). EPA was also required to establish threshold quantities (TQs) for these substances, which would determine the applicability of rules to prevent accidental releases of these substances. Section 112(r)(7)(B) required EPA to promulgate reasonable regulations and appropriate guidance to provide, to the greatest extent practicable, for the prevention and detection of accidental releases of regulated substances and for response to such releases by the owners or operators of the sources of such releases. The section mandates that the regulations require the owner or operator of a stationary source "to prepare and implement a risk management plan to detect and prevent or minimize accidental releases of such substances from the stationary source, and to provide a prompt emergency response to any such releases in order to protect human health and the environment." The section further mandates that the plan include:

- A hazard assessment to assess the potential effects of an accidental release of any regulated substance. This assessment shall include an estimate of potential release quantities and a determination of downwind effects, including potential exposures to affected populations. Such assessment shall include a previous release history of the past 5 years, including the size, concentration, and duration of releases, and shall include an evaluation of worst case accidental releases;

[3] Federal Emergency Management Agency. Phillips Petroleum Chemical Plant Explosion and Fire. October 1989. https://www.usfa.fema.gov/downloads/pdf/publications/tr-035.pdf

[4] Nature 281, 521 (18 October 1979). http://www.nature.com/nature/journal/v281/n5732/pdf/281521a0.pdf

- A program for preventing accidental releases of regulated substances, including safety precautions and maintenance, monitoring and employee training measures to be used at the source; and
- A response program providing for specific actions to be taken in response to an accidental release of a regulated substance so as to protect human health and the environment, including procedures for informing the public and local agencies responsible for responding to accidental releases, emergency health care, and employee training measures.

Finally, the section requires the owner or operator of an affected stationary source to develop and file a risk management plan with EPA, the Chemical Safety Board (CSB) (also established under the section), the State, and local response agencies.

OSHA adopted its process safety management standard (PSM) (codified at 29 CFR 1910.119) in 1992 (57 FR 6403, Feb. 24, 1992). The PSM standard requires facilities to develop and implement an integrated approach to chemical process safety including the following elements: accurate, up-to-date diagrams of all process equipment, an analysis of the process hazards, standard operating procedures, training, maintenance, pre-startup reviews, management of change, compliance audits, incident investigation, employee participation, hot-work permits, contractor training, and emergency response. The applicability of the PSM standard is driven by the presence of specific chemicals in quantities above thresholds set in the standard.

EPA published its section 112(r) regulations in two stages – a list of regulated substances and TQs in 1994 (59 FR 4478, January 31, 1994), and the risk management program requirements in 1996 (61 FR 31731, June 20, 1996); both are codified at 40 CFR part 68. As required by section 112(r), part 68 includes several major requirements that were not covered by the PSM standard. These include a hazard assessment consisting of an offsite consequence analysis (OCA) and five-year accident history, and the development and submission of a risk management plan (RMP) that summarizes a source's risk management program. EPA also required stationary sources to develop a management system to oversee the program and included emergency response program requirements beyond those contained in the PSM standard. RMPs were first submitted to EPA in June 1999 and must be updated at least every 5 years. EPA has amended the rule a number of times to modify the list of substances, to alter data requirements, and to address other issues. The primary requirements adopted in 1996, however, remain in place.

The Risk Management Program rule establishes three program levels and requires facility owners or operators to conduct hazard assessments and submit RMPs regardless of the program level. Program 1 (P1) requirements apply to processes that would not affect the public in the case of a worst-case release and with no accidents with specific off-site consequences within the past five years. P1 provisions impose limited hazard assessment requirements and emergency response requirements.

Program 2 (P2) applies to processes not eligible for P1 or subject to Program 3 (P3), and imposes streamlined prevention program requirements, including safety information, hazard review, operating

procedures, training, maintenance, compliance audits, and incident investigation elements. P2 provisions also impose hazard assessment, management, and emergency response requirements. P2 processes are primarily chlorine use at publicly owned water and wastewater facilities, in States without OSHA-approved State plans. To further reduce the burden on facilities with P2 processes, EPA developed and published a number of industry-specific guidance documents[5] and an OCA guidance document.

P3 requirements apply to processes not eligible for P1 and either subject to OSHA's PSM standard, under federal or State OSHA programs, or classified in one of ten specified North American Industrial Classification System (NAICS) codes (1997 version) listed at 40 CFR 68.10(d)(1). The ten NAICS codes are:

- 32211 (pulp mills)
- 32411 (petroleum refineries)
- 32511 (petrochemical manufacturing)
- 325181 (alkali and chlorine manufacturing)
- 325188 (all other basic inorganic chemical manufacturing)
- 325192 (cyclic crude and intermediate manufacturing)
- 325199 (all other basic organic chemical manufacturing)
- 325211 (plastics material and resin manufacturing)
- 325311 (nitrogenous fertilizer manufacturing)
- 32532 (pesticide and other agricultural chemical manufacturing)

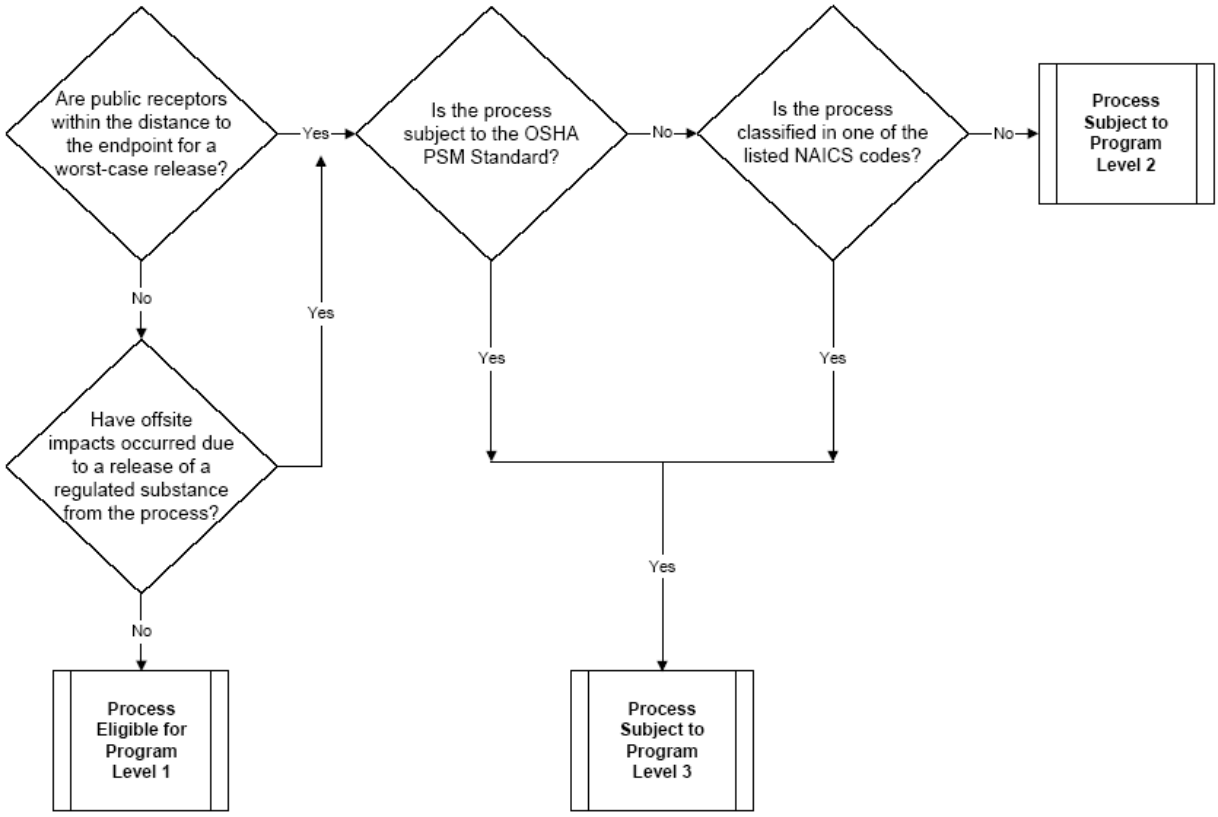
P3 requirements impose elements nearly identical to those in OSHA's PSM standard as the accident prevention program. The P3 prevention program includes requirements relating to the following:

- Process safety information
- Process Hazard Analysis (PHA)
- Operating procedures
- Training
- Mechanical integrity
- Management of change
- Pre-startup review
- Compliance audits
- Incident investigations
- Employee participation
- Hot work permits, and
- Contractors.

[5] There are guidance documents for propane storage, refrigeration, water/wastewater treatment, warehouses, chemical distributors, and others.

P3 provisions also impose the same hazard assessment, management, and emergency response requirements that are required for P2.

The following flowchart demonstrates how facilities determine to which program level they are subject[6]:



Facilities[7] that are exempt from the OSHA PSM standard may be subject to EPA requirements under the RMP rule. This occurs for several reasons. First, the lists of substances regulated are not identical; for example, EPA lists aqueous ammonia at any solution that is 20 percent ammonia or more; OSHA covers it only at concentrations of 44 percent or more. Second, because federal OSHA has no authority over State and local government employees, the OSHA PSM standard does not apply to publicly owned facilities (mainly water and wastewater treatment systems) in States where federal OSHA implements and enforces the standard (about half the States). Where States implement and enforce OSHA standards (referred to as State-plan States), the State is required to impose OSHA standards on State and local government employees as a condition of delegation.[8] Lastly, regulatory exemptions are not

[6] http://www2.epa.gov/sites/production/files/2013-10/documents/chap-02-final.pdf

[7] Facilities are also commonly referred to as stationary sources, and the terms are used interchangeably throughout this document.

[8] Twenty-six states, Puerto Rico, and the Virgin Islands have OSHA-approved State Plans. In these states, publicly owned water and wastewater treatment plants are typically in P2. Twenty-two State Plans (21 states and one U.S.

identical; for example, the OSHA PSM standard exempts normally unoccupied remote facilities, but the RMP rule does not.

Approximately 12,500 currently regulated facilities have filed RMPs for approximately 17,000 processes. Most facilities have only one process, but certain industries, such as chemical manufacturing and petroleum refining, often have more than one regulated process; about 100 facilities have more than 10 regulated processes. The population of RMP facilities is dynamic. Several thousand facilities have either switched chemicals to non-regulated substances, reduced chemical inventories below threshold quantities, or ceased operations and subsequently deregistered from the program since the first RMPs were submitted in 1999. However, every year new facilities are registering and submitting new RMPs.

Although the accident histories submitted with RMPs have shown a reduction in the frequency of accidents since the beginning of the program, there continue to be serious chemical releases. RMP data for 2004 through 2013, the most recent 10 year period with complete information, shows that there are an average of 150 accidents each year with reportable impacts.

In April 2013, the West Texas Fertilizer Company, an RMP-regulated facility in West, Texas, that stored anhydrous ammonia (an RMP- and PSM-regulated substance) and ammonium nitrate (not regulated under the RMP rule or the PSM standard) caught fire, which led to a massive explosion of the ammonium nitrate. Fifteen people, most of them firefighters, died and more than 160 members of the public were injured. Two nearby schools, an apartment building, a nursing home, and much of the surrounding town were also damaged.[9] In addition to this tragedy, a number of other serious incidents demonstrate a significant risk to the safety of American workers and communities. On March 23, 2005, explosions at the BP Refinery in Texas City, Texas killed 15 and injured more than 170.[10] On April 2, 2010, an explosion and fire at the Tesoro Refinery in Anacortes, Washington killed seven.[11] On August 6, 2012, a fire at the Chevron Refinery in Richmond, California involving flammable fluids endangered 19 Chevron employees and created a large plume of chemicals that traveled across the Richmond,

territory) cover both private and state and local government workplaces. Public water and wastewater plants in these states are in P3. The remaining six State Plans (five states and one U.S. territory) cover state and local government workers only. Their public water/wastewater plants are P2. https://www.osha.gov/dcsp/osp/

[9] CSB. January 2016. Final Investigation Report, West Fertilizer Company Fire and Explosion, West, TX, April 17, 2013. REPORT 2013-02-I-TX. http://www.csb.gov/west-fertilizer-explosion-and-fire-/

[10] U.S. Chemical Safety and Hazard Investigation Board (CSB). March 2007. Investigation Report: Refinery Explosion and Fire, Texas City, Texas, March 23, 2005. http://www.csb.gov/assets/1/19/CSBFinalReportBP.pdf.

[11] CSB. May 2014. Investigation Report: Catastrophic Rupture of Heat Exchanger, Tesoro Anacortes Refinery, Anacortes, Washington, April 2, 2010. http://www.csb.gov/assets/1/7/Tesoro_Anacortes_2014-May-01.pdf.

California area. Nearly 15,000 residents sought medical treatment due to the release.[12] On June 6, 2013, a fire and explosion at Williams Olefins in Geismar, Louisiana killed two and injured many more.[13]

These incidents highlight the regulatory need that this proposed rule modernization is addressing. Section 112(r) of the Clean Air Act aimed to address low frequency and high consequence chemical events. These are catastrophic incidents which have large societal impacts when they occur, but very little likelihood for any individual chemical facility. As such, market forces may not provide an incentive for any given company to invest in measures to prevent such accidents as they're so unlikely to occur at the individual level. However, looking across the United States and universe of regulated facilities, these accidents occur with sufficient frequency to warrant regulation.

In response to recent catastrophic chemical facility incidents such as the West explosion and others, in 2013 President Obama issued Executive Order (EO) 13650, entitled Improving Chemical Facility Safety and Security,[14] which among other items, required EPA and OSHA to consider whether and how to update and modernize the RMP rule and PSM standard. Both EPA and OSHA issued requests for information (RFI) to seek input from the public and the regulated community on potential revisions to the rules.[15] EPA received a total of 579 public submissions on the RFI. Several public comments were the result of various mass mail campaigns[16] and contained numerous copies of letters or petition signatures. Approximately 99,710 letters and signatures were contained in these several comments. In general, members of the public that submitted comments supported imposing more stringent requirements on facilities, including a requirement for industry to use inherently safer systems to prevent chemical disasters. The regulated industry opposed most suggested revisions to the rule as unnecessary and costly. The proposed rule is the result of EPA's consideration of the comments, as well as of recommendations from the CSB, the Agency's experience gained through participation in EO 13650 listening sessions,[17] and information gained by EPA through inspection of RMP facilities and enforcement of the rule over the past sixteen years.

1.2 Organization of the Analysis

This regulatory impact analysis (RIA) is organized as follows:

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[12] CSB. January 2014. Regulatory Report: Chevron Richmond Refinery Pipe Rupture and Fire, Chevron Richmond Refinery #4 Crude Unit, Richmond, California, August 6, 2012. Report No. 2012-03-I-CA. http://www.csb.gov/assets/1/19/CSB_Chevron_Richmond_Refinery_Regulatory_Report.pdf.

[13] CSB. 2013. Ongoing Investigation of Williams Olefins Plant and Fire, Geismar, LA. June 13, 2013. http://www.csb.gov/williams-olefins-plant-explosion-and-fire-/.

[14] https://www.whitehouse.gov/the-press-office/2013/08/01/executive-order-improving-chemical-facility-safety-and-security

[15] OSHA's RFI was published on December 9, 2013 (78 FR 73756) and EPA's RFI was published on July 31, 2014 (79 FR 44604).

[16] The terms "form letter campaign" and "mass mail campaign" are used interchangeably throughout this report.

[17] In 2013 and 2014, as part of the EO 13650 activities, the federal government held a dozen listening sessions, supplemented by two online webinars. For a list of locations and link to the notes for these sessions go to http://www.regulations.gov/#!docketDetail;D=DHS-2013-0075.

- Chapter 2 describes the provisions that EPA is proposing to add or amend and the alternatives that EPA considered for each provision analyzed in this document.
- Chapter 3 discusses the universe of regulated entities and the various divisions used in the analysis.
- Chapter 4 discusses the basis for cost estimates for each of the provisions and alternatives and presents the unit costs.
- Chapter 5 presents the total costs and 10-year costs.
- Chapter 6 discusses the potential benefits of the rule.
- Chapter 7 presents the small entity impacts.
- Chapter 8 presents the environmental justice analysis
- Chapter 9 discusses other statutory and related analyses.

CHAPTER 2: PROVISIONS AND ALTERNATIVES

This chapter presents a summary of the provisions in the proposed rule and the alternatives analyzed. The provisions being proposed include revisions to existing prevention program and emergency response requirements as well as new requirements related to public disclosure of information. For some provisions EPA considered three alternatives, which represent low, medium, and high costs.

The RIA analyzed the following proposed new requirements and revisions to existing requirements as well as several alternatives for each:

1. *Third-Party Audits—(proposed revisions apply to existing §§68.58 and 68.79 and new §§68.59 and 68.80):* Revising the compliance audit provisions by requiring the next compliance audit following an RMP reportable accident[18] to be conducted by a third-party.
2. *Root Cause Analysis- (proposed revisions apply to §§68.60 and 68.81):* Revising the incident investigation provisions to require a root cause analysis following an RMP reportable accident or an incident that could reasonably have resulted in an RMP reportable accident (i.e., "near miss").
3. *Safer Technology and Alternatives Analysis (STAA)—(proposed revisions apply to §68.67):* Revising the PHA provisions to add a requirement to conduct a STAA - defined as "the integration of a variety of risk reduction or risk management strategies that work toward making a facility and its chemical processes as safe as possible"[19] - for a subset of P3 processes in specific NAICS codes.
4. *Coordination Activities—(proposed revisions apply to §§68.90, new 68.93, and 68.95):* Reorganizing and clarifying existing requirements for all facilities with P2 and P3 processes to coordinate emergency response capabilities with local response agencies and adding a new requirement to coordinate annually, document these coordination activities, and allow the LEPC to require that the chemical facility take responsibility for its own emergency response.
5. *Exercises—(proposed revisions apply to new §68.96):* Adding new requirements for facilities to conduct exercises annually. This includes an annual notification exercise that applies to both responding and non-responding facilities. Owners and operators of responding facilities must conduct a field exercise once every five years (and after a RMP reportable accident) and tabletop exercises annually, in the other years.
6. *Information Availability—(proposed revisions apply to new §68.205 and existing §68.210):* Adding a new requirement to make certain information available to the LEPC or local response agencies upon request. In addition, the proposed rule would revise the public information

[18] RMP reportable accident means any accident that must be reported under the five-year accident history requirements of §68.42, which is an accidental release from a covered process that resulted in deaths, injuries, or significant property damage on-site, or known offsite deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage.

[19] EPA/OSHA Chemical Safety Alert: Safer Technology and Alternatives. June 2015. http://www2.epa.gov/sites/production/files/2015-06/documents/alert_safer_tech_alts.pdf

availability requirements to simplify the presentation of existing publicly available information and help the public better understand the risks at the facility.

7. *Public Meeting—(proposed revisions apply to §68.210):* Adding a new requirement to hold a public meeting after an RMP reportable accident.

2.1 Alternatives Analyzed

Third-Party Audits—(proposed revisions apply to existing §§68.58 and 68.79 and new §§68.59 and 68.80)

The existing rule requires P2 and P3 processes to conduct a compliance audit at least once every 3 years. The proposed rule would require facilities with P2 and/or P3 processes to contract with an independent third-party to conduct the next scheduled compliance audit following an RMP reportable accident or after an implementing agency[20] determines that certain circumstances exist that suggest a heightened risk for an accident. The third-party would have to be someone with whom the facility does not have an existing or recent relationship and who meets specific qualification criteria. The low cost alternative (i.e., the proposed option) would apply only for P2 and P3 processes after an RMP reportable accident or at the request of the implementing agency. The medium cost alternative would apply every three years for all compliance audits conducted for all P3 processes. The high cost alternative would apply every three years for all compliance audits conducted for P2 and P3 processes.

Root Cause Analysis—(proposed revisions apply to §§68.60 and 68.81)

The proposed rule would require facilities with P2 and/or P3 processes to conduct a root cause analysis as part of an incident investigation following an RMP reportable accident or an incident that could reasonably have resulted in an RMP reportable accident (i.e., "near miss"). A root cause analysis is a formal process to identify underlying reasons for failures that lead to accidental releases. These analyses usually require someone trained in the technique. The low cost alternative would apply the provision only to RMP reportable accidents or near misses in P3 processes. The medium/high cost alternative (proposed option) would apply to RMP reportable accidents or near misses involving P2 and P3 processes.

Safer Technology and Alternatives Analysis (STAA)—(proposed revisions apply to §68.67)

Under the proposed rule, facilities in NAICS codes 322 (paper manufacturing), 324 (petroleum and coal products manufacturing), and 325 (chemical manufacturing) with P3 processes would be required to conduct a STAA for each process as part of their PHA, which occurs every 5 years. The STAA includes two parts: the initial analysis to identify alternatives, and a feasibility study to determine the costs and assess the reasonableness of implementing technology alternatives. The proposed rule is the low cost alternative, which would apply to all facilities with P3 processes in NAICS codes 322 (Paper Manufacturing), 324 (Petroleum and Coal Product Manufacturing), and 325 (Chemical Manufacturing).

[20] The implementing agency is the federal state, or local agency that is taking the lead for implementation and enforcement of part 68 or the state or local equivalent.

The medium cost alternative would apply the requirement to all P3 processes. The high cost alternative would apply the requirement to all P3 processes and require facilities to implement safer technology and alternatives that are considered feasible.

Coordination Activities—(proposed revisions apply to §§68.90, new 68.93, and 68.95)

Under the proposed rule, all facilities with P2 or P3 processes would be required to coordinate with local response agencies annually to determine response needs and ensure that response resources and capabilities are in place to respond to an accidental release of a regulated substance. The owner or operator would also be required to document coordination activities. The proposed rule also includes a provision enabling the LEPC or local emergency response official to require that the RMP-facility owner or operator comply with the emergency response program requirements of §68.95. Section 68.95 requires the owner or operator to develop an emergency response program that includes an emergency response plan, procedures for use, inspection and maintenance of response equipment, training for responding employees, and procedures to review and update the program. As a result of improved coordination between facility owners and operators and local emergency response officials, EPA believes that some facilities that are currently designated as non-responding facilities may become responding facilities (i.e., develop an emergency response program in accordance with §68.95). For the proposed alternative, EPA conducted a sensitivity analysis estimating costs faced by RMP facilities that converted from non-responder to responder status (see Section 2.2 below).

Alternatives to this provision are similar to the proposed requirements. One alternative would eliminate the option for local officials to require that a facility owner or operator comply with the requirements of §68.95. A second alternative is a high cost alternative and would require all facilities with P2 or P3 processes to comply with §68.95, regardless of local response capability[21]. This would be analogous to the requirements under the Oil Pollution Prevention regulation (40 CFR Part 112) where all facilities subject to the Facility Response Plan provisions at §112.20 are required to prepare and implement an emergency response plan for oil discharges into navigable waters or adjoining shorelines.

Exercises—(proposed revisions apply to new §68.96)

Notification Exercises. All facilities with P2 or P3 processes would be required to conduct a notification exercise annually to ensure that the contact list to be used in an emergency is complete, accurate, and up-to-date.

Tabletop and Field Exercises. The proposed rule would require responding facilities to conduct annual exercises of their emergency response plans and invite local emergency response officials to participate. Under the low cost alternative, facilities would conduct tabletop exercises annually. Under the proposed option, which is the medium cost alternative, responding facilities would conduct a full field exercise at least once every five years and tabletop exercises annually in the interim years. Responding

[21] For this alternative to the proposed option, the sensitivity analysis would not be relevant.

facilities with an RMP reportable accident would also have to conduct a full field exercise within a year of an RMP reportable accident, but this may not impose any additional burden under the medium alternative as it would count as the required field exercise for the next 5-year period. Under the high cost alternative, responding facilities would conduct full field exercises annually.

Information Availability—(proposed revisions apply to new §68.205 and existing §68.210)

The proposed rule would require facility owners or operators to provide, upon request, to the LEPC or other local response agencies with information on all of the following that apply to the facility: regulated substances; five-year RMP reportable accident history; summaries of compliance audit reports; summaries of incident investigation reports; summaries of implementation of inherently safer technology (IST); and information on emergency response exercises, including schedules for upcoming exercises. Facilities owners or operators would be required to update this information annually.

In addition, all facilities would be required to disclose certain chemical hazard information to the public. The facility or its parent company, if applicable, would have to make the information available in an easily accessible manner, which might be presenting information on a company website, posting the information at public libraries, publishing it in local papers, or other means appropriate for particular communities and facilities. The information to be disclosed includes names of regulated substances at the facility; Safety Data Sheets (SDS); accident history information; emergency response program information; and LEPC or local response agency contact information.

Public Meeting—(proposed revisions apply to §68.210)

The proposed rule would require facilities to hold a public meeting for the local community within 30 days of an RMP reportable accident. The medium cost alternative would require P2 and P3 facilities to hold a public meeting at least once every five years and within 30 days of an RMP reportable accident. The high cost alternative would require all facilities (i.e., including P1 facilities) to hold a public meeting at least once every five years and within 30 days of an RMP reportable accident.

2.2 Additional Changes Associated with Local Coordination Activities

As a result of improved coordination between facility owners and operators and local emergency response officials, EPA believes that some facilities that are currently designated as non-responding facilities may become responding facilities. Therefore, in addition to the provisions listed above, the RIA estimates the costs associated with becoming a responding facility. This includes the costs of developing an emergency response program in accordance with §68.95, purchasing and maintaining appropriate equipment, training personnel, conducting exercises, and preparing the associated exercise reports for LEPCs.

In earlier rulemakings, EPA specified that if a facility owner or operator determined that the local emergency responders did not have the training and equipment to respond to a release of an RMP regulated substance at the facility, then the facility owner or operator must take responsibility for being

able to respond; however, it has become clear that in practice this has not always been the case. Information from EPA regional offices, State emergency organizations, and local response agencies has shown that facilities are not always coordinating or communicating with local responders, as required, and in some cases neither a facility nor its local response agency is prepared to respond to releases of regulated substances.

The proposed rule would explicitly require a facility owner or operator with a Program 2 or Program 3 process to coordinate annually with local emergency responders to determine response needs and ensure that response resources and capabilities are in place to respond to an accidental release of a regulated substance. When the outcome of the response coordination activities demonstrates that local response capabilities are not adequate to respond, or upon the request of local responders, the facility owner or operator must develop an emergency response program in accordance with §68.95.

EPA examined RMP data to estimate the percent of RMP facilities with Program 2 and/or 3 processes that are non-responders, which means they are relying on local authorities to respond to any releases of regulated substances at the facility.[22]

Approximately 57 percent of facilities fell into this category. Many of these facilities are smaller facilities in rural areas. Unlike the other alternatives analyzed, the number and type of facilities that may convert from non-responder status to responder is uncertain. A previous FEMA analysis reported that approximately 76% of the population is covered by hazmat teams, which provides an indication of which facilities might have to become responding facilities.[23] However, the distribution of regulated facilities does not necessarily match the US population, so EPA used data from that FEMA report to conduct a sensitivity analysis. The RIA presents the costs associated with 25%, 50%, and 75% of the estimated number of non-responding facilities becoming responding facilities who are located in counties that do not have hazmat teams. The high cost alternative for coordination would require all P2 and P3 facilities to become responders.

2.3 Summary of Alternatives

Exhibit 2-1 presents the alternatives by rule requirement. Where cells are merged, the requirements are the same across the alternatives covered. For provisions that include alternative options analyzed, the proposed rule provisions are highlighted in gray.

[22] EPA. January 27, 2016. Technical Background Document for Notice of Proposed Rulemaking: Risk Management Programs under the Clean Air Act, Section 112(r)(7).

[23] https://www.fema.gov/media-library/assets/documents/26675

Exhibit 2-1: Alternatives by Regulatory Provision

Rule Provision	Low Alternative	Medium Alternative	High Alternative
Prevention Program Elements			
Third-party Audit (§§68.58, 68.59, 68.79, and 68.80))	Next compliance audit after RMP reportable accident (facilities with P2 and P3 processes)	All compliance audits at facilities with P3 processes conducted every three years by a third-party	All compliance audits at facilities with P2 and P3 processes conducted every three years by a third-party
Root Cause Analysis (§§68.60 and 68.81)	Applies to RMP reportable accidents and "near misses" involving P3 processes	Applies to all RMP reportable accidents and "near misses" involving P2 and P3 processes	
STAA (§68.67)	Facilities with P3 processes in NAICS codes 322, 324, 325 conduct STAA and feasibility analyses	All facilities with P3 processes conduct STAA and feasibility analyses	All P3 facilities conduct STAA and feasibility analyses and implement feasible alternatives
Emergency Planning and Response			
Coordination (§§68.90, 68.93 and 68.95)	All facilities with P2 and P3 processes coordinate with local responders and document annually	All P2 and P3 facilities coordinate and document annually; LEPC may require source to implement ER program	All P2 and P3 facilities must comply with ER Program (i.e., become responding facilities) regardless of local capability.
Notification Exercises (§68.96)	All facilities with P2 and P3 processes must verify their emergency notification contact information annually		
Tabletop and Field Exercises (§68.96)	Responding facilities conduct tabletop exercises annually	Responding facilities conduct: a field exercise at least once every 5 years (and within one year of an RMP reportable accident); tabletop exercises in the other four years	Responding facilities conduct a field exercise annually
Information Disclosure			
Disclosure to LEPC (§68.205)	All facilities make certain information available to the LEPC or local emergency response officials upon request.		
Disclosure to the Public (§68.210)	All facilities make certain chemical hazard information available to the public in an easily accessible manner.		
Public Meeting (§68.210)	Facilities hold a public meeting within 30 days of an RMP reportable accident.	P2 and P3 facilities hold a public meeting at least once every 5 years and within 30 days of an RMP reportable accident.	All facilities hold a public meeting once every 5 years and within 30 days of an RMP reportable accident

2.4 Impacts to Governments

The proposed rule imposes direct costs to local governments that own and operate RMP facilities (primarily water and wastewater systems, but also some power plants and swimming pools). The proposed rule also imposes indirect costs to local emergency response and planning agencies to review new information that would be submitted and to participate in exercises at the invitation of facility owners and operators. Although local agencies are not required to participate in exercises or review documents, many will do so. The RIA discusses and presents these costs separately.

CHAPTER 3: UNIVERSE OF REGULATED FACILITIES

Approximately 12,500 facilities have filed current RMPs with EPA and are potentially affected by the proposed rule changes. These facilities range from petroleum refineries and large chemical manufacturers to water and wastewater treatment systems; chemical and petroleum wholesalers and terminals; food manufacturers, packing plants, and other cold storage facilities with ammonia refrigeration systems; agricultural chemical distributors; midstream gas plants; and a limited number of other sources that use RMP-regulated substances. This chapter describes these facilities and how they are categorized for the purposes of the economic analysis.

3.1 Current RMP Facilities

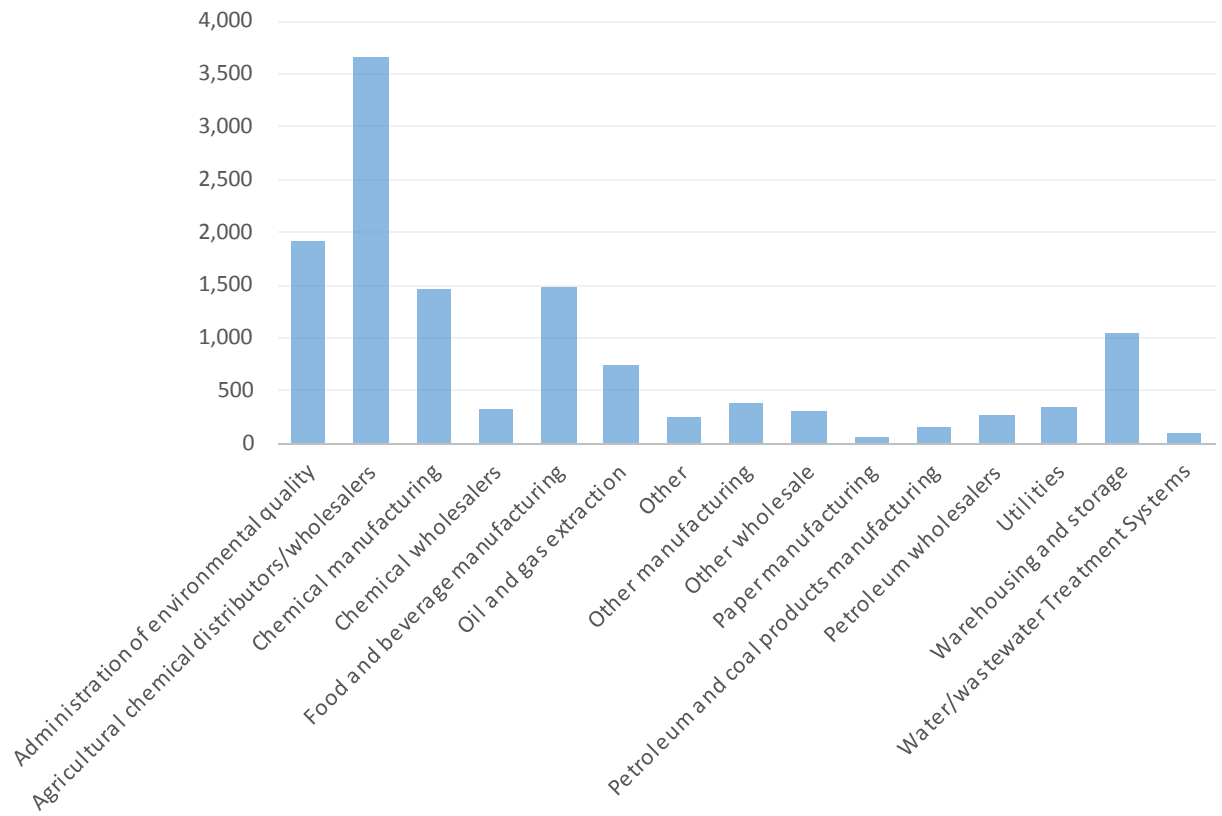
Exhibit 3-1 presents the number of facilities according to the latest RMP reporting as of February 2015 by industrial sector and chemical use.

Exhibit 3-1: Number of Affected Facilities by Sector

Sector	NAICS Codes	Total Facilities	Chemical Uses
Administration of environmental quality programs (i.e., governments)	924	1,923	Use chlorine and other chemicals for treatment
Agricultural chemical distributors/wholesalers	111, 112, 115, 42491	3,667	Store ammonia for sale; some in NAICS 111 and 115 use ammonia as a refrigerant
Chemical manufacturing	325	1,465	Manufacture, process, store
Chemical wholesalers	4246	333	Store for sale
Food and beverage manufacturing	311, 312	1,476	Use (mostly ammonia as a refrigerant)
Oil and gas extraction	211	741	Intermediate processing (mostly regulated flammable substances and flammable mixtures)
Other	44, 45, 48, 54, 56, 61, 72	248	Use chemicals for wastewater treatment, refrigeration, store chemicals for sale
Other manufacturing	313, 326, 327, 33	384	Use various chemicals in manufacturing process, waste treatment
Other wholesale	423, 424	302	Use (mostly ammonia as a refrigerant)
Paper manufacturing	322	70	Use various chemicals in pulp and paper manufacturing
Petroleum and coal products manufacturing	324	156	Manufacture, process, store (mostly regulated flammable

Sector	NAICS Codes	Total Facilities	Chemical Uses
			substances and flammable mixtures)
Petroleum wholesalers	4247	276	Store for sale (mostly regulated flammable substances and flammable mixtures)
Utilities	221 (except 22131, 22132)	343	Use chlorine (mostly for water treatment)
Warehousing and storage	493	1,056	Use mostly ammonia as a refrigerant
Water/wastewater Treatment Systems	22131, 22132	102	Use chlorine and other chemicals
Total		**12,542**	

Exhibit 3-2: Chart of Affected Facilities by Sector



The RMP rule applies to processes (i.e., activities involving regulated substances including any use, storage, manufacturing, handling, or on-site movement of such substances, or combination of these activities) at facilities with regulated substances above threshold amounts. Many facilities may handle other chemicals that are not RMP-regulated or have processes that are not subject to the rule. In general, the cost of implementing the rule provisions varies primarily by the complexity of the processes

involved. The chemical manufacturers and refineries have more covered processes per facility and more complex issues to consider when evaluating hazards, designing exercises, conducting audits, investigating incidents, and explaining information to responders and the public compared to facilities that simply store or use chemicals in simple processes (e.g., refrigeration systems and water and waste treatment systems). For the purposes of the cost analysis, therefore, all facilities in NAICS 324 and 325 (petroleum and coal products manufacturing and chemical manufacturing) are considered complex; all other facilities are considered simple.

The proposed STAA provision is limited to P3 processes in three sectors that have had a high frequency of accidental releases (NAICS codes 322, 324, and 325). These sectors were selected because they represent relatively complex processes that account for 49% of all RMP reportable accidents.[24] Exhibit 3-3 presents the number of processes for all facilities by program level and for the three sectors, as well as the number of facilities within each program level.

Exhibit 3-3: Number of Processes by Program Level and Sector

Program Level	Facilities	Processes
1	642	1,096
2	1,272	5,448
3	10,628	14,454
Total	**12,542**	**20,998**

STAA Sectors	Processes
NAICS 322 (Paper Manufacturing)	97
NAICS 324 (Petroleum and Coal Products Manufacturing)	1,453
NAICS 325 (Chemical Manufacturing)	2,758
Total	**4,308**

To analyze the STAA provision, EPA separated the processes in the three sectors into those that are more likely to involve manufacturing and reacting chemicals under more extreme conditions (i.e., high temperatures and pressures) from those that involve mixing and using chemicals under less extreme conditions. The former are the petroleum operations in NAICS 324, petrochemicals and other basic chemical manufacturing in NAICS 3251, and synthetics and resins in NAICS 3252. All other chemicals manufacturing sectors (agricultural chemicals, drugs, paints, soaps, and others) were merged with pulp/paper mills in the cost analysis and are assumed to mix and use chemicals under less extreme conditions. Exhibit 3-4 presents the number of processes for the three sectors; NAICS codes 324, 3251, and 3252 are further disaggregated by the facility size because the level of effort for a STAA is likely to

[24] February 2015 RMP Database.

increase as the size of these more complicated processes increases, as measured by the number of FTEs involved in the process at the facility.

Exhibit 3-4: Number of Processes for STAA Sectors by Sector and Facility Size

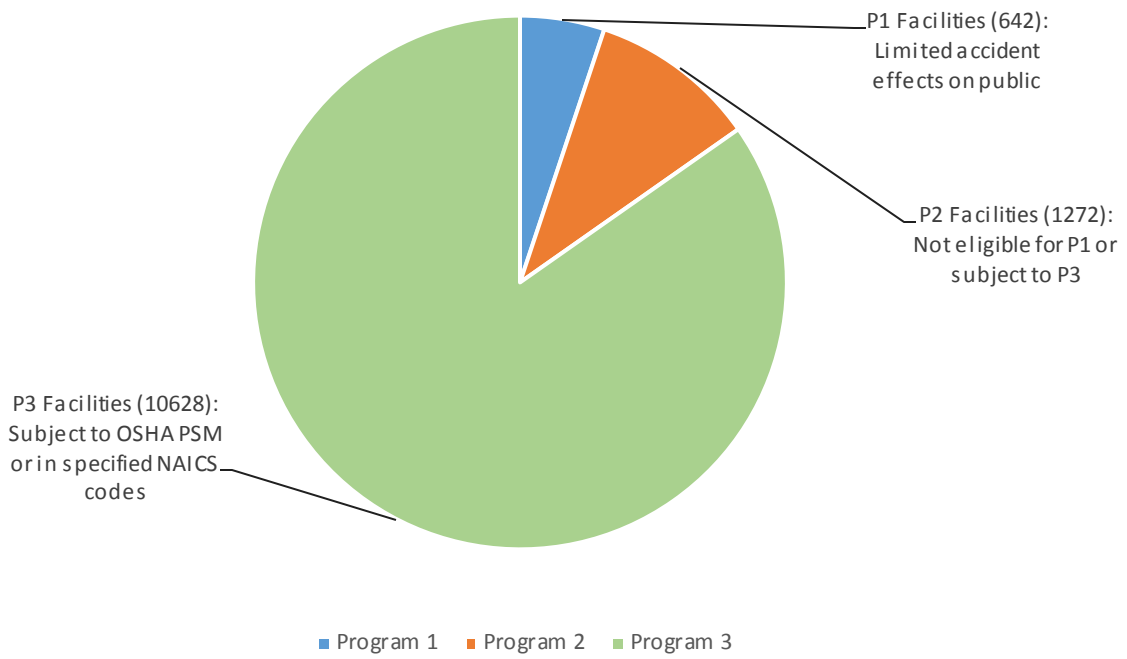
Sector	Processes Program 3	0-19 Full Time Equivalents (FTEs)	20-99 FTEs	100+ FTEs
NAICS 324 (Petroleum and Coal products Manufacturing)	1,453	7	39	1,407
NAICS 325 (Chemical Manufacturing)				
NAICS 3251 (Basic chemicals)	1,664	144	644	876
NAICS 3252 (Synthetics/Resins)	400	14	151	235
NAICS 32XX (Other Chemicals)	694			
NAICS 322 (Paper Manufacturing)	97			

3.2 Divisions Used in Analysis

The RMP rule imposes different requirements on facilities based on Program levels. P3 processes are those that are not eligible for P1 and are subject to the OSHA PSM standard or are in certain NAICS codes (refineries, a limited number of chemical manufacturers, and pulp mills). Of the 2,442 processes in the selected NAICS codes, all but 10 are listed as subject to OSHA PSM; two of the non-PSM processes appear to have been misclassified (a wastewater treatment facility and farm co-operative) and three or four others may be subject to PSM (the substance listed is covered by OSHA at certain concentrations).[25]

[25] Some facilities listed only 5-digit NAICS codes, so 10 other processes may be subject only to the RMP rule.

Exhibit 3-5: Number of Facilities by Program Level



In July 2015, OSHA issued a new interpretation of its retail exemption, a policy that exempted certain employers under OSHA's 1992 definition of "retail facility." Prior to this change, most facilities that classified themselves as agricultural chemical distributors and many other wholesalers listed themselves as P2, because they were exempt from the OSHA PSM standard. The effect of the change in interpretation will make all of these facilities subject to OSHA's PSM standard and, therefore, subject to Program 3 of the RMP rule. To take that into account for this RIA, EPA has reclassified all P2 facilities that listed themselves in NAICS 11, 12, 15, 424 (wholesalers), and 493 (warehouses) as P3. As a consequence almost 85 percent of all RMP facilities (10,628) are now subject to P3 (See Exhibit 3-6).

Most P2 facilities (935 out of 945) are publicly owned water/wastewater treatment facilities in States where OSHA (rather than the State) enforces OSHA rules[26]. As a result of this difference, approximately half of the water/wastewater treatment facilities have processes that are subject to P3 and half that are in P2 although there is no difference in the processes covered. The remaining P2 facilities are utilities that use aqueous ammonia and other facilities that use chemicals not subject to OSHA PSM.[27] Exhibit 3-6 presents the number of facilities by sector and Program Level; publicly owned water/wastewater

[26] For the reason why, please see Section 1.1 *History* above.

[27] There are some facilities that listed themselves as P2 that have either selected the wrong Program level on the RMP submission or have incorrectly indicated that they are not subject to PSM, as they handle OSHA PSM chemicals in quantities far above the OSHA threshold. Because there are errors in the other direction among the public systems (i.e., facilities in States not subject to PSM that listed themselves as P3,), the analysis did not attempt to correct the errors.

treatment systems in the Exhibit are listed under governments (NAICS 92), while privately owned and operated systems are listed under NAICS 2213.

Exhibit 3-6: Number of Facilities by Sector and Program Level

Sector	P1	P2	P3	Totals
NAICS 311, 312 Food and Beverage Manufacturer	3	11	1,462	1,476
NAICS 322 Pulp and Paper	1	1	68	70
NAICS 324 Petroleum	13	3	140	156
NAICS 325 Chemical	53	76	1,336	1,466
Other Manufacturing	62	73	249	384
NAICS 4246 Chemical Distributors	6	0	327	333
NAICS 4247 Petroleum Distributors	14	0	262	276
NAICS 11, 12, 15, 42491 Agricultural	10	0	3,657	3,667
NAICS 211 Oil and Gas Exploration	310	41	390	741
NAICS 2213 Water/Wastewater*	1	10	91	102
NAICS 221, 222 Utilities	38	72	233	343
NAICS 493 Warehousing	70	0	986	1,056
NAICS 423, 424 Other Wholesale	5	0	297	302
NAICS 92 Governments	15	935	973	1,923
Other	41	50	157	247
Total	**642**	**1,272**	**10,628**	**12,542**

* Except government-owned, which appear as NAICS 92 Government.

3.2.1 Facilities Affected by the STAA Requirement

For the medium cost alternative considered for the STAA (all P3 processes), processes outside of the three NAICS sectors discussed above were classified based on the level of effort needed to conduct the analysis. Moderate level of effort processes were those in other manufacturing sectors and refrigeration systems. Refrigeration systems were considered as moderate because they are usually large facilities that cool, chill, refrigerate, or freeze various food or beverage products. Refrigeration systems occur in multiple NAICS codes; the food and beverage manufacturers and refrigerated warehouses (NAICS 49312) were the main sectors, but they also occur in agriculture, wholesale, terminals, and retail. Exhibit 3-7 presents the number of processes in each of these categories. Water treatment systems, utilities, and gas plants were estimated to require a relatively low level of effort. Facilities that simply store chemicals for sale were estimated to require a very low level of effort to do an STAA because they generally have just tanks and loading/unloading equipment.

Exhibit 3-7: Number of Other P3 Processes for STAA Alternatives by Type

Process Type/Level of Effort	Number of P3 Processes
Manufacturing/Refrigeration Systems/moderate	3,460
Water/Gas/Utilities/low	1,899
Storage/very low	4,881

3.2.2 Universe Breakdown for Emergency Response Coordination and Exercise Requirements.

The proposed requirements associated with emergency response depend on whether a facility responds to releases with its own personnel (or contractors) or relies on local public emergency responders. As explained above, the responding facilities were identified by examining information provided related to the emergency response plan in the RMP database. Exhibit 3-8 presents the numbers of responding and non-responding facilities by complexity of the facility (refineries/chemical manufacturers as complex, all other facilities as simple) and by the number of full-time equivalent (FTE) employees on site, which affects the number of people involved in exercises. The large manufacturers were further divided because, unlike most of the facilities in the retail and wholesale sectors, they operate 24/7 and therefore have fewer workers at the facility at any one time than the FTE count listed in the RMP. For the analysis, large manufacturers were considered those with more than 300 FTE or potentially 100 FTE or more per shift (in general swing and night shifts have fewer employees onsite than the day shift if only because administrative personnel are not usually present). Hence, the analysis assigns costs to the 773 manufacturers with 100 to 300 FTE the same as if they were in the 20-99 FTE category for the response provisions.

Exhibit 3-8: Responding and Non-responding Facilities by FTE and Complexity*

	0-19 FTE	20-99 FTE	100+ FTE	Total
Responding Facilities				
Simple	1,640	880	1,466	3,986
Complex (NAICS 324, 325)	141	459	534	1,134
Total	**1,781**	**1,339**	**2,000**	**5,120**
Non Responding				
Simple	4,728	899	731	6,358
Complex (NAICS 324, 325)	141	235	46	422
Total	**4,869**	**1,134**	**777**	**6,780**
Non-Responding (not in County with Hazmat Team)				
Simple	3,242	358	280	3,880
Complex	77	141	14	232
Total	**3,319**	**499**	**294**	**4,112**

* Note: Exhibit does not include RMP facilities with only P1 processes

A different way to classify facilities as small or large is based on the Small Business Administration's standards for firms. The classification of RMP facilities on that basis is presented in Chapter 7.

3.2.3 Universe Breakdown for Provisions that Apply After an RMP Reportable Accident

Finally, the proposed third-party audit and root cause analysis provisions would apply only to facilities that have an RMP reportable accident (the root cause analysis provision would also apply to facilities that have a "near miss"). The existing rule requires reporting for accidental releases from covered processes with impacts that resulted in deaths, injuries, or significant property damage onsite, or known offsite deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage. In practice, however, some facilities have reported accidental releases with no reported impacts. For the purposes of this analysis, EPA used only the number of RMP reportable accidents, which are those accidents with reported impacts. EPA analyzed the number of accidents reported during the prior 10-year period. The reason is that prior to 2004, some facilities were still completing initial implementation of the rule; 2013 is the most recent year for which there are complete data[28]. Exhibit 3-9 presents the number of RMP reportable accidents per year for 2004 through 2013. Exhibit 3-10 presents the number of RMP reportable accidents by industry sector for the same total 10-year timeframe.

Exhibit 3-9: RMP Reportable (Impact) Accident by Year

Year	Impact Accidents
2004	197
2005	152
2006	140
2007	204
2008	168
2009	149
2010	128
2011	138
2012	118
2013	123
Total	**1,517**
Range	118 - 204
Average/Year	**152**

[28] A more detailed explanation is provided in Chapter 6.

Exhibit 3-10: RMP Reportable Accidents by Sector

Sector	Total 10-Year	Accident Frequency per Facility (over 10 years)
Refineries (NAICS 324)	169	1.08
Pulp and Paper (NAICS 322)	46	0.66
Chemical Manufacturers (NAICS 325)	530	0.36
Food/Beverage Manufacturers (NAICS 311, 312)	270	0.18
Other Manufacturers (All other NAICS 31-33)	53	0.14
Oil/Gas exploration (NAICS 211)	53	0.07
Warehouses (NAICS 493)	72	0.07
Other wholesalers (All other NAICS 423, 424)	20	0.07
Chemical/petroleum wholesalers (NAICS 4246, 4247)	38	0.06
Water/POTW (NAICS 22131, 22132, 92)	75	0.04
Agricultural Facilities (NAICS 11, 42491)	156	0.04
All Other	35	0.06

3.3 Government Entities Affected by the Rule

The rule affects governmental entities both directly and indirectly. Most of the facilities are water or wastewater treatment facilities, but there are some large swimming pools covered as well. Most of the governmental entities are cities, but the universe includes larger special districts (e.g., the Metropolitan Water District of Southern California) as well as some federal facilities. Of the governmental entities directly affected, 910 have one RMP facility, 268 have two regulated facilities, 60 have 3 facilities, 27 have 4 facilities, and 27 have 5 or more. Not all facilities belonging to a governmental entity are located in the entity. There are fewer than 1,200 "parent" companies listed for publicly owned systems. Because facilities do not always list the owner or list variations of the owner's name, it is not possible to develop an accurate estimate of the number of public entities affected by the rule. It is clear, however, that some of the larger cities and counties have a substantial number of facilities. For example, Los Angeles County owns and operates at least 33 facilities, which do not include the facilities owned by cities within the county.

Additionally, local or county governments will receive new information filed by RMP-regulated facilities as a result of the proposed rule and may voluntarily participate in exercises held by facilities. Although this proposed rule doesn't specify requirements for these government entities to review the information submitted or to take part in exercises, EPA expects that many of them will do so and therefore this analysis considers those indirect costs to local governments. The burden on any single local government will increase as the number of affected entities in its jurisdiction increases. Our cost estimates will reflect this added burden. There are 6,956 cities that have one or more RMP facilities. Although most

have only one RMP facility, a number have 20 or more, and there are counties with close to 200 RMP facilities (e.g., Harris County, TX). Thus, those counties with many RMP facilities may have greater indirect costs due to the additional volume of submitted information and requests for participation in exercises.

3.4 Limitations

The analysis assumes that every facility subject to the RMP rule has registered with EPA and filed an RMP. EPA recognizes that this may not be true. EPA and delegated implementing agencies search for and occasionally identify regulated facilities that have failed to submit RMPs. Historically, relatively few of these "non-filers" have been found, but we have little basis for determining the full extent of such non-compliance.

The RMP database may include facilities that are no longer operational. For this analysis, we removed one refinery (and nine processes) from the data because the facility appears to have closed in 2001 without following the requirements to deregister. EPA recognizes there may be other facilities in the RMP database that are no longer operating.

The RMP facility population is dynamic. The number of RMP facilities and processes is expected to change over the period of analysis because of firms that will grow, shrink, close, or open in the near or distant future. Despite these expected changes, the analysis relies on the number and nature of RMP facilities and processes that exist as of the February 2015 RMP database as a constant estimate of future RMP facilities/processes.

Finally, as discussed in more detail in Chapter 7, there are some problems with the data as filed with EPA. There are a number of facilities that list NAICS codes that are inaccurately applied, which means some facilities have misclassified themselves as P2 instead of P3, and for public facilities as P3 instead of P1 or P2. For example: EPA identified storage and terminal areas that were listed as refineries; agricultural co-operatives and refrigerated warehouses listed in multiple sectors; and large terminals listed as wholesalers, support for transportation, and warehouses. Although EPA has attempted to correct the most obvious problems, and the numbers in any category are EPA's best estimate, they should be viewed as approximations.

CHAPTER 4: COSTS OF PROPOSED REVISIONS

This chapter outlines the assumptions used to estimate the incremental costs of the proposed revisions to the Risk Management Program and the alternative options under consideration. EPA does not estimate the baseline costs incurred to comply with the existing RMP regulations.

The Agency sought to quantify and monetize costs where possible. When we were unable to quantify costs – for example, due to a high level of uncertainty about what actions would be taken as a result of the proposed change – we present a potential range of costs. The time frame of analysis is 10 years. As several of the proposed rule elements are required on a five year period, we included a time span long enough to capture two full periods.

Specific assumptions are outlined for each rule provision below. The analysis employs a model facility approach in which representative facility categories were developed to reflect a variety of features expected to influence costs (e.g., process complexity, number of full-time employees, emergency response planning activities, etc.). Cost assumptions were developed for each model facility type and addressed factors such as number of staff hours involved in implementing a provision, equipment costs, and fixed costs for contractor involvement. Prevailing wage rates were used to estimate per facility costs for rule provisions. With a model facility approach, the unit cost estimates represent averages that cover a wide variation in expected costs even within a single sector. Given the high level of uncertainty associated with the costs of some of the provisions, however, attempting to project costs for a more disaggregated universe would imply a level of knowledge of future costs that does not exist.

4.1. Wage Rates

The Agency used the Bureau of Labor Statistics May 2014 Occupational Employment and Wage Estimates[29] to construct a weighted wage rate for different occupation categories. For all rule provisions, labor hours were assumed to be distributed across six general labor categories: Management, Corporate Management, Attorneys, Engineers, Production Staff, and Local Responders. The weighted wage rates for complex facilities (NAICS codes 324 and 325) were estimated separately from simple facilities because wages paid by these facilities are higher than in wholesale and government sectors, which dominate the simple facilities category. For each of the NAICS codes representing industries in the simple facilities category that are affected by the proposed rule provisions (Food and Beverage, Agricultural Facilities, etc.), standardized BLS Occupation Titles were identified to correspond to the six general labor categories. The wage rates for each BLS Occupation Title were multiplied by a fringe benefits factor of 1.5 to create a loaded wage rate.[30]

[29] See http://www.bls.gov/oes/current/oes_nat.htm.

[30] The benefits multiplier is based on an average for the sectors as estimated by BLS in its Employer Costs for Employee Compensation. BLS includes items such as sick leave and vacation as benefits. See http://www.bls.gov/news.release/ecec.nr0.htm.

After loaded wage rates were established for each industry, they were combined to form a weighted average based on how prominent each industry was within its universe of facilities, either simple or complex. Exhibit 4-1 presents the wage rates.

Exhibit 4-1: Weighted-Average Loaded Hourly Wage Rates (2014 Dollars)

Labor Category	Simple Facilities	Complex Facilities
Management	$74.99	$99.64
Corporate Management	$82.47	$100.71
Attorneys	$101.81	$113.33
Engineers	$55.22	$76.21
Production Staff	$28.51	$41.56
Local Responders	$53.43	$53.43

4.2 Rule Familiarization

RMP facility staff would require some time to review the final rule and determine which provisions apply to the facility. The time required for this review would be limited because most of the proposed provisions amend current requirements as opposed to introducing completely new provisions. Many of the provisions are straightforward such as those regarding public disclosure. Others apply only after an RMP reportable accident or near miss such as root cause analysis; relatively few facilities have reportable releases or near misses. Still others such as the safer technology alternatives analysis are expected to take time to understand; however, apply to a limited number of facilities in sectors that are familiar with the issues associated with the rule provision. In addition to affected facilities, the analysis also assumed that all affected LEPC's would need to review the rule to familiarize themselves with rules that affect facilities in their jurisdiction. EPA projects that all facilities with simple processes would need 2 hours to review the rule as would the few complex facilities in P1 and P2. Complex facilities in P3 are projected to spend 4 hours reviewing the rule. LEPC's are projected to spend 1 hour reviewing the rule. Delegated state and local implementing agencies are projected to spend 4 hours reviewing the rule. The unit costs are as follows:

- Simple facilities = 2 hour of management time or $149.97
- P1 and P2 complex facilities = 2 hour of management time or $199.28.
- P3 complex facilities = 4 hours of management time or $398.56.
- LEPCs = 1 hour of time or $53.43
- Delegated implementing agencies = 4 hours of management time or $299.94

4.3 Prevention Program Rule Provisions

Third-party Compliance Audits

The existing rule requires P2 and P3 facilities to conduct a compliance audit at least once every 3 years. The proposed provision requires facilities that have had RMP reportable accidents to contract with an

independent third-party to conduct the audit. The analysis estimated the cost of hiring a third-party to conduct the audit based on the public comments that EPA received through the July 31, 2014, Request for Information. Of the 14 comments providing input on the potential economic impacts of third-party audits, several comments specifically provided point estimates for the third-party auditor fee.[31] These estimates ranged between $10,000 and $20,000 for simpler facilities and up to $40,000 for complex facilities, and represented estimates for all auditor fees, including travel expenses. Thus, this RIA assumed $15,000 for simple facilities and $40,000 for complex facilities. These expenses are considered incremental to the costs for compliance audits that are covered in the original rule, as similar levels of facility staffing would be required to work with the third-party auditor (i.e., EPA does not expect the cost of the third-party auditor to be offset by cost savings from reduced staff levels of effort related to auditing). In addition, the analysis projects that management time would be devoted to identifying auditors, selecting an auditor, and contracting with that entity for third-party audit services.

The analysis estimates that the time required to contract for a third-party audit would vary with the complexity of the processes to be covered and multiple facility staff would be involved, except for the smallest category of facilities. At a minimum, one manager and one engineer would be involved to identify potential auditors and write the statement of work on which the auditor would base its bid. For larger firms that routinely contract and have contract departments, a contracts specialist and attorney would be part of the process. Many large firms and all governments would have standard contract language. Governments are estimated to spend more time on the contracting process, however, because most are required to solicit competitive bids and document the basis for the selection. Private firms may use a similar process but are not required to do so. Private firms are likely to spend time negotiating contract language after the award. In total, hourly assumptions and costs for a third-party audit are shown in Exhibit 4-2.

[31] See comments 0638 and 0667 – These two comments from industry specifically provided point estimates on the costs of third-party audits. One comment, received from J.R. Simplot Company, placed the cost of the audit between $36,000 and $40,000 for larger facilities, and approximately $20,000 for smaller, less complex facilities. The other comment, received from the American Coatings Association, indicated that third-party audits "could cost some of its member companies approximately $10,000 per facility."

Exhibit 4-2: Hourly Assumptions and Unit Costs for Hiring Third-party Auditors

Facility Type	Total Hours for Contracting Process			Facility Labor Cost	Auditor Fee	Total Facility Cost
	Management	Attorneys	Engineers			
Simple w/ 0-19 FTEs	32	4	0	$2,807	$15,000	$17,807
Simple w/ 20-99 FTEs	44	4	18	$4,701	$15,000	$19,701
Simple w/ 100+ FTEs	30	4	56	$5,749	$15,000	$20,749
Complex w/ 0-19 FTEs	32	4	0	$3,642	$40,000	$43,642
Complex w/ 20-99 FTEs	44	4	18	$6,209	$40,000	$46,209
Complex w/ 100+ FTEs	30	4	56	$7,710	$40,000	$47,710
Small Government	30	0	25	$3,630	$15,000	$18,630
Large Government	60	0	39	$8,951	$40,000	$48,951

Incident Investigation (Root Cause Analysis and Near Miss Investigation)

This proposed provision requires that facilities in specific program levels that have had an RMP reportable accident or near miss incident conduct a root cause analysis, as part of their accident investigation, to determine the underlying reasons for the (near) failure. A root cause analysis is a structured process led by a person trained in the methodology. The time required may vary considerably based on the complexity of the processes involved. This analysis assumes that complex facilities would require 48 total hours (entirely engineering time) for a root cause analysis and simple facilities would spend 8 total hours (split evenly between engineering and production time). For near miss incidents, the analysis assumes that complex facilities would require 72 hours (12 hours of management, 36 hours of engineering, and 24 hours of production) for a complete near miss incident investigation and 14 hours (6 hours of management, 4 hours of engineering, and 4 hours production) for simple facilities.[32] Root cause analyses for near miss incidents generally require more labor time across all categories because there are already investigation activities occurring with baseline accidents.

There are fewer additional hours required for RMP reportable accident root cause analyses because those accidents must already be investigated in the baseline and thus the effect of the proposed rule is only the net increase in labor for the root cause analysis. The increased labor affects only the engineering category for complex facilities, and only the engineering and production labor categories for simple facilities. Root cause analyses for RMP reportable accidents are not expected to require additional management time beyond that already required for RMP reportable accidents. Management time is expected to be devoted primarily to decisions concerning resolution of corrective actions arising from the investigation, and these activities should require roughly the same amount of time whether corrective actions relate to root causes or other contributing causes. For simple facilities, additional

[32] Assumptions based on EPA's knowledge of industry practice.

labor for root cause analyses was assumed to be evenly distributed between production staff and engineers. For complex facilities, all additional labor for root cause analysis was placed in the engineer labor category as a conservative estimation approach, as this category has a higher labor rate than production.

For near miss incidents that could reasonably have resulted in a catastrophic release, the existing rule already requires an incident investigation. However, EPA believes that in the baseline many facility owners and operators did not understand or comply with the existing near miss incident investigation requirements, so this analysis assumes some additional time will be required across all labor categories for near miss investigations.

The estimate of the time required for an incident investigation is based on estimates in the original RMP RIA, which relied on best professional judgement and comments on the original rule proposal received from industry[33]. The estimates in the original RMP RIA involved development of a labor model that assumed investigations would involve a team of management, technical, and production staff, and that staff at larger and more complex facilities would require more hours to complete an investigation. This analysis used reduced labor assumptions for near misses because investigations of incidents that do not damage equipment or harm workers would be less difficult to conduct than those that have to recreate conditions that existed prior to the release. Simple facility costs are estimated to include $1,000 for a trained facilitator to assist with the investigation. Complex facilities generally have staff familiar with the methodology and would staff the root cause analysis in-house. Exhibit 4-3 displays the hours assumed for each labor category for each type of facility, and the estimated cost per facility.

Exhibit 4-3: Unit Cost for Root Cause Analysis and Near Miss Investigation

	Managers	Engineers	Production	Other Costs	Facility Cost
Near Miss - simple	6	4	4	$1,000	$1,785
Near Miss - complex	12	36	24		$4,937
Accidents - simple	0	4	4	$1,000	$1,335
Accidents - complex	0	48	0		$3,658

Safer Technology and Alternatives Analysis (STAA)

This proposed provision requires facilities with P3 processes in NAICS codes 322, 324, and 325 to conduct an STAA as part of their process hazard analysis (PHA), which occurs every 5 years. STAA is generally a process in which facility staff analyze their current processes and practices to determine if there are safer alternatives to their current operating practice. This can range from small changes – such as upgrading valves – to large shifts like substituting less toxic or volatile chemicals.

This RIA divides the STAA process into three parts:

[33] Economic Analysis in Support of the Final Rule on RMP Regulations for the Chemical Accident Release Prevention, as Required by Section 112(r) of the CAA, May 21, 1996.

1. The initial analysis to identify alternatives;
2. A feasibility study to determine the costs and assess the reasonableness of implementing the change in light of other costs and programs; and
3. Implementation of alternatives (implementation is not required under the proposed provision).

Hourly labor assumptions for the initial analysis and the feasibility study are based on guidelines published by the American Institute of Chemical Engineers / Center for Chemical Process Safety (AIChE/CCPS) and consultation with engineers who have extensive experience in performing hazard analyses.[34] AIChE/CCPS has published several guidelines addressing the subjects of hazard analysis and safer technologies. Among these are:

- *Inherently Safer Chemical Processes – A Life Cycle Approach, Second Edition* (AIChE/CCPS,2009);
- *Guidelines for Hazard Evaluation Procedures, Second Edition* (AIChE/CCPS, 1992); and,
- *Guidelines for Hazard Evaluation Procedures, Third Edition* (AIChE/CCPS, 2008).

In *Guidelines for Hazard Evaluation Procedures, Third Edition*, CCPS notes that "Inherent safety reviews can be conducted as separate studies using a form of HAZOP Study, or they can be incorporated into HAZOP studies conducted for other purposes."[35] *Inherently Safer Chemical Processes – A Life Cycle Approach* expands on this concept, and also provides information on additional approaches to incorporating safer technologies into process hazard analyses, including checklist, "What-If", Failure Mode and Effects Analysis, and other analytical methods. Based on this information, EPA developed a labor model for safer technologies reviews adapted from the HAZOP study and What-If/Checklist approaches, which are PHA methods commonly used by facilities subject to this proposed provision. *Guidelines for Hazard Evaluation Procedures, Second Edition* contains information on the typical days of effort required to complete HAZOP and What-If/Checklist PHAs for small/simple and large/complex facilities.[36] EPA adapted this information, and incorporated additional labor hours to account for the proposed rule's requirement to determine the feasibility of inherently safer designs considered.

The estimated labor hours assumed facilitator and scribe labor costs, as well as facility team and management participation that increased with process complexity. Facilities in NAICS 322, 324, and 325 are expected to have staff qualified to conduct the analysis in-house. All other facilities would be expected to hire a consultant to lead the team. Most of these other facilities use chemicals or store them, but often rely on engineering firms or maintenance contractors to design the equipment and do anything other than routine minor maintenance. They may not, therefore, have staff knowledgeable enough in the process and design to identify and evaluate alternatives. The technical feasibility assessment considers the extent of process redesign, its engineering implications, and possible costs. As stated, most facilities except the large facilities in NAICS 322, 324 and 325 are expected to seek help

[34] EPA consulted with engineers at ABS Consulting.
[35] "HAZOP" is an acronym for "Hazard and Operability Study," which is one PHA methodology allowed under the RMP rule.
[36] See *Guidelines for Hazard Evaluation Procedures, Second Edition* (AIChE/CCPS, 1992), Table 5.4.

from consultants (i.e., engineering firms). Storage and distribution facilities, which generally are very simple (mostly large tanks with loading/unloading equipment) are not expected to need a consultant to assess feasibility because chemical substitution is not as great a possibility (these facilities usually sell the chemical in question) and because the technical issues are limited. For example, most bulk anhydrous ammonia distributors are not likely to substitute another chemical for anhydrous ammonia. Exhibit 4-4 displays the hours assumed for each task by labor category and type of facility, and the resulting per facility cost estimates.

Implementation of safer alternatives is not required under the proposed option. The high cost alternative would apply the requirement to all P3 processes and require facilities to implement feasible safer technologies and alternatives. However, EPA has not projected implementation costs for this option because of the high degree of uncertainty associated with such projections (see Chapter 5 for further explanation).

Exhibit 4-4: Hourly Assumptions and Unit Costs for STAA

Sector	Labor Hours			Facility Cost
	Corporate Manager	Engineer	Consultant	
Initial Analysis				
Large facilities NAICS 324-325		608		$40,240
NAICS 322, Small/Medium 324, 325		252		$13,109
Other Manufacturers, Refrigeration Systems		100	$9,808	$17,429
Water/Gas Plants/Utilities		36	$6,000	$8,744
Storage Facilities		36	$6,000	$8,744
Feasibility Analysis				
Large facilities NAICS 324-325	24	80		$8,514
NAICS 322, Small/Medium 324, 325	16	80	$8,000	$15,708
Other Manufacturers	16	32	$8,000	$12,050
Water/Gas Plants/Utilities and Refrigeration Systems	8	32	$5,200	$8,444
Storage Facilities	8	32		$3,244

4.4. Emergency Response Preparedness Rule Provisions

4.4.1 Emergency Response Program Coordination with Local Responders

This provision would require all facilities with P2 or P3 processes to coordinate with local responders annually to make them aware of the hazards at the facility. If the facility is a non-responder and relies on the local response force then the coordination would primarily focus on any changes that have occurred at the facility and confirm existing response strategies or develop new ones.

If the facility is a responder and in charge of responding to its own chemical emergencies then the coordination would primarily focus on informing local entities on what response capabilities are in place and how the community may be impacted. The analysis assumes that the coordination effort would average 4 hours of facility management time and 4 hours of time from LEPCs to participate in coordination activities. EPA based this estimate on input from an EPA regional official who regularly participated in emergency coordination meetings with local responders and regulated facilities.[37] The time required for any particular facility may vary depending on a variety of factors including the familiarity of the local responders with the facility and its hazards. For many facilities, this coordination may already occur voluntarily in the baseline and would therefore not be an added cost; for others, it could take considerable time to arrange a personal meeting. In other words, EPA recognizes that there will be variability across facilities in this cost but adopts two cost estimates that vary only depending on whether the facility is simple or complex. In addition to the coordination effort, the proposed rule also requires documentation of that effort. The analysis uses an average of 4 hours of management time and applies it across all applicable facilities, as opposed to estimating current compliance with this provision. The estimates of labor hours and unit cost estimates are shown in Exhibit 4-5.

Exhibit 4-5: Hourly Labor and Unit Costs for Coordination with Local Responders

Facility Type	Management	LEPCs	Facility Labor Cost
Complex Facilities	4	4	$514
Simple Facilities	4	4	$612

This proposed provision may lead to some current facilities who are non-responders to convert from non-responder to responder status. To estimate a range of possible impacts of non-responder conversions, the analysis conducts a sensitivity analysis of how many conversions may happen among the population of facilities in counties without existing hazardous materials (hazmat) teams among local emergency responders. The sensitivity analysis provides cost estimates for the conversion of 25 percent, 50 percent, and 75 percent of current facilities who are non-responders and located in counties without a hazmat team.

4.4.2 Notification Drills

The proposed rule requires all facilities with P2 or P3 processes to conduct a notification drill, during which a facility member checks each person and agency on its emergency action contact list, to ensure that the contact information is accurate (e.g., that the person listed is still in that position and the phone numbers and email addresses are correct). As the contact list is somewhat limited (the number of organizations to be contacted must be small enough that the primary ones could be contacted quickly),

[37] September 01, 2015 email communication from Steve Mason, EPA Region 6 to Jim Belke, EPA Office of Emergency Management.

the analysis estimated that it would take no more than 2 hours of engineering staff time to verify the information. The unit costs are shown in Exhibit 4-6.

Exhibit 4-6: Hourly Labor and Unit Costs for Notification Drills

Facility Type	Engineers	Facility Labor Cost
Complex Facilities	2	$152
Simple Facilities	2	$110

4.4.3 Facility Exercises

Responding facilities are facilities that intend to develop and implement the emergency response program required under §68.95 in order to respond to releases at their site. The proposed rule requires such facilities to conduct an annual exercise of their emergency response program developed in accordance with §68.95 and in accordance with the community emergency response plan developed under 42 U.S.C. § 11003.[38] At least once every 5 years, a full field exercise would be required; in other years, facilities may conduct a tabletop exercise where the participants work together to identify a scenario and then establish objectives for the response without actually mobilizing responders and employees. The objectives for both field and tabletop exercises would include:

1. Identifying who would be contacted in an emergency,
2. Procedures and measures for emergency response after an accidental release of a regulated substance (e.g., what equipment would be deployed, who would be evacuated, how decisions on public notification would be made, who would contact the public, etc.), and
3. Proper first-aid and emergency medical treatment necessary to treat accidental human exposures.

In a field exercise, all of the steps of a response are carried out (e.g., responders and equipment would be deployed). The purpose of a field exercise is to evaluate the ability of the responders and other employees to implement the emergency response plan on which they have been trained.

The cost of both types of exercises vary with the size and complexity of a facility. Every phase of the process – planning, exercise, and post-action evaluation – would require more time for larger and more complex facilities. Smaller facilities have a limited number of possible scenarios (from leaks to slow releases to total failure of a storage vessel). Larger facilities, and particularly those with complex chemical processes, have more possible failure modes and a greater possibility of the first release triggering additional releases or creating other risks. EPA developed estimates of the time associated with both types of exercises and the number of people who would be involved by seeking input from EPA regional staff who have routinely participated in both types of exercises and by reviewing exercise

[38] Section 303 of Emergency Planning and Community Right-to-Know Act (42 U.S.C. §11003). http://www.gpo.gov/fdsys/pkg/USCODE-2011-title42/html/USCODE-2011-title42-chap116.htm

reports provided by EPA regional offices. Labor hours and unit costs for tabletop and field exercises are presented in Exhibits 4-7 and 4-8, respectively.

Exhibit 4-7: Hourly Labor and Unit Costs for Table-Top Exercises

Facility Type	Management	Engineers	Production	Emergency Responders	Facility Cost
Simple w/ 0-19 FTEs	24	34	11	26	$5,380
Simple w/ 20-99 FTEs	29	34	28	31	$6,507
Simple w/ 100+ FTEs	61	61	60	48	$12,218
Complex w/ 0-19 FTEs	24	34	11	26	$6,829
Complex w/ 20-99 FTEs	29	34	28	31	$8,301
Complex w/ 100+ FTEs	84	92	98	78	$23,621

Exhibit 4-8: Hourly Labor for Field Exercises

Facility Type	Management	Engineers	Production	Emergency Responders	Facility Cost
Simple w/ 0-19 FTEs	30	38	23	60	$8,209
Simple w/ 20-99 FTEs	48	64	72	87	$13,835
Simple w/ 100+ FTEs	78	68	232	129	$23,111
Complex w/ 0-19 FTEs	30	38	23	60	$10,047
Complex w/ 20-99 FTEs	48	64	72	87	$17,301
Complex w/ 100+ FTEs	136	136	760	192	$65,758

4.5. Information Availability Rule Provisions

Public Information Availability

This provision assumes two primary types of activities related to public disclosure: (1) disclosure to the community, and (2) disclosure to local emergency planning committees and other emergency responders.

For disclosure to the community, facilities would be required to make certain information available to the public either on the facility's website, through file sharing, or through some other means (e.g., providing information at a public library, or other public offices, or providing it via e-mail). The proposed information elements should be readily available to facility managers because most of the information is already compiled for compliance with various health and safety regulations. The Safety Data Sheets are documents that OSHA requires every facility to have available for its employees, and which contain chemical hazard information required under 29 CFR 1910.1200. The names of chemicals and 5-year accident history are already collected for reporting in the RMP. Especially for simple facilities, this information is unlikely to change much from year to year; the only cost associated with this element is the time required to collect and review the information for accuracy. The analysis estimates that simple

facilities would spend 2 hours per year reviewing the information to ensure that it is up-to-date. Complex facilities may have more information to review because they may manufacture, process, and use multiple regulated substances in multiple processes. The analysis estimated that small complex facilities would spend 4 hours collecting and reviewing the information. Large complex facilities were estimated to spend 16 hours per year because management and possibly counsel would need to ensure that the information was not subject to any restrictions related to security or confidential business concerns.

LEPC Information Availability

For disclosure to local emergency responders, the provision would require facilities to draft and provide summaries of certain activities upon request – compliance audits, any incident investigations, any implementation of IST, and exercise reports. Facilities would also have to provide the 5-year accident history, but this element is reported in the RMP and should require little effort beyond updating. EPA estimates that the summaries would require corporate management and legal review to maintain organizational consistency (for corporations with multiple facilities) and removal of any legally sensitive materials, such as Chemical-terrorism Vulnerability Information (CVI) or Confidential Business Information (CBI). Complex facilities, which have more covered processes that are subject to provisions, are projected to spend more time developing and reviewing information prior to submission to local agencies. The analysis further estimates that LEPCs will require time to review materials as they are submitted. The amount of time required scales with the complexity of the facility. The labor hour assumptions for each type of disclosure to the community and to local emergency responders are shown in Exhibit 4-9.

Exhibit 4-9: Hourly Labor and Facility Costs

For Information Disclosure to the Community and to Local Emergency Responders

Provision/Facility Type	Management	Corporate Management	Attorneys	Engineers	LEPCs	Facility or Responder Costs
Public Disclosure – Small Complex	2	0	0	2	0	$352
Public Disclosure – Large Complex	8	0	0	8	0	$1,407
Public Disclosure – Simple	1	0	0	1	0	$130
Accident History – Simple	0.5	0.5	0.5	1	0	$185
Accident History – Complex	1	1	1	1	0	$390
Audit Report – Simple	2	2	2	4	0	$739
Audit Report – Complex	4	4	4	8	0	$1,864
Investigation Reports - Simple	4	4	2	4	0	$1,054
Investigation Reports – Complex	8	4	8	12	0	$3,021
IST – Simple	4	4	4	4	0	$1,258
IST – Complex	8	4	8	16	0	$3,326
Exercise Reports – Simple	2	1	1	4	0	$555
Exercise Reports – Complex	2	2	2	8	0	$1,237
LEPC Review – Simple	0	0	0	0	1	$53
LEPC Review – Small Complex	0	0	0	0	2	$107
LEPC Review – Large Complex	0	0	0	0	4	$214

4.5.1 Public Meeting

This provision would require RMP facilities to hold a public meeting immediately following (i.e., within 30 days of) an accident. The analysis estimates that each facility would need to spend time planning for the meeting – deciding when and where to hold the meeting, arranging the meeting space, developing and posting notices of the meeting, and developing materials to be presented and distributed. In addition, at least two people from the facility would attend the meeting, which was estimated to take 4 hours of the attendees' time; even if the meeting is only 2 hours, attendees would have to arrive early and would stay after the official ending to talk with people, collect extra materials, and close up the meeting space.

For simple and small complex facilities, the analysis estimated that total time for preparation would be 12 hours and attendance would be 8 hours (2 managers for 4 hours each). For large complex facilities, where the information presented may be more complicated and subject to legal concerns (security and confidentiality), the analysis estimated that the facility staff would spend 24 hours preparing and reviewing presentations and handouts; 4 facility staff (2 managers and 2 engineers) would attend the meeting. The costs for space are expected to vary from nothing, when the meeting can be held in a public building, to between $500 and $1,000 when a meeting space must be rented or where the facility has to pay overtime to a custodian (e.g., at a public school). The materials distributed would also impose some costs, but most facilities may produce them in-house. It has been EPA's experience after the passage of CSISSFRRA[39] that most facilities conducted meetings less than 1 day in length and used public facilities. To arrive at a point estimate for the cost of a meeting room, the analysis took a sample of meeting room costs from a variety of locations and used the average of $550.[40] The analysis further estimated that every facility would need to rent a meeting space, which likely overestimates the cost of this provision. Exhibit 4-10 displays the assumed hours by labor category and facility type, and the resulting estimated facility costs.

[39] Chemical Safety Information, Site Security and Fuels Regulatory Relief Act

[40] Meeting room price was determined using the average price of 17 meeting venues that could accommodate at least 20 individuals. The analysis used meeting rooms from Chicago, Houston, Phoenix, Kansas City, Philadelphia, and Atlanta. Data were provided by evenues.com.

Exhibit 4-10: Hourly Labor and Unit Costs for Public Meetings

Facility Type	Management	Engineers	Production	Other Costs	Facility Cost
Simple Facilities	8	8	4	$550	$1,706
Small Complex Facilities	8	8	4	$550	$2,123
Large Complex Facilities	16	16	8	$550	$3,696

4.6 New Responders

This cost provision is not a specific requirement of the proposed rule but addresses situations in which current non-responders may convert to being responders. It also addresses one of the alternative options (the High Option) under Emergency Response Program Coordination with Local Responders. EPA is aware that some facilities have assumed that the public responders could respond to accidents at the facility when the communities do not, in fact, have nearby responders with appropriate training and equipment for the hazards present at the facility (e.g., a hazardous materials or "hazmat" team). EPA used an existing analysis of hazmat team locations obtained from the Federal Emergency Management Agency (FEMA). Those data were compiled for the 2012 National Preparedness Report to characterize the existing coverage of hazmat teams.[41] The 2012 report found that "the nation has developed a mature set of assets for addressing hazardous materials incidents." There were approximately 1,100 state and local hazmat teams identified, and the FEMA report concluded that 76% of the population is covered by these hazmat response teams.[42]. EPA used those data to estimate the number of RMP facilities that could potentially be required to develop an emergency response program. (See chapter 5 for more detail on this subject).

The cost estimate for facilities that need to become responders assumes seven types of activities:

- Emergency response plan development,
- Training,
- Equipment purchase,
- Tabletop exercises,
- Field exercises,
- Emergency response program coordination with local emergency response officials, and
- Public disclosure of exercise reports.

For each activity category, the analysis categorizes facilities by complexity and size according to FTEs.

[41] https://www.fema.gov/media-library/assets/documents/26675

[42] The approach for estimating the 76% was roughly based on the population in proximity to a hazmat team.

Emergency response plan development, training, and equipment purchase all use hourly assumptions estimated based on the requirements set by the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard (29 CFR 1910.120(q)), which any employer whose employees respond to releases of hazardous materials must meet.[43] Any employer whose employees would respond to the hazmat incidents must develop an emergency response plan and train the workers on responding to the particular hazards they may face. Based on discussions with EPA staff involved in emergency response planning, complex facilities are assumed to require 32 hours of manager time, 40 hours of engineering time (5 engineers spending 8 hours each), and 32 hours of production staff time to develop an emergency response plan. Simple facilities are assumed to require 16 hours of manager time, 16 hours of engineering time (4 engineers spending 4 hours each), and 8 hours of production staff time. The analysis estimates that all new responders will develop a plan in year 1, and then they will expend 10 percent of the initial costs every year thereafter to maintain the plan.

Equipment purchase cost estimates were based on publicly available equipment vendor costs and EPA's own experience of what would reasonably be required to respond to an incident. The list of items and costs estimates is as follows:

[43] The HAZWOPER standard uses the phrase "hazardous substances" but defines it to cover all DOT hazmat; regulated substances are a small subset of DOT hazmat.

Exhibit 4-11: New Responder Equipment Costs[44]

Item	Cost Per Item	Number of Items	Total Cost
Level A Suit	$1,750	6	$10,500
Tyvek Suit (bulk pack)	$200	1	$200
Cryogenic Gloves	$180	10	$1,800
Chemical Resistance Boots	$150	6	$900
Vinyl Boot Covers	$7.00	6	$42
Neoprene Boot Covers	$100	6	$600
Nitrile Rubber Gloves	$12	6	$72
Viton Rubber Gloves	$10	6	$60
PVC/Nitrile Gloves	$56.95	6	$341.70
Self-contained Breathing Apparatus	$5,500	6	$33,000
Spare Bottles SCBA	$800	6	$4,800
Chlorine Kit "A"	$2,300	1	$2,300
Chlorine Kit "B"	$2,500	1	$2,500
Non-sparking Tool Kit	$900	1	$900
Sledgehammer	$55	3	$165
Bolt Cutter	$85	1	$85
Sorbent Pad (100/bundle)	$64	1	$64
Neutralizer (5 gallon bucket)	$436	1	$436
Eye Wash Station	$129	1	$129
Plastic Pools	$10	3	$30
Total			**$58,925**

The analysis used a point estimate for equipment costs of $60,000 for complex facilities and local government, and $50,000 for simple facilities, based on the number of staff who would be expected to use the equipment as fewer accidents occur at simple facilities relative to complex facilities.

In addition to plan development and equipment, the OSHA HAZWOPER Standard requires that any workers who may respond to hazmat releases to obtain training on proper procedures. At a minimum, responders need 24 hours of classroom training; at least two responders in any team need more extensive training, 40 hours of classroom training, and 3 days of operational training. A minimum hazmat team would include 5 responders; at least 4 responders are needed for any release[45], and 1 other would need to be trained to ensure that a facility had a full complement at any time (to cover vacations/sick leave/travel). Complex facilities and governments are estimated to need at least 6

[44] Facility equipment costs are based on an estimate developed by EPA Region 6 emergency responders. Costs assume open market pricing for equipment needed to equip a six-person hazardous materials response team. See email from Steve Mason, EPA Region 6, to Jim Belke, EPA Office of Emergency Management, of June 2, 2015.

[45] This is the minimum number of responders necessary to meet the emergency site entry team and backup personnel requirements specified under 29 CFR 1910.120(q)(3)(v) and (vi).

responders. Because the training is generally available only in major cities, the analysis included travel time and per diem costs.

Most of the RMP facilities outside of the manufacturing sector are staffed only during the day, 5 days a week. The analysis estimates that they would, therefore, have only one hazmat team comprised of a single 5-person team. Manufacturing plants generally operate 24/7. Based on EPA's experience, the analysis estimated that chemical manufacturers and refineries would have hazmat teams of at least 6 people per shift, with 4 teams needed to cover the entire facility at all times.[46] Other manufacturing and large facilities were estimated to have a single 6-person team that is on-call for the off hours.

Based on EPA's experience, the cost of training ranges from $450 (for the 24-hour course) to $1,600 (for the 72-hour course).[47] The analysis, therefore, used $450 and $800 for the training fees and $100 per day for travel and expenses.[48] Beyond the training fee, the facility would have to pay the employees for their time and travel costs. Exhibits 4-12 and 4-13 present the hourly labor assumptions for emergency response plan development and training, respectively:

Exhibit 4-12: Hourly Labor for New Responder Emergency Response Plan Development

Facility Type	Management	Attorney	Engineers	Production	Emergency Responders	Facility Cost
Simple	16	0	16	8	0	$2,311
Complex and Local Government	32	0	40	32	0	$7,567

Exhibit 4-13: Hourly Labor for New Responder Training

Facility Type	Management	Attorneys	Engineers	Production	Training Fees and Travel Expenses	Facility Cost
Simple	0	0	72	80	$4,850	$11,107
Complex w/ 0-99 FTEs or Local Government	0	0	96	80	$5,600	$16,241
Complex w/ 100+ FTEs	0	0	384	320	$22,400	$64,964

[46] A 3-shift schedule requires 5 shifts of workers to operate 24/7.

[47] Some vendors provide training that is exclusively on-line and consequently considerably less expensive; OSHA has indicated in interpretation letters that such training is not sufficient to meet the requirements of the standard.

[48] $100 per day is considered a blended average of likely travel expenses. GSA per diem rates generally suggest hotel rates of between $89 to upwards of $200 depending on the area and time of year. Meals and incidental expenses are in addition to that amount. However, state and local officials are generally not allowed per diems if travel and training is within 50 miles of home offices and private employers may seek to take training that is close to their location to minimize travel or overnight stays.

New responders have ongoing costs that are different than the initial unit costs. As required by OSHA, the analysis estimates that each of 5 trained staff, for simple facilities, will need to undergo a refresher course annually that costs $100 per person. For large complex facilities, the analysis estimates that all 24 trained staff will undergo the training. In addition, it is estimated that staff turnover will create additional initial training needs. All facilities are estimated to train one new responder per year.

Assumptions for Tabletop and Field Exercises, and disclosure activities can be found in those respective sections of this chapter.

This portion of the analysis, although not a provision to itself, estimates the costs of non-responders converting to responders. Chapter 5 presents the total cost of the rule with a sensitivity analysis of 25 percent, 50 percent, and 75 percent of current non-responders not in a county with a Hazmat team converting to responder status. One of the proposed options (the high option) for coordination with local responders requires all facilities to be responders (100 percent conversions).

CHAPTER 5: TOTAL COSTS

EPA considered multiple options representing a range of costs for most of the proposed rule provisions.[49] This chapter presents the total costs of provisions by option, as well as total proposed rule costs, undiscounted, discounted, and annualized. Costs are projected over 10 years and discounted at 3 percent and 7 percent. The time period was chosen because it is long enough for two rotations of the least frequent required activities (which occur every five years).

This chapter is organized as follows:

- Section 5.1 presents the broad analytical assumptions used in the analysis focusing primarily on the annual frequency of rule provision activities.
- Section 5.2 shows the rule familiarization costs.
- Section 5.3 describes the total costs associated with the proposed prevention program provisions – third-party compliance audits, incident investigation, and STAA.
- Section 5.4 describes the total costs associated with the proposed emergency response preparedness provisions – emergency response program coordination with local responders, notification exercises, and facility exercises.
- Section 5.5 describes the total costs associated with the proposed information sharing provisions – information sharing with LEPCs, information sharing with the public, and public meetings.
- Section 5.6 describes the sensitivity analysis of total costs associated with the potential for current non-responding facilities to convert to responding facilities as a result of the proposed changes to the emergency response program coordination provisions. The analysis includes varying assumptions of the percentage of non-responding facilities that may become responders.
- Section 5.7 shows the total costs for each rule provision option, as well as the total cost for the proposed rule.

5.1 Analytical Assumptions

Annual Frequency

The analysis generally divided total costs into initial year costs and ongoing costs. For provisions or options in which the activity occurs in several year increments, the annual frequency is a fraction representing what portion of facilities would likely be implementing the provision in any given year. For example, if an activity is expected to happen once every 5 years, the annual frequency would be 0.2, as 20 percent of the applicable facilities would likely be completing the activity in any given year. The assumption that implementation would be distributed evenly across time (i.e., if facilities are required to

[49] See Chapter 2 for detailed presentation of the options considered.

conduct an activity once every 5 years, that one fifth would do it in any one year) may overstate the costs for some years and understate them for others. This issue primarily concerns the STAA and the medium and high options for third-party audits. The STAA is part of the PHA, which must be updated every 5 years. If facilities have maintained that schedule from the first PHA they conducted (i.e., they have not had to update the PHA prior to the 5-year anniversary, which would reset the clock for the next update), these costs may be concentrated over 1 to 3 years rather than distributed evenly over 5 years because facilities had 3 years to come into compliance with the original rule. The same issue arises with third-party audits when applied to all compliance audits in the medium and high options; all of the costs could occur in a single year as facilities' first audit may have occurred in 1999. EPA, however, has no information on how frequently facilities have conducted PHAs or audits before the renewal date because of process or procedural changes, accidental releases, or information on risks that they thought needed to be reconsidered.

Initial and Ongoing Costs

The analysis only used an ongoing cost when costs for years 2-10 were not the same as the initial cost components. If costs for years 2-10 were the same as the initial year (with some variation based on the annual frequency), then multiplying the initial cost by the annual frequency accounted for any continuing costs. The only proposed rule provisions with ongoing costs different from the initial costs are found for new responders (Section 5.5).

Capital Costs

The analysis did not monetize any capital costs (see the discussion on STAA implementation costs). The costs of equipment purchased for facilities becoming new responders has not been amortized. Although individual items of response equipment are relatively low cost, the overall cost of purchasing response equipment may cause some facilities to choose to finance response equipment purchases in order to spread the costs over several years, while others may treat them as an operating expense and pay in a single year. By not amortizing responder equipment costs in this analysis, EPA is making the conservative assumption that facilities will pay these initial costs in a single year.

5.2 Rule Familiarization

EPA did not analyze any options for rule familiarization, as this is not a provision of the rule, but rather a necessary cost of any rulemaking. All facilities and local governments are estimated to be affected by rule familiarization.

Exhibit 5-1: Rule Familiarization

Facility Type	Unit Cost	Facilities	Total Initial Cost
Simple	$150	10,921	$1,637,844
P1 and P2 Complex	$199	145	$28,896
P3 Complex	$399	1476	$588,278
LEPCs	$53	1724	$92,113
Delegated Implementing Agencies	$300	14	$4,199
Total		**14,266**	**$2,351,330**

5.3 Prevention Program Rule Provisions

Third-party Compliance Audits

EPA analyzed three options for the proposed requirement that a facility hire a third-party to conduct the compliance audit required under the existing rule. Under the existing rule, P2 and P3 facilities must conduct a compliance audit at least once every 3 years.

Low Option (Proposed): Applicable to P2 and P3 Facilities Following an Accident

The low option would impose the requirement for a third-party auditor only on P2 or P3 facilities that had a reportable accidental release. These facilities would be required to contract with a third-party for their next scheduled compliance audit. Accident numbers are based on the RMP data from RMP reportable accidents, referenced in Exhibit 3-9, and are estimated based on the 10-year annual average. The RMP database contains data on accidents that have had reportable impacts, but also those without. Since this provision does not require third-party audits for accidents without any reportable impacts, we deducted the number of accidents with no impacts from the total number of accidents in the RMP database. We also deducted the number of accidents that occurred at P1 facilities, as the proposed provision would only apply to P2 and P3 facilities. The analysis projects that the annual number and distribution of accidents among types of facilities will remain the same and that in any one year, the number of facilities conducting a third-party audit will be equal to the number of accidents.[50] That is, although the approximately 148 third-party audits for the P2 and P3 facilities that have a reportable release in 2016 may occur up to 3 years after the releases, depending on when the previous audit

[50] EPA recognizes that subsequent to the current rule taking effect, accident rates may decrease but wishes to calculate a conservative cost estimate so assumes a constant accident rate.

occurred, the analysis projects that over time, about 148 facilities would conduct such an audit each year.[51] The breakout for total costs is shown in Exhibit 5-2:

Exhibit 5-2: Total Annual Undiscounted Costs for Third-party Compliance Audits (Low Option)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Simple w/ 0-19 FTEs	1	$17,807	19	$338,329
Simple w/ 20-99 FTEs	1	$19,701	15	$295,509
Simple w/ 100+ FTEs	1	$20,749	39	$809,219
Complex w/ 0-19 FTEs	1	$43,642	3	$130,925
Complex w/ 20-99 FTEs	1	$46,209	13	$600,722
Complex w/ 100+ FTEs	1	$47,710	53	$2,528,654
Small Government	1	$18,630	3	$55,890
Large Government	1	$48,951	4	$195,803
Total			**149**	**$4,955,052**

Medium Option: Applicable to All P3 Facilities

Under the medium option, all P3 facilities would have to hire a third-party to conduct compliance audits at the facility every three years. The analysis projects that a third of P3 facilities would, therefore, be conducting a third-party audit every year. Facility numbers are based on the RMP data and can be found in Exhibit 3-6. The breakout for total costs is presented in Exhibit 5-3.

Exhibit 5-3: Total Annual Undiscounted Costs for Third-party Compliance Audits (Medium Option)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Simple w/ 0-19 FTEs	0.33	$17,807	5,488	$32,248,846
Simple w/ 20-99 FTEs	0.33	$19,701	1,093	$7,105,816
Simple w/ 100+ FTEs	0.33	$20,749	1,582	$10,832,330
Complex w/ 0-19 FTEs	0.33	$43,642	255	$3,672,460
Complex w/ 20-99 FTEs	0.33	$46,209	665	$10,140,641
Complex w/ 100+ FTEs	0.33	$47,710	572	$9,005,826
Small Government	0.33	$18,630	451	$2,772,718
Large Government	0.33	$48,951	522	$8,432,251
Total			**10,628**	**$84,210,888**

[51] The number of audits may be overstated because the number of facilities that had reportable releases over the ten-year period considered (1272) is lower than the number of releases reported (1516), according to the RMP accident database, as some facilities may have multiple accidents.

High Option: Applicable to All P2 and P3 Facilities

Under the high option, all P2 and P3 facilities would have to hire a third-party to conduct compliance audits at the facility every three years. The analysis projects that a third of P2 and P3 facilities would, therefore, be conducting a third-party audit every year. Facility numbers are based on the RMP data and can be found in Exhibit 3-6. The breakout for total costs is presented in Exhibit 5-4.

Exhibit 5-4: Total Annual Undiscounted Costs for Third-party Compliance Audits (High Option)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Simple w/ 0-19 FTEs	0.33	$17,807	6364	$37,396,439
Simple w/ 20-99 FTEs	0.33	$19,701	807	$5,246,471
Simple w/ 100+ FTEs	0.33	$20,749	1,262	$8,641,214
Complex w/ 0-19 FTEs	0.33	$43,642	285	$4,104,515
Complex w/ 20-99 FTEs	0.33	$46,209	694	$10,582,865
Complex w/ 100+ FTEs	0.33	$47,710	580	$9,131,781
Small Government	0.33	$18,630	972	$5,975,791
Large Government	0.33	$48,951	936	$15,119,899
Total			**11,900**	**$96,198,975**

Incident Investigation (Root Cause Analysis and Near Miss Investigation)

The RMP rule currently requires the owner or operator of a facility to investigate each incident which resulted in, or could reasonably have resulted in a catastrophic release (i.e., including a near miss). EPA is proposing to require a root cause analysis be conducted as part of the incident investigation and analyzed three options:

Low Option: Applicable to P3 Accidents and Near Misses

The low option would require P3 facilities to conduct root cause analyses for any RMP reportable accident and to investigate and conduct a root cause analysis for near misses. The current rule requires investigation of near misses as well, but due to significant noncompliance with this provision, the costs of near miss investigations are being included in this analysis. The analysis estimates that there would be one near miss for each RMP reportable accident. The number of actual near misses is unknown and depends on a judgment of the seriousness of an incident and belief that it could reasonably have resulted in a catastrophic release. Industry estimates for the cost of incident investigations vary widely.

Exhibit 5-5: Total Annual Undiscounted Costs for Root Cause Incident Investigation (Low Option)

Facility Type	Unit Cost	Facilities	Total Initial Cost
P3 Near Miss – Simple	$1,785	75	$133,863
P3 Near Miss – Complex	$4,937	68	$335,695
P3 Accident – Simple	$1,335	75	$100,119
P3 Accident – Complex	$3,658	68	$248,758
Total		**286**	**$818,435**

Medium/High Option (Proposed): *Applicable to P2 and P3 Accidents and Near Misses*

The medium/high option would apply the requirements for root cause analysis and near miss investigation to all P2 and P3 facilities. Accident numbers are drawn from the data on RMP reportable accidents, referenced in Exhibit 3-9.

Exhibit 5-6: Total Undiscounted Costs for Root Cause Incident Investigation (Medium/High Option)

Facility Type	Unit Cost	Facilities	Total Initial Cost
P2 Near Miss – Simple	$1,785	5	$8,924
P2 Near Miss – Complex	$4,937	1	$4,937
P3 Near Miss – Simple	$1,785	75	$133,863
P3 Near Miss – Complex	$4,937	68	$335,695
P2 Accident - Simple	$1,335	5	$6,675
P2 Accident - Complex	$3,658	1	$3,658
P3 Accident - Simple	$1,335	75	$100,119
P3 Accident - Complex	$3,658	68	$248,758
Total		**298**	**$842,629**

Safer Technology Alternatives Analysis

EPA analyzed three options for the proposed requirement to conduct an STAA, but monetized costs for only two of the options.

Low Option (Proposed): Applicable to a Subset of P3 Facilities

The low option would apply the rule provision to a subset of P3 processes – those in NAICS codes 322 (pulp and paper manufacturing), 324 (petroleum and coal products manufacturing), and 325 (chemical manufacturing) – and require owner/operators to conduct an initial evaluation and feasibility study of potential safer technologies every 5 years as part of the PHA. EPA is not proposing to require implementation of any particular technology.

Exhibit 5-7: Total Undiscounted Costs for STAA (Low Option)

Facility Type	Annual Frequency	Unit Cost	Processes	Total Initial Cost
Paper and Small/Medium Complex	0.2	$28,817	1,783	$10,276,120
Large Complex	0.2	$48,754	2,514	$24,513,659
Total			**4,297**	**$34,789,779**

Medium Option: Applicable to all P3 processes

The medium option would impose the requirement to conduct the initial analysis and determine feasibility on all P3 processes every 5 years as part of the PHA. Exhibit 5-8 presents the costs for the medium option.

Exhibit 5-8: Total Undiscounted Costs for STAA (Medium Option)

Facility Type	Annual Frequency	Unit Cost	Processes	Total Initial Cost
Initial Phase Analysis				
Paper and Small/Medium Complex	0.2	$13,109	1,783	$4,674,512
Large Complex	0.2	$40,240	2,514	$20,232,785
Simple Manufacturing	0.2	$17,429	455	$1,586,062
Water/POTW	0.2	$8,744	1,178	$2,060,004
Intermediate Gas Processing and Utilities	0.2	$8,744	721	$1,260,835
Refrigeration	0.2	$17,429	3,005	$10,474,982
Storage	0.2	$8,744	4,881	$8,535,553
Feasibility Analysis				
Paper and Small/Medium Complex	0.2	$15,708	1,783	$5,601,609
Large Complex	0.2	$8,514	2,514	$4,280,874
Simple Manufacturing	0.2	$12,050	455	$1,096,566
Water/POTW	0.2	$8,444	1178	$1,989,522
Intermediate Gas Processing and Utilities	0.2	$8,444	721	$1,217,695
Refrigeration	0.2	$9,250	3005	$5,559,357
Storage	0.2	$3,244	4881	$3,167,271
Total			**14,537**	**$71,737,628***

*Total may not sum due to rounding

High Option

The high option for STAA would require all P3 facilities to implement any STAA options that the facility determined are feasible. Thus the costs for this option include the annual $71.7 million estimated above for initial and feasibility analyses plus implementation costs. EPA has not projected implementation costs for this option because of several problems that result in a high degree of uncertainty associated with such projections. First, what exactly facilities consider to be a safer or inherently safer change has

various interpretations. EPA reviewed the IST implementation reported by New Jersey (NJ)[52] and Contra Costa County[53], where State and local laws require the analysis, to evaluate what types of changes might be expected from facilities. Contra Costa County officials disagreed with categories made by oil refineries and reclassified the majority of the items listed by three refineries from inherently safer to active or passive changes – active being changes that require operator intervention and passive being those that are automatic. NJ and commenters on the NJ program labeled the majority of changes that facilities claimed as IST as not IST. The descriptors applied to IST– minimization, substitution, moderation, and simplification – can often be applied to active and passive STAA measures, as well.

Second, the high option would require facilities to adopt feasible IST changes, and the judgement regarding feasibility is subjective and thus very difficult to predict. The proposed rule defines feasible to mean "capable of being successfully accomplished within a reasonable time, accounting for economic, environmental, legal, social, and technological factors. Environmental factors would include consideration of potential transferred risks for new risk reduction measures." For example, switching from chlorine to other water treatment methods is clearly technically possible; about half of the systems originally subject to the rule have made the switch away from chlorine and avoided continued coverage under the RMP rule. Whether it is feasible for a particular system would be driven by various factors, including the risk posed by the facility (e.g., is it close to inhabited areas or at some distance), other demands on the operating government (e.g., does the system need to replace aging pipelines, install water monitors, increase sewage treatment capacity, etc.), and perhaps other considerations. Most RMP facilities pose a variety of risks to workers and the public; any investment in risk reduction would be assessed at each facility in the context of those other risks. For example, most of the facilities with refrigeration systems subject to the rule are involved in food processing and storage; the risks to the public of food contamination or spoilage from less effective refrigerant processes may outweigh the risk of an ammonia release when determining where to invest capital funds. Many facilities subject to the rule have a wide range of environmental regulatory requirements, from reducing air emissions and avoiding spills, treating effluents, to reducing greenhouse gas emissions. Facilities may also have requirements related to chemical security. Some alternative refrigerants, such as CFCs and HCFCs, cause ozone depletion. Changing to a different refrigerant such as carbon dioxide, a cheap and non-toxic refrigerant, would require different equipment to accommodate higher working pressures involved and may only be cost effective for new systems. All of these, as well as other concerns, might be factored into a facility owner's decisions on where best to spend resources.

Third, the costs of STAA changes range widely. A study of some human factors in the chemical process industry, presented in 2001, reported on changes that reduced risks to humans. The cost of these

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[52] NJ DEP. January 15, 2010. Inherently Safer Technology (IST) Implementation Summary. New Jersey Department of Environmental Protection (NJDEP), Trenton, NJ. http://www.nj.gov/dep/rpp/brp/tcpa/downloads/IST_SUMWEB.pdf

[53] CCHS. December 9, 2014. Annual Performance Review and Evaluation- Industrial Safety Ordinance. Contra Costa County Health Services (CCHS), Contra Costa County, CA. http://cchealth.org/hazmat/pdf/iso/iso-report.pdf.

reductions ranged from less than $1,000 to about $100,000 (in current dollars).[54] The costs of replacing chlorine in water treatment systems are far higher.[55]. Construction costs ranged from $650,000 to $13 million and operating costs ranged from cost-savings to positive costs of $2.4 million or more a year. EPA obtained information on the cost of replacing or modifying hydrogen fluoride (HF) which is used at 47 refineries for alkylation. Costs for installation of technology that involved reducing the volatility of HF by using an additive was estimated to range from $3.64 million to $7 million.[56] The cost of conversion to use of a solid acid catalyst replacing HF is estimated at $50 million.[57]It costs approximately $50 million to convert an HF alkylation unit to sulfuric acid, however, conversion is estimated to be one-half to two-thirds of the cost of installing a new sulfuric acid alkylation unit.[58] Switching refrigerants from an anhydrous ammonia to an ammonia-glycol system appears to typically cost $4 to $6 million.[59] EPA has not projected whether the larger quantity of sulfuric acid that a refinery would need to replace HF would increase costs or whether there would be other changes in the operating costs. It is likely that any switch from ammonia, as the sole refrigerant, would increase the basic cost of refrigeration and increase other operating costs, as ammonia is generally more efficient (i.e., uses less energy) than other refrigerants. Chemical substitution, in any case, would be possible at less than half the facilities; the rest either manufacture the regulated substances or store them for sale. Some examples of lower cost measures include removing sampling stations, replacing vessel sight glasses with magnetic level indicators, removing dead-leg piping, using smaller diameter pipe or seal-less pumps, lowering storage inventories, and moderating process conditions such as operating temperature and pressure.

EPA also has little information about the actual costs associated with somewhat larger projects that would replace, for example, piping or pumps with those made with stronger materials. The costs of these would be facility-specific and could vary widely. In short, as the previous examples indicate, a requirement to implement feasible STAA could add substantially to the cost of the rule.

5.4 Emergency Response Preparedness Requirements

5.4.1 Emergency Response Program Coordination with Local Responders

EPA analyzed two options related to coordination. The current rule requires owners or operators of regulated facilities with Program 2 or 3 processes to coordinate with local response authorities and in some cases develop an emergency response program in accordance with §68.95 except when the stationary source is included in the community emergency response plan developed under section 303

[54] Attwood, Dennis and David Fennell, "Cost-effective Human Factors Techniques for Process Safety," CCPS International Conference and Workshop, October 2-5, 2001, Toronto, ON, CANADA

[55] http://www.gao.gov/assets/260/258480.pdf

[56] See: http://www2.dupont.com/Clean_Technologies/en_US/assets/downloads/AlkyCurrentEvents2001.pdf

[57] See: http://www.publicintegrity.org/2011/03/28/3798/new-oil-refinery-south-dakota-says-it-will-use-alternative-toxic-acid

[58] See: http://www.uspirg.org/sites/pirg/files/reports/Needless_Risk_USPIRG.pdf

[59] See: http://yosemite.epa.gov/opa/admpress.nsf/0/1c6b8ee238fd17d185257996005b892f

of EPCRA (for sources with regulated toxic substances) or has coordinated response actions with the local fire department (for sources with only regulated flammable substances)

Low/Medium Option (Proposed): Applicable to Program 2 and 3 Facilities

The low/medium option enhances existing requirements by requiring Program 2 and 3 facilities to coordinate *annually* with local emergency responders to ensure resources and capabilities are in place to respond to an accidental release. This provision also requires facilities to document their coordination activities including the names of individuals involved, organizational affiliations, and more. The purpose of the proposed revisions to the coordination requirement is to improve responders' understanding of the risks at the facility and to better prepare them for a safe and timely response. Coordination activities may include a review of the facility's emergency action plan, (for non-responding facilities) the facility's emergency response plans (for responding facilities), and local response capabilities including providing information for the local community emergency response plan. Facility counts are drawn from Exhibit 3-6. This analysis assumes that facilities are not conducting coordination activities annually in the baseline, nor are they documenting those activities. The costs for the low and medium options are the same (the low option eliminates the provision allowing an LEPC to require that the facility comply with §68.95)[60]. The low and medium options may also cause a portion of current non-responding facilities to convert to responders. We estimate this expected additional cost in a sensitivity analysis presented in Section 5.6.

Exhibit 5-9: Total Undiscounted Costs for Coordination (Low/Medium Option)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Simple P2/3	1	$514	10,345	$5,313,853
Complex P2/3	1	$612	1,555	$952,099
Total			**11,900**	**$6,265,952**

High Option: Applicable to All Current Non-responding Facilities

This high option would require all current non-responding facilities to comply with §68.95 and develop emergency response capabilities and an emergency response plan. The number of non-responding facilities can be found in Exhibit 3-8. EPA projects that all nonresponding facilities would develop the plan in year one, and then spend 10 percent of the initial development costs maintaining the plan annually in years 2-10. EPA projects that all non-responders would purchase the necessary equipment in the first year and then spend 10 percent of the initial purchase price annually for years 2-10 for maintenance and replacement. In Exhibit 5-10, cost elements are presented by total initial costs, and maintenance costs, if applicable. If a sub-provision has an ongoing maintenance cost, it is assumed that the initial cost will be incurred in year 1, and the ongoing cost will be incurred in years 2-10. For

[60] See Chapter 2 for a detailed description of alternative options for the coordination rule provision.

facilities that do not have an ongoing cost, the initial cost will be incurred with the annual frequency provided.

Exhibit 5-10: Total Undiscounted Costs for Coordination and Developing an ER Program (High Option)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost	Maintenance Costs
Plan Development					
Simple <20 FTEs	N/A	$2,311	4,724	$10,918,980	$1,091,898
Simple 20-99 FTEs	N/A	$2,311	899	$2,077,935	$207,793
Simple 100+ FTEs	N/A	$2,311	731	$1,689,622	$168,962
Complex <20 FTEs	N/A	$7,567	144	$1,089,621	$108,962
Complex 20-99 FTEs	N/A	$7,567	235	$1,778,200	$177,820
Complex 100+ FTEs	N/A	$7,567	47	$355,640	$35,564
Subtotal				**$17,909,997**	**$1,791,000**
Training					
Simple <20 FTEs	N/A	$11,107	4,071	$45,215,184	$11,078,537
Simple 20-99 FTEs	N/A	$11,107	774	$8,596,549	$2,106,310
Simple 100+ FTEs	N/A	$11,107	721	$8,007,897	$1,962,079
Complex <20 FTEs	N/A	$16,241	144	$2,338,694	$446,191
Complex 20-99 FTEs	N/A	$16,241	235	$3,816,619	$880,824
Complex 100+ FTEs	N/A	$64,964	47	$3,053,295	$582,527
Local Government	N/A	$16,241	788	$12,797,855	$2,953,571
Subtotal				**$83,826,094**	**$20,010,039**
Equipment					
Simple <20 FTEs	N/A	$50,000	4,071	$203,550,000	$20,355,000
Simple 20-99 FTEs	N/A	$50,000	774	$38,700,000	$3,870,000
Simple 100+ FTEs	N/A	$50,000	721	$36,050,000	$3,605,000
Complex <20 FTEs	N/A	$60,000	144	$8,640,000	$864,000
Complex 20-99 FTEs	N/A	$60,000	235	$14,100,000	$1,410,000
Complex 100+ FTEs	N/A	$60,000	47	$2,820,000	$282,000
Local Government	N/A	$60,000	788	$47,280,000	$4,728,000
Subtotal				**$351,140,000**	**$35,114,000**
Table Top Exercise					
Simple <20 FTEs	0.8	$5,380	4,724	$20,331,928	$0
Simple 20-99 FTEs	0.8	$6,507	899	$4,679,615	$0
Simple 100+ FTEs	0.8	$12,218	731	$7,144,981	$0
Complex <20 FTEs	0.8	$6,829	144	$786,690	$0
Complex 20-99 FTEs	0.8	$8,301	235	$1,560,535	$0
Complex 100+ FTEs	0.8	$23,621	47	$888,166	$0
Subtotal				**$35,391,915**	**$0**
Field Exercise					
Simple <20 FTEs	0.2	$8,209	4724	$7,756,324	$0

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost	Maintenance Costs
Simple 20-99 FTEs	0.2	$13,835	899	$2,487,452	$0
Simple 100+ FTEs	0.2	$23,111	731	$3,378,766	$0
Complex <20 FTEs	0.2	$10,047	144	$289,351	$0
Complex 20-99 FTEs	0.2	$17,301	235	$813,139	$0
Complex 100+ FTEs	0.2	$65,758	47	$618,121	$0
Subtotal				**$15,343,153**	**$0**
LEPC Disclosure – Exercise Report					
Simple <20 FTEs	1	$555	4724	$2,622,482	$0
Simple 20-99 FTEs	1	$555	899	$499,071	$0
Simple 100+ FTEs	1	$555	731	$405,807	$0
Complex <20 FTEs	1	$1,237	144	$178,138	$0
Complex 20-99 FTEs	1	$1,237	235	$290,712	$0
Complex 100+ FTEs	1	$1,237	47	$58,142	$0
Subtotal				**$4,054,354**	**$0**
Total			**6,780**	**$507,665,513**	**$56,915,039**

The initial cost of $507,665,513 is the cost that all facilities will incur when they begin complying with this provision and convert from being non-responders to responders. The $56,915,039 is the cost that facilities will incur to maintain responder status in terms of maintaining equipment, response plans, and training. Equipment costs make up approximately 70% of the costs of converting to an emergency responder. It seems possible that some facilities will finance the initial costs and spread them across multiple years. Thus the current assumption that facilities must pay these initial costs in a single initial year is conservative. The initial costs for becoming responders includes training costs – such as course fees, labor hours, and travel costs – plus the cost of acquiring equipment, all of which must occur in the first year in order to meet OSHA requirements. Maintenance costs include the cost of annual refresher training, the assumption that one new responder per year needs to be trained (to account for turnover), as well as costs for equipment that needs to be repaired or replaced.

For activities that have an annual frequency rate – all pertaining to facility exercises – the annual frequency represents how often facilities will need to implement that activity. As explained in section 5.1, an annual frequency of 0.2 for field exercises effectively means 20% of facilities will be implementing this requirement in the first year of becoming a responder. The total costs for these provisions represent the number of facilities that would be implementing that expenditure in the first year of becoming a responder.

Notification Exercises

EPA analyzed only one option for this provision.

Low/Medium/High Option: Applicable to all Program 2 and 3 Facilities

This provision would require all P2 and P3 facilities to conduct an annual notification exercise to verify that emergency contact information is up-to-date. This includes verifying that notification contact information for emergency responders, Federal, state and local response agencies, and other accidental release notification contacts is correct and includes functional phone numbers. The breakout of costs is in Exhibit 5-11.

Exhibit 5-11: Total Undiscounted Costs for Notification Drills (All Options)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Simple Facilities	1	$110	10,345	$1,142,519
Complex Facilities	1	$152	1,555	$237,021
Total			**11,900**	**$1,379,540**

Facility Exercises

EPA analyzed three options for emergency response exercises.

Low Option: *Applicable to All P2 and P3 Responding Facilities*

The low option would require all P2 and P3 responding facilities to conduct an annual tabletop exercise. The breakout of costs are in Exhibit 5-12.

Exhibit 5-12: Total Undiscounted Costs for Facility Exercises (Low Option)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Simple <20 FTEs	1	$5,380	1640	$8,823,127
Simple 20-99 FTEs	1	$6,507	880	$5,725,892
Simple 100+ FTEs	1	$12,218	1467	$17,923,542
Complex <20 FTEs	1	$6,829	141	$962,875
Complex 20-99 FTEs	1	$8,301	459	$3,810,029
Complex 100+ FTEs	1	$23,621	533	$12,590,231
Total			**5,120**	**$49,835,696**

Medium Option (Proposed): Applicable to All P2 and P3 Responding Facilities

The medium option would require all responding P2 and P3 facilities to conduct a field exercise every 5 years and within one year after an RMP reportable accident and conduct an annual table top exercise in the other years. Given this timeline, the analysis used an annual frequency rate of 0.2 for the field

exercise and 0.8 for the tabletop exercises. The analysis also assumed that facilities with an accident would have met their 5-year field exercise requirement by conducting an exercise within one year of the accident, effectively pushing their next required field exercise out 5 more years. Therefore, post-accident exercises were assumed not to affect the costs of this option. The breakout of costs is in Exhibit 5-13.

Exhibit 5-13: Total Undiscounted Costs for Facility Exercises (Medium Option)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Table Top Exercise				
Simple <20 FTEs	0.8	$5,380	1,640	$7,058,502
Simple 20-99 FTEs	0.8	$6,507	880	$4,580,713
Simple 100+ FTEs	0.8	$12,218	1,467	$14,338,834
Complex <20 FTEs	0.8	$6,829	141	$770,300
Complex 20-99 FTEs	0.8	$8,301	459	$3,048,023
Complex 100+ FTEs	0.8	$23,621	533	$10,072,185
Subtotal				**$39,868,557**
Field Exercise				
Simple <20 FTEs	0.2	$8,209	1,640	$2,692,712
Simple 20-99 FTEs	0.2	$13,835	880	$2,434,880
Simple 100+ FTEs	0.2	$23,111	1,467	$6,780,643
Complex <20 FTEs	0.2	$10,047	141	$283,322
Complex 20-99 FTEs	0.2	$17,301	459	$1,588,217
Complex 100+ FTEs	0.2	$65,758	533	$7,009,760
Total			**5,120**	**$60,658,091**

High Option: Applicable to All P2 and P3 Responding Facilities

The high option would require all P2 and P3 responding facilities to conduct an annual field exercise. The breakout of costs are in Exhibit 5-14.

Exhibit 5-14: Total Undiscounted Costs for Facility Exercises (High Option)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Simple <20 FTEs	1	$8,209	1,640	$13,463,560
Simple 20-99 FTEs	1	$13,835	880	$12,174,402
Simple 100+ FTEs	1	$23,111	1,467	$33,903,213
Complex <20 FTEs	1	$10,047	141	$1,416,612
Complex 20-99 FTEs	1	$17,301	459	$7,941,083
Complex 100+ FTEs	1	$65,758	533	$35,048,801
Total			**5,120**	**$103,947,670**

5.5 Information Disclosure Rule Provisions

5.5.1 Public Meeting

EPA analyzed three options for imposing a requirement to hold a public meeting.

Low Option (Proposed): Public Meeting After an RMP Reportable Accident

This option would require that facilities hold a public meeting within 30 days of an accident meeting the reporting criteria of §68.42. Similar to our approach for estimating the costs for third-party audits, accident numbers are based on the RMP data from RMP reportable accidents, referenced in Exhibit 3-9, and are estimated based on the 10-year annual average. As with third-party audits, we deducted the number of accidents with no impacts from the total number of accidents in the RMP database. However, unlike third-party audits, we did not deduct the number of accidents that occurred at P1 facilities, as the proposed provision will apply to any RMP facility that has an RMP reportable accident, including P1 facilities. The breakout of costs for this option is in Exhibit 5-15.

Exhibit 5-15: Total Undiscounted Costs for Public Meetings (Low Option)

Accident Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Complex	1	$3,696	82	$139,526
Simple	1	$1,706	70	$258,358
Total			**152**	**$397,883**

Medium Option: Public Meeting Every Five Years and After an RMP Reportable Accident; Applicable to All P2 and P3 Facilities

This option would require that all P2 and P3 facilities conduct a public meeting once every five years and immediately following an RMP reportable accident. The analysis uses an annual frequency of 0.2 to account for this. The breakout of costs is in Exhibit 5-16.

Exhibit 5-16: Total Undiscounted Costs for Public Meetings (Medium Option)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Small Complex	0.2	$2,123	528	$224,194
Large Complex	0.2	$3,696	1027	$759,179
Simple	0.2	$1,706	10345	$3,529,077
Total			**11,900**	**$4,512,451**

High Option: Public Meeting Every Five Years and After an RMP Reportable Accident; Applicable to All Facilities

This option would require that all facilities conduct a public meeting once every 5 years and immediately following an accident (i.e., P1 facilities would also have to comply). The analysis uses an annual frequency of 0.2 to account for this. The breakout of costs is in Exhibit 5-17.

Exhibit 5-17: Total Undiscounted Costs for Public Meetings (High Option)

Facility Type	Annual Frequency	Unit Cost	Facilities	Total Initial Cost
Small Complex	0.2	$2,123	565	$239,905
Large Complex	0.2	$3,696	1056	$780,617
Simple	0.2	$1,706	10921	$3,725,573
Total			**12,542**	**$4,746,094**

Information Availability

EPA analyzed one option (with multiple cost outcomes depending on whether the STAA provision would apply to a subset of P3 facilities (STAA low option) or whether it would apply for all P3 facilities (medium and high options)) for the information sharing provisions for the LEPC or emergency response officials and the public.

LEPC or Emergency Response Officials

This proposed provision would require the facility owner or operator to make information on regulated substances, compliance audits, IST, accident history, incident investigations, and exercises available to the LEPC or emergency response officials upon request. Facilities owners or operators would be required to update this information annually. EPA had no information to determine how many LEPCs or emergency response officials would make such requests; however, EPA expects that all regulated facilities would incur costs to update the information annually. The provision to share compliance audit summaries applies to P2 and P3 facilities. The provision for sharing IST implementation information is calculated based on the total number of processes for which this provision would apply. The other provisions for providing accident histories and investigation report summaries to LEPCs or emergency response officials are based on a subset of P2 and P3 facilities that are expected to have RMP reportable accidents. Costs of providing emergency response exercise information to LEPCs is based on the number of P2 and P3 responding facilities.[61]

[61] The provision to share information on the names and quantities of regulated substances is similar to the public disclosure provision (the public disclosure provision does not require sharing chemical quantity information) and no additional costs are estimated for sending this information to the LEPCs or local emergency response officials.

Public

This provision would require the facility to make information available annually in a manner that is easily accessible to the public including: the names and Safety Data Sheets of regulated substances used at the facility, the facility's five-year accident history, a summary of the emergency response program information reported in the RMP, a summary of emergency exercises conducted and a schedule for upcoming exercises, and LEPC contact information.

Low/Medium/High Option: Applicable to All Facilities

This provision would require that all facilities collect information related to RMP compliance and disclose it to the public and local emergency response agencies. This includes those with Program 1 processes. However, facilities in Program 1 are not required to generate some information (e.g., they are not required to do compliance audits). The breakout of costs related to public disclosure and local emergency responders is in Exhibit 5-18:

Exhibit 5-18: Total Undiscounted Costs for Information Sharing Provisions (All Options)

Facility Type	Annual Frequency	Unit Cost	Facilities (unless otherwise noted)	Total Initial Cost
Public Disclosure				
Small Complex	1	$459	565	$259,090
Large Complex	1	$1,621	1,056	$1,711,295
Simple	1	$184	10,921	$2,005,498
LEPC Disclosure				
Accident History – Simple	1	$185	372	$68,767
Accident History - Complex	1	$390	350	$136,464
Audit Report - Simple	0.33	739	10,345	$2,524,286
Audit Report - Complex	0.33	$1,864	1,555	$956,740
Investigation Reports - Simple	1	$1,054	372	$392,213
Investigation Reports - Complex	1	$3,021	350	$1,057,418
STAA – Simple	0.2	$1,258	1,783 processes	$448,591
STAA – Complex	0.2	$3,326	2,514 processes	$1,672,335
Exercise Reports – Simple	1	$555	3,987	$2,213,344
Exercise Reports - Complex	1	$1,237	1,133	$1,401,603
LEPC Review - Simple	1	$53	10,921	$583,509
LEPC Review - Small Complex	1	$107	565	$60,376
LEPC Review - Large Complex	1	$214	1,056	$225,688
Total				**$11,741,335**

5.6 New Responders

The proposed provision to improve coordination with local responders includes the possibility that local emergency response officials with jurisdiction may require that the owner or operator of the stationary source maintain an in-house emergency response capability. As a sensitivity analysis, EPA has examined different assumptions regarding the number of current non-responding facilities (see Exhibit 3-8 for numbers) that might develop and maintain such in-house capability and thereby convert to responding facilities.

EPA faced a lack of information regarding the number of nonresponding facilities that might develop their own emergency response programs to comply with the proposed rule's coordination provision. As a consequence, EPA performed a sensitivity analysis that examined a facility's proximity to existing hazardous materials (hazmat) teams. While this approach is less than ideal for a number of reasons explained below, the general idea was that proximity to an existing hazmat team reduces the likelihood that a facility will need to provide for its own emergency response. EPA used an existing analysis of hazmat team locations obtained from the Federal Emergency Management Agency (FEMA). Those data were compiled for the 2012 National Preparedness Report to characterize the existing coverage of hazmat teams.[62] The 2012 report found that "the nation has developed a mature set of assets for addressing hazardous materials incidents." There were approximately 1,100 state and local hazmat teams identified, and the FEMA report concluded that 76% of the population is covered by these hazmat response teams.[63]

Although the exact location of each hazmat team could not be identified from the FEMA data, it was possible to identify the county of each hazmat team (see Exhibit 5-19). Using ArcGIS tools, the maps of non-responding facilities and hazmat team counties were merged and appear as Exhibit 5-20. These data provide the boundaries for a sensitivity analysis of the number of non-responders that will become responders as a result of the proposed rule's coordination requirements.

Approximately 38.5% of non-responding facilities are located in counties with hazmat teams. Having a hazmat team within the same county makes it more likely that the RMP facility can rely on that team and not need to convert to responder status. However, this may be an overestimate of the percent that will not convert because being located in a county with a hazmat team does not necessarily mean that every chemical handled by a particular facility is covered by that team. On the other hand, it might underestimate hazmat team coverage as there are several states that have expended significant effort to have their whole state covered by hazmat response. For instance, Florida takes into account the location of RMP facilities in the planning of its hazmat response capabilities.[64] EPA's county analysis does not account for such statewide planning and coverage. Since 38.5% of non-responding facilities are in hazmat counties, 61.5% are not "covered," and might potentially have to become responders. This

[62] https://www.fema.gov/media-library/assets/documents/26675

[63] The approach for estimating the 76% was roughly based on the population in proximity to a hazmat team

[64] http://www.floridadisaster.org/hazmat/serc/documents/2010%20SERC%20AR-final.pdf

represents the upper bound of our sensitivity analysis. Full counts of facilities in and out of hazmat counties, broken down by the main facility categories, appear in Exhibit 5-21.

Exhibit 5-19: Counties with Hazardous Material Teams

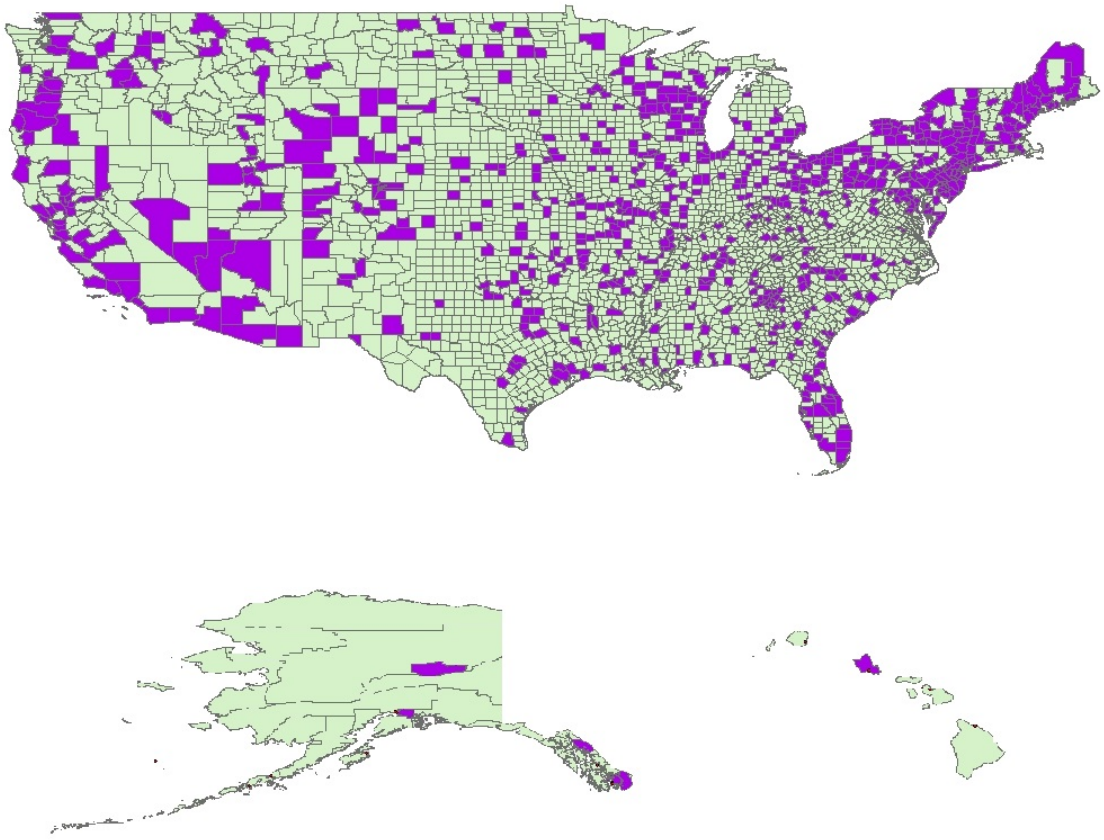

Exhibit 5-20 Locations of Non-Responding Facilities

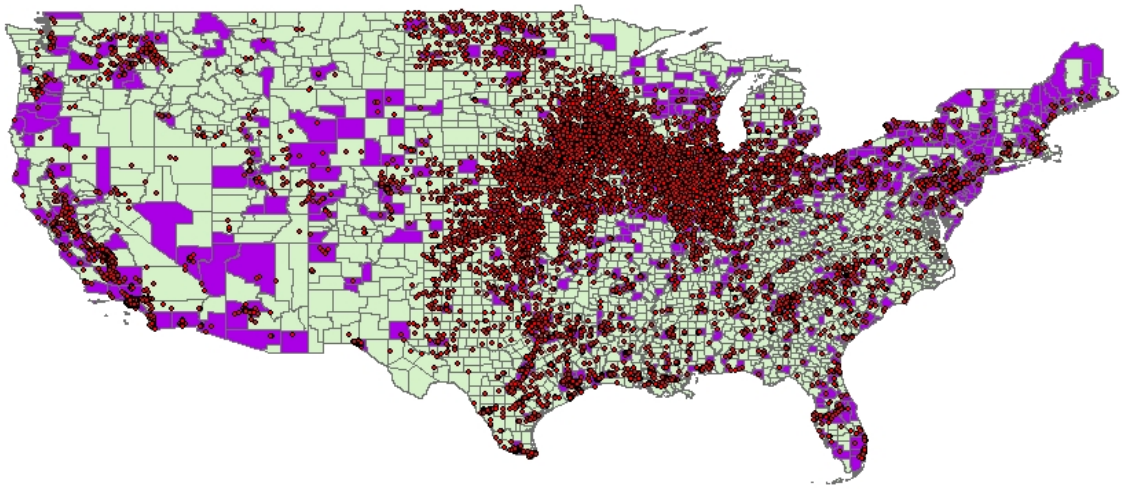

Exhibit 5-21: Sensitivity Analysis of Percent of Non-Responding Facilities that Might Convert to Responder Status

Sector	In a County with a Hazmat Team		
	Out	In	Percent
All Non-Responders	4,349	2,722	38.5%
Food/Bev. Manufacturers	204	294	59.0%
Ag. Facilities	2,328	742	24.2%
Chem Wholesale	113	104	47.9%
Warehouses	162	306	65.4%
Other Wholesale	2,270	645	22.1%
Oil Gas	262	75	22.3%
Water or POTW	654	703	51.8%
Refineries	10	8	44.4%
Chemical Manufacturers	237	184	43.7%
Pulp and Paper	1	4	80.0%

Using 61.5 percent on the high-end, the sensitivity analysis used this portion of the non-responding RMP facility universe (equivalent to 4,112 facilities) to assume that 25%, 50%, and 75% of these non-responding facilities would need to become responding facilities.

The unit cost breakdown is the same as presented in Exhibit 5-10. Exhibits 5-22, 5-23, and 5-24 present new responder costs for 25 percent, 50 percent, and 75 percent of current non-responding facilities to become responders. The components of the costs for this sensitivity analysis are described above in Section 5.3.1 under the High Option alternative.

Exhibit 5-22: Total Undiscounted Costs for New Responders: 25% Conversion (Millions, 2014 Dollars)

Provision Type	25% Conversion Facilities	Total Initial Cost	Ongoing Costs
Plan Development	1,028	$2.7	$0.3
Training	1,028	$12.8	$3.0
Equipment	1,028	$53.9	$5.4
Table Top Exercise	1,028	$5.0	$0
Field Exercise	1,028	$2.1	$0
LEPC Disclosure – Exercise Report	1,028	$0.6	$0
Total*		**$77.1**	**$8.7**

*Totals may not sum due to rounding

Exhibit 5-23: Total Undiscounted Costs for New Responders: 50% Conversion (Millions, 2014 Dollars)

Provision Type	50% Conversion Facilities	Total Initial Cost	Ongoing Costs
Plan Development	2,056	$5.4	$0.5
Training	2,056	$25.7	$6.1
Equipment	2,056	$107.7	$10.7
Table Top Exercise	2,056	$10.1	$0
Field Exercise	2,056	$4.2	$0
LEPC Disclosure – Exercise Report	2,056	$1.2	$0
Total*		**$154.3**	**$17.4**

*Totals may not sum due to rounding

Exhibit 5-24: Total Undiscounted Costs for New Responders: 75% Conversion (Millions, 2014 Dollars)

Provision Type	75% Conversion Facilities	Total Initial Cost	Ongoing Costs
Plan Development	3,084	$8.0	$0.8
Training	3,084	$38.5	$9.2
Equipment	3,084	$161.6	$16.2
Table Top Exercise	3,084	$15.1	$0
Field Exercise	3,084	$6.3	$0
LEPC Disclosure – Exercise Report	3,084	$1.8	$0
Total*		**$231.4**	**$26.2**

*Totals may not add due to rounding

For the medium (proposed) option, the analysis assumed 50% conversion of non-responders.

5.7 Cost Uncertainties Associated with Prevention Program Provisions

Introduction

The proposed rule includes three prevention program provisions – third-party audits, incident investigation/root cause analysis, and STAA – involving information collection and analysis activities on the part of the owner or operator. These provisions can lead to a wide range of outcomes, and therefore costs, if and when the owner acts upon the findings and/or recommendations generated by the audit, investigation, or analysis. In the case of third-party audits and incident investigations, the existing rule requires the owner or operator to correct deficiencies identified during audits and to resolve incident report findings and recommendations. Thus, in the baseline, owner/operators would already take actions in response to findings from the baseline versions of these two provisions. The proposed rule imposes the requirement of a *third-party* audit in place of the baseline requirement for an audit that does not specify a third-party, when a facility has experienced an accident. Similarly the proposed rule imposes the requirement of a root cause analysis in place of the baseline requirement for an incident

investigation that does not specify targeting the root cause, when a facility has experienced an accident or a "near miss." These provisions are proposed for facilities that have experienced accidents or near misses because the fact of the accident or near miss is a signal that a more objective, deeper analysis would be useful to ensure the facilities are in compliance and taking effective steps to remedy any underlying problems.

Unlike the third-party audit and root cause provision, the proposed STAA provision applies to applicable facilities whether or not there has been an accident or near miss, targeting those that fall into the three NAICS codes, 322, 324, and 325, which have the highest accident rates. Also unlike the other two prevention provisions, the outcome of the STAA provision is not limited to ensuring compliance but goes beyond compliance to consideration of any potentially feasible safer alternative technologies. However, for the proposed STAA provision (unlike its high-cost alternative that EPA is not proposing but explains in section 5.3) EPA would not require the owner to implement any inherently safer technologies (IST) determined to be feasible, but some owners may choose to implement IST voluntarily. This section examines the uncertainty associated with estimating the costs of actions that owners or operators may take as a result of developing additional information from these three provisions.

Third-party audits

Purpose of audit, potential for actions resulting from information collected

The purpose of a compliance audit is to examine whether the facility's accident prevention program – PHA, mechanical integrity program, operating procedures, etc. – is properly implemented and in compliance with 40 CFR part 68 requirements. Such an audit can result in a wide range of potential findings. The purpose of involving a third-party to conduct the audit following an accident is to ensure that the information gathered is from an unbiased source to look objectively at compliance with the RMP rule. Relative to the baseline audit requirement, EPA expects the third-party audits to lead to a different and more objective audit report that may result in more costly changes in facility processes; less costly changes; or changes with approximately the same cost as the baseline audit. One view is that we may expect more costly changes since the objectivity of the third-party auditor may give less regard to ensuing costs. However, EPA believes that such changes that may require more up-front costs than baseline audits could reduce the probability of another accident and bring the facility into compliance.

More efficient allocation of resources

Rigorous auditing that takes advantage of expert advice provides a detailed and thorough examination of potential problems and constructs careful ideas to remedy those problems. In the baseline without the proposed rule, audits are being conducted with potentially less expertise or with biased information. The remedies suggested by a third-party audit are expected to be more efficient at identifying deficiencies and correcting risky situations than remedies that would occur in the baseline. From this perspective, there is an expectation that the more efficient remedies suggested by third-party audits will impose different costs but not necessarily additional costs. They may reveal underlying problems and

remedies that result in a more efficient allocation of the resources targeted at bringing the facility into compliance with the RMP rule.

Examples of auditing results that could lead to additional expenditures

Examples of potential actions resulting from audits could include more frequent equipment inspections, use of different or additional inspection methods, equipment upgrade or replacement, installation and use of different or additional hazard controls, altering process operating conditions, materials, or chemistry, modification of operating procedures, additional training, staffing changes, etc. The wide scope of compliance audits and variation in potential follow up actions causes uncertainty in estimating expected costs. This uncertainty is exacerbated by a lack of information about the incremental difference in changes that result from a third-party audit compared to a baseline audit. Due to these uncertainties and this lack of information, EPA did not estimate the expected costs from follow-up actions.

How do we characterize these costs?

The nature of audits is to discover areas of facility operation that are not in compliance with existing rule standards and identify actions to improve safety. This is true of existing audits as well as third-party audits. Indeed, the purpose of the proposed third-party audit provision is the same as the purpose of the self-audit provision in the current rule – to identify and correct failures in the facility's prevention program. EPA believes that an accident occurring after a self-audit suggests that the self-audit may have been inadequate and may be an indicator that the firm was not in compliance with applicable prevention program elements of the rule. EPA recognizes that coming into compliance may entail additional expenditures by facility owners. While the costs of facilities coming into compliance were estimated in the 1996 RMP RIA, for the purpose of future analyses, EPA would like to better understand the magnitude of this additional spending. EPA requests comment on how much, if any, additional spending is expected from actions taken due to third-party auditor reports, relative to actions expected in response to auditor reports in the baseline. [65]

Incident investigation/Root Cause Analysis

Purpose of investigation, potential for root cause provision to result in additional costs

The existing rule already requires incident investigations to be performed and findings to be addressed. However, the proposed rule contemplates a more thorough "root cause" investigation to identify underlying causes of an incident. The outcome of a root cause investigation could reveal more substantial system-related reasons why an incident occurred and identify correctable failures in

[65] In the preamble to the proposed rule, EPA has requested public comment on the types of costs that result from independent audits (other than the cost of the audit) that are different from self-audit costs.

management systems. These underlying causes may not be identified under the baseline incident investigation provision.

Examples of investigation findings from the root cause analysis that might involve significant costs

Similar to the audits, incident investigations can reveal a wide variety of incident causes. These can range from the immediate or proximate causes of an incident to its underlying, system-related cause or causes. For example, an investigation may reveal that the immediate cause of an incident was equipment failure (e.g., failure of a corroded pipe), or operator error (e.g., an operator performed procedural steps in an incorrect sequence). A deeper "root cause" investigation would go beyond these findings and identify the underlying reasons for why the equipment failed (e.g., underlying deficiencies in the facility's mechanical integrity program) or why the operator made the error (e.g., underlying deficiencies in the facility's operator training program).

The baseline incident investigation provision requires the owner or operator to determine "the factors that contributed to the incident," but does not explicitly require the owner to perform a root cause investigation. Some regulated facilities may already interpret the baseline provision as requiring root cause investigations, but EPA believes that many others do not. Because the proposed root cause investigation requirement is likely to result in many facilities identifying deeper system-related causes of incidents, actions taken to resolve these causes may require greater expenditures than those taken for the baseline investigation requirement, which may not lead to identification of system-related causes. For example, instead of replacing a single piece of failed piping, a root cause investigation may lead to facility-wide enhancements in piping inspections, and replacement of numerous additional piping sections where excessive corrosion was subsequently identified. Similarly, instead of providing additional training for a single operator, the root cause investigation may prompt a full overhaul of the facility's operator training program, including use of new training techniques, and additional training for all process operators. Root cause investigations may also reveal multiple systemic accident causes. For example, in addition to identifying systemic training problems, the investigation may reveal that there were other underlying root causes such as an equipment design problem that led the operator to make the error (e.g., confusing labeling or equipment configuration), or unclear operating procedures.

How do we characterize these costs?

Resolving such system-related deficiencies is expected, on average, to require greater expenditures than resolving investigation findings related to baseline (i.e., non-root-cause) investigations. However, similar to audits, EPA expects that resolving underlying problems will, in the long term, reduce the probability and magnitude of a future accident. Similar to the audit, the incident investigation is intended to bring facilities into compliance by revealing deficient aspects of facility operations – in this case, aspects that have caused an accident, and may cause future accidents. Just as with audit results, EPA recognizes that coming into compliance may entail additional expenditures by facility owners. Even though the costs of coming into compliance were estimated in the original RMP RIA, EPA would like to better understand the magnitude of this additional spending to possibly include it in future analyses.

EPA requests comment on additional costs that might occur due to root cause analysis, that are over and above costs that would occur in the baseline from the existing incident investigation requirement.[66]

STAA

Purpose of STAA provisions

The proposed STAA requirement is intended to reveal potential opportunities for regulated facilities to eliminate or substantially reduce the hazards associated with regulated processes by performing a detailed analysis of alternative process technologies. The STAA provision requires the owner or operator to consider process hazard controls in the following order of preference: inherently safer technology or design, passive measures, active measures, and procedural measures. The provision also requires the owner or operator to determine the feasibility of the inherently safer technologies and designs considered.

The STAA provisions are targeted at three sectors – petroleum and coal products manufacturing, chemical manufacturing, and paper manufacturing – that have had a high frequency of RMP-reportable accidents relative to other RMP-regulated industry sectors. The baseline RMP requirements already require owners and operators of most facilities in these sectors to perform a PHA. The PHA provisions require facilities to identify, evaluate, and control process hazards using appropriate engineering and administrative controls. However, the baseline requirement does not explicitly require the owner or operator to consider inherently safer technologies. EPA believes that requiring owners and operators of higher risk facilities to consider safer technologies and alternatives – with an emphasis on inherently safer technologies – may reveal alternative hazard controls that were not considered in the baseline PHA requirement.

The STAA provision is different than the audit and investigation provisions because the proposal does not require implementation of any process or operational changes identified as feasible. Implementation, unlike the other two proposed prevention provisions, would be voluntary and thereby move beyond the baseline and proposed RMP requirements.

In other words, EPA believes that some facilities may voluntarily implement inherently safer technologies as a result of conducting the STAA. This is, in part, because the proposed definition of "feasible"[67] may result in implementation of alternatives that previously were not considered feasible (i.e., where implementation barriers such as costs or environmental and legal factors had previously been judged as too high to warrant implementation). As a result of conducting a new STAA, the facility

[66] In the preamble to the proposed rule, EPA has requested public comment on the types of costs that result from root cause investigations as compared to non-root-cause investigations.

[67] The proposed rule defines feasible to mean "capable of being successfully accomplished within a reasonable time, accounting for economic, environmental, legal, social, and technological factors. Environmental factors would include consideration of potential transferred risks for new risk reduction measures."

owner or operator may re-assess and decide to implement an inherently safer alternative after reviewing the STAA and feasibility analysis.

Costs of implementing STAA

The costs of implementing recommendations resulting from the STAA provision are uncertain, but in some cases could be quite high. As explained in Section 5.3, the known costs of certain STAA changes range from less than $1000 to $50 million. However, it is possible that a facility owner or operator would voluntarily choose to implement a high cost change if they believe its benefits warranted the expense. EPA did not attempt to estimate the costs of voluntary implementation of STAA changes for the same reasons it did not estimate implementation costs under the high option for this provision, where implementation of feasible STAA alternatives would be required. For many significant STAA changes, the costs would be facility-specific, and EPA has little information on the potential costs of large STAA projects. Additionally, judgements regarding what changes are considered to be safer or inherently safer, and the feasibility of such changes, is subjective. These factors make it very difficult to predict the costs of STAA changes and whether or not they would have occurred in the baseline. Nevertheless, EPA seeks comment on whether information exists to project what changes facilities are likely to voluntarily undertake for the categories of facilities subject to this proposed provision. EPA particularly requests cost data or studies for implementation of IST changes from any commenters who may prefer the high option for this provision.

5.8 Total Costs

The analysis presents total costs as total undiscounted costs over the 10 year period of analysis, total discounted (3 percent and 7 percent), and annualized (3 percent and 7 percent). When annual costs for different years are equal to one another across the analysis time period, the annualized costs calculated using different discount rates (e.g., 3 and 7 percent) are equal.

Exhibit 5-25 presents the total costs for all options. Blue cells represent the proposed rule option. Exhibit 5-26 presents the total cost for the proposed rule only.

Exhibit 5-25: Total Costs (Millions, 2014 Dollars)

Cost Elements	Low Option		Medium Option		High Option	
	Annualized (3%)	Annualized (7%)	Annualized (3%)	Annualized (7%)	Annualized (3%)	Annualized (7%)
Third-party Audits	$5.0	$5.0	$84.2	$84.2	$96.2	$96.2
Root Cause Analysis	$0.8	$0.8	$0.8	$0.8	$0.8	$0.8
Safer Technology and Alternatives	$34.8	$34.8	$71.7	$71.7	$71.7	$71.7
Coordination	$6.3	$6.3	$6.3	$6.3	$108.2	$116.9
New Responders	$16.5	$17.8	$33.0	$35.6	$49.5	$53.5
Notification Drills	$1.4	$1.4	$1.4	$1.4	$1.4	$1.4
Exercise Costs	$49.8	$49.8	$60.7	$60.7	$103.9	$103.9
LEPC Disclosure	$11.7	$11.7	$11.7	$11.7	$11.7	$11.7
Public Disclosure	$4.0	$4.0	$4.0	$4.0	$4.0	$4.0
Public Meetings	$0.4	$0.4	$4.5	$4.5	$4.7	$4.7
Rule Familiarization	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3
Total Cost*	**$130.9**	**$132.3**	**$278.6**	**$281.3**	**$452.6**	**$465.2**

* Totals may not sum due to rounding

Exhibit 5-26: Total Cost of Proposed Rule (Millions, 2014 Dollars)

Cost Elements	Total Undiscounted	Total Discounted (3%)	Total Discounted (7%)	Annualized (3%)*	Annualized (7%)
Third-party Audits	$49.5	$42.3	$34.8	$5.0	$5.0
Root Cause Analysis	$8.4	$7.2	$5.9	$0.8	$0.8
Safer Technology and Alternatives	$347.9	$296.7	$244.3	$34.8	$34.8
Coordination	$62.7	$53.4	$44.0	$6.3	$6.3
New Responders	$311.1	$281.6	$250.3	$33.0	$35.6
Notification Drills	$13.8	$11.8	$9.7	$1.4	$1.4
Exercise Costs	$606.6	$517.4	$426.0	$60.7	$60.7
LEPC Disclosure	$129.1	$100.1	$82.4	$11.7	$11.7
Public Disclosure	$39.8	$33.9	$27.9	$4.0	$4.0
Public Meetings	$4.0	$3.4	$2.8	$0.4	$0.4
Rule Familiarization	$2.4	$2.3	$2.2	$0.3	$0.3
Total Cost⁺	**$1,575.4**	**$1,350.2**	**$1,130.3**	**$158.3**	**$161.0**

⁺ Totals may not sum due to rounding

In total, the proposed rule would cost $158,284,120 (annualized 3 percent) or $160,962,918 (annualized 7 percent) including 50 percent conversion of new responders.

CHAPTER 6: BENEFITS

Facilities subject to the RMP regulation pose significant risks to the public and the environment. These risks stem from potential accidental chemical releases that can cause fires, explosions, and harmful vapor clouds. Chemical accidents - fires and explosions in particular - not only kill and injure people, but can do great damage to property. Property damage can include damage to goods produced, plant equipment and structures, and nearby industrial, commercial, and residential buildings, equipment, and furnishings. Damage can also occur to the natural environment and negatively affect nearby ecosystems and wildlife. Resources, such as emergency personnel and equipment, are diverted to address the fire, explosion, or vapor cloud. Properties located near the accident may lose value as a result of the perceived risks and other disamenities posed by proximity to the facility.

Risks posed by RMP facilities are reduced by lowering the probability and magnitude of accidents, which is the objective of the proposed rule. Thus, the benefits of the proposed rule include reductions in the number of people killed, injured, and evacuated or otherwise inconvenienced by sheltering in place; reductions in the damage caused to property on-site and off-site including product, equipment, and buildings; reductions in damages to the environment and ecosystems; and reductions in resources diverted to extinguish fires and clean up affected areas. The proposed rule would also provide other benefits, such as increased public information, which in addition to helping to minimize the impacts of accidents on the offsite public, could also lead to more efficient property markets in areas near RMP facilities.

6.1 Benefit Categories

Exhibit 6-1 illustrates the social benefits associated with each proposed rule provision. There are four primary social benefit categories identified by EPA. These include:

- *Prevention of Future RMP Accidents*: Several rule provisions would prevent accidents by triggering improvements in plant design, equipment, procedures, or operator training. Preventing serious accidents avoids numerous direct costs, including worker, responder, and public fatalities and injuries, public evacuations, public sheltering-in-place, and property and environmental damage. It also avoids indirect costs, such as lost productivity due to product damage and business interruption both on-site and off-site, expenditure of emergency response resources and attendant transaction costs, and reduced offsite property values.
- *Mitigation of Future RMP Accidents*: Several rule provisions would reduce the impacts of serious accidents by promoting a more rapid and efficient response to these incidents. If a serious chemical accident or major catastrophe occurs, mitigating its impacts benefits society by reducing the number of fatalities and injuries, reducing the magnitude of property damage and lost productivity both on-site and off-site, and reducing the extent of public evacuations, sheltering, and expenditure of emergency response resources.

- *Improved Information*: Three rule provisions would result in providing improved information to emergency planners, emergency responders, and the public. Providing improved information to emergency planners and responders is beneficial because it results in more efficient allocation of public response resources by improving the ability of planners and responders to make appropriate decisions concerning equipment, training, and procedures. Improved information will also improve local contingency planning and training of emergency responders. Providing better information to members of the public will allow people to make better decisions about where to live and work, what to do when an emergency occurs, and how to account for the market value of property located near RMP facilities.
- *Prevention and Mitigation of Future non-RMP Accidents at RMP Facilities*: Actions that prevent or reduce the severity of accidents in RMP-covered processes are also likely to prevent or mitigate non-RMP accidents at the same facilities because the same or similar actions can be taken with regard to processes and equipment not subject to the regulation, often at minimal additional cost. For example, if an owner or operator implements operational safety policies to prevent or respond to an RMP-related emergency, it will also improve their ability to respond to any emergency or accident at the facility because of the new operational safety policies.

Exhibit 6-1: Social Benefits of Proposed Rule Provisions

Rule Provision	Social Benefits (primary social benefit in bold)
1. Third-party audits	**Prevention of future RMP facility accidents** Mitigation of future RMP facility accidents Prevention of future non-RMP accidents at RMP facilities Mitigation of future non-RMP accidents at RMP facilities
2. Root cause analysis	
3. Safer technology and alternatives analysis	
4. Emergency coordination	**Mitigation of future RMP facility accidents** Improved information Mitigation of future non-RMP accidents at RMP facilities
5. Emergency response exercises	
6. LEPC information disclosure	**Improved information** Mitigation of future RMP facility accidents Mitigation of future non-RMP accidents at RMP facilities
7. Public information availability	**Improved information** Mitigation of future RMP facility accidents
8. Public meetings	**Improved information** Mitigation of future RMP facility accidents

As Exhibit 6-1 indicates, each rule provision would produce social benefits in multiple benefit categories. The primary social benefit category for each rule provision is indicated in bold type. Exhibit 6-1 indicates, for example, that performing accident root cause analysis primarily will help prevent future similar accidents and that improved emergency coordination will primarily help mitigate future accident impacts. The table suggests that providing better information to neighboring residents and businesses may improve the efficiency of their decisions about where to locate. Note that the table also identifies other benefit categories listed below the boldface primary one. For example, better informed neighbors may have improved responses to warnings that lower their potential exposure and panic, thereby mitigating damages. Additionally, residents who are extremely risk averse may decide to live further from RMP facilities after reviewing improved information, improving the efficiency of local real estate markets.

6.1.1 Prevention

Proposed rule provisions 1, 2, and 3 involve changes to the rule's accident prevention program elements and are intended to lower the likelihood of future accidents of the same or similar type. Rule provision 1, which would require certain compliance audits to be conducted by an independent third-party, should improve the objectivity of auditors and result in identification of safety problems and necessary process improvements before such deficiencies can result in accidents. Rule provision 2, the root cause analysis provision (that would apply after an RMP reportable accident or near miss), should prevent future accidents by identifying the underlying causes and corrective actions for serious accidents and near misses. Over time, implementing the corrective actions and lessons learned through root cause analyses should prevent future accidents and result in a reduction of on-site and offsite impacts. Rule provision 3, the STAA analysis, should result in identification of potential process changes that, if implemented, would result in owners or operators using less hazardous substances, minimizing the

amount of regulated substances present in a process, moderating process conditions, or reducing process complexity. Such changes, if implemented, help prevent accidents by either eliminating the possibility of an accidental release entirely, by making a process more fault-tolerant, such that a minor process upset or equipment malfunction does not result in a serious accidental release, and by making releases that may occur less severe. The STAA analysis provision does not actually require the owner or operator to implement any changes, so it would only provide benefits if the facility voluntarily decides to implement changes. EPA has not estimated the costs of implementation in the cost analysis.[68]

In addition to preventing future accidents, provisions 1, 2, and 3 have additional social benefits, including mitigation of future RMP facility accidents, prevention of future non-RMP accidents at RMP facilities, and mitigation of future non-RMP accidents at RMP facilities. These provisions can identify process improvements that result in less severe releases (e.g., an audit or investigation that identifies improvements to a release detection or mitigation system).

6.1.2 Mitigation

Proposed rule provisions 4 and 5 are primarily focused on improving emergency response capabilities. Faster and better coordinated responses, including effective and efficient notification of the public, should reduce human health impacts and property damage, and limit the number of on-site and off-site impacts. Bringing fires and releases under control more quickly and ensuring that workers and responders know the most effective actions to take for a particular facility under particular conditions could reduce the duration of incidents, the likelihood of injuries to emergency responders, and limit exposures—particularly for long-duration events. For example, a food plant in St. Tammany parish, Louisiana, recently experienced an ammonia leak. The plant, a nearby commercial facility, and an interstate highway were shut down for hours while hazardous material crews worked to contain the leak.[69]

Improved emergency response to control fires could also prevent knock-on impacts, such as additional explosions at facilities that store highly flammable gases, potentially resulting in a release of a regulated substance. For example, a propane fire at a Texas refinery in 2007 caused a chlorine release, four injuries, total refinery evacuation, and a shutdown.[70] A 2009 natural gas explosion at a food manufacturing plant led to release of ammonia from the refrigeration system and 71 hospitalizations for

[68] Although the costs associated with those changes may in some cases be high, it is unlikely that a facility would implement costly changes unless it determined that its own private benefits (for example, there could be production efficiency improvements as well as safety enhancements) would equal or exceed those costs.
[69] Roberts, Faimon A. (2015) I-12 in St. Tammany and Tangipahoa Reopened After Ammonia Leak. The Advocate. Baton Rouge. October 16.
[70] CSB Report, Valero Refinery Propane Fire, Final Report, July 9, 2008, http://www.csb.gov/valero-refinery-propane-fire/.

toxic exposure.[71] Improving emergency response could also reduce the length of offsite exposures, which would lower the risk to the public.

The Emergency Coordination provision, number 4, would require RMP facilities to keep written records of coordination efforts with local response agencies including dates, names, and affiliations of individuals contacted. This provision should improve emergency responses by ensuring that appropriate capabilities are established to respond to emergencies. The Exercise provision, number 5, would require almost all RMP facilities to perform notification exercises, and all responding RMP facilities to perform tabletop and field exercises. Such exercises increase emergency response readiness, both for RMP facility owners or operators and local responders, by testing emergency communications systems and emergency plans and by ensuring local and facility response personnel know what actions to take during various accident scenarios. Together, rule provisions 4 and 5 should mitigate the impact of RMP facility accidents that may occur.

Improved coordination between facility owners and operators and the local emergency response officials and emergency exercises (when local responders are involved) also helps ensure that local officials know what to tell the public when real accidental releases occur. This improved information will lead to more efficient responses by the public.

6.1.3 Information Disclosure

Three of the proposed rule components (6, 7, and 8) directly target information provision. Providing information to the public and local agencies has multiple benefits. Better informing the public about chemicals at an RMP facility enables more efficient decisions in the marketplace for nearby properties. Nearby residents will be able to make more informed decisions about where to locate their homes and businesses. Those people who are more risk averse may prefer locating further away compared to people who are less risk averse.

Better informing LEPCs enables more efficient decision-making regarding expenditures on equipment and training for emergency preparedness. By improving information available to the public and LEPCs about the chemicals stored and processes used at RMP facilities, equipment, materials and training will be better aligned with the risks presented by the RMP facility. In addition, if local residents and businesses understand the potential risks from a facility accident, they will be better able to understand recommendations for sheltering in place or evacuation and take appropriate actions should an actual incident occur, thereby mitigating the impacts of the event. Such knowledge can also help develop trust between the facility and the community, which could limit unnecessary concern and make residents more willing to act on recommendations.

[71] CSB Report, ConAgra Natural Gas Explosion and Ammonia Release, Final Report, February 4, 2010, http://www.csb.gov/conagra-natural-gas-explosion-and-ammonia-release/.

6.1.4 Conclusion

The discussion in this section has qualitatively explained how the proposed rule provisions could prevent and mitigate accidents and improve information available to the public and LEPCs. EPA has no data or empirical estimates of the precise impact of each rule provision on the probability and magnitude of an accident, or on improved efficiency due to better information. In order to shed light on the existing landscape, however, in the next section EPA will describe in detail the number and costs of accidents currently associated with RMP facilities. To the extent practicable, the analysis monetizes the costs of damages to partially estimate the baseline costs that should decline due to the proposed rule. It also qualitatively discusses other benefits that are expected outcomes of the proposed rule.

6.2 Number and Costs of Baseline Accidents

As part of the RMP Program, owners or operators of facilities subject to the rule must submit information on accidents that occurred over the previous 5 years if they produced on-site or offsite deaths, injuries, or property damage, or if they led to an evacuation, sheltering in place event, or offsite environmental damage. The analysis reviewed these data for all facilities that reported accidents that occurred from 2004 through 2013 (the last year with complete data) to provide a 10-year baseline.[72] The beginning of the 10-year period was chosen as the earliest date that would fully reflect the impacts of the most recent RMP rule update.

Some accidents that occurred at RMP facilities during the 10-year period were not reported to EPA either because the facility closed subsequent to the accident, decommissioned the process, or removed the regulated substance from the process involved in the accident before it was required to submit a report to the RMP database. For example, a Praxair facility in St. Louis, Missouri, had a fire involving propylene cylinders on June 24, 2005, that resulted in one fatality and significant offsite property damage.[73] MFG Chemical, in Dalton, Georgia, released a cloud of allyl alcohol on April 12, 2004, that led to 154 people being medically treated, 5 hospitalized for chemical exposure, and a community evacuation.[74] Both of these facilities either closed or deregistered the affected process before the deadline for their subsequent RMP report. Due to the omission of such accidents, the 10-year baseline may under-represent the number and magnitude of RMP chemical accidents.

The RMP data indicated that there were 1,517 RMP reportable accidents among the 2,291 total accidents in the 10-year baseline. Facilities provided information for 774 accidents that had no reportable impacts so EPA dropped them from the baseline database. The RMP accident database

[72] The accidents included those that occurred at facilities that subsequently deregistered from the RMP Program. As such, some accidents analyzed may have occurred at facilities no longer subject to the RMP rule. Offsetting this, however, is the registration of new facilities subsequent to 2013.

[73] CSB Report, Praxair Flammable Gas Cylinder Fire, Final Report, June 15, 2006, http://www.csb.gov/praxair-flammable-gas-cylinder-fire/.

[74] CSB Report, MFG Chemical Inc. Toxic Gas Release, Final Report, April 11, 2006, http://www.csb.gov/mfg-chemical-inc-toxic-gas-release/.

contains information on the initiating event and contributing factors for each accident. The impacts reported should be those attributable to, or resulting from, direct exposure to toxic concentrations, radiant heat, or overpressures from accidental releases or from indirect consequences of a vapor cloud explosion from the accidental release. However, EPA determined that there were some accidents where a release of a regulated substance was not the cause of the resulting impacts.

To address this difficulty, RMP reportable accidents were reviewed in detail based on industry knowledge and other resources, such as reports by the Chemical Safety Board, to ensure that only impacts attributable to the release of a regulated substance were included. For example, for one accident, a review of the Chemical Safety Board report indicated that the initiating event was an explosion in a natural gas fuel line that led to a building collapse, the death of 4 workers, and in combination with a subsequent fire, the eventual release of ammonia.[75] The analysis included the accident in the 10-year baseline, and retained the injuries, but excluded the 4 deaths and the property damage because they preceded the regulated substance release. In another case, EPA omits the accident and damages from the analyzed data because it appears that a fire was accidentally set by a flare fired on July 4 by a neighbor.[76]

We indicate that one potential benefit of the proposed rule is prevention of "non-RMP" accidents at RMP facilities. Therefore, it is arguable that EPA should have counted these accidents and accident consequences in the baseline. However, EPA chose not to do so because it is a conservative approach to estimating the potential benefits of the proposed rule.

[75] CSB Report, ConAgra Natural Gas Explosion and Ammonia Release, Final Report, February 4, 2010, http://www.csb.gov/conagra-natural-gas-explosion-and-ammonia-release/

[76] Fire at Patrick Cudahy meat packing plant in Cudahy, WI on July 9, 2009,http://www.bizjournals.com/milwaukee/stories/2009/07/20/daily58.html

6.2.1 On-site RMP Reportable Accidents in the 10-Year Baseline

Exhibit 6-2 presents the 10-year data, by year, for on-site impacts of accidents. Deaths and injuries are attributed to either employees or members of the public.

Exhibit 6-2: On-site Impacts by Year

Year	Impact Accidents	Employee Deaths	Employee Injuries	Public Injuries	Public Deaths	Value of Property Damage
2004	197	6	211	46	0	$124,186,397
2005	152	16	370	6	0	$343,100,280
2006	140	3	193	11	0	$181,088,015
2007	204	5	188	60	0	$207,676,070
2008	168	6	194	11	0	$514,472,444
2009	149	5	221	6	2	$87,029,904
2010	128	9	130	5	0	$114,845,119
2011	138	2	127	0	0	$108,642,919
2012	118	1	159	0	0	$86,245,834
2013	123	3	162	3	0	$287,608,254
Annual Average	151.7	5.6	195.5	14.8	0	$205,489,524
Total Reportable	**1,517**	**56**	**1,955**	**148**	**2**	**$2,054,895,236**

There were a total of 58 on-site fatalities over the 10-year analysis time period, which amounts to an annual average of 6 fatalities. Several accidents involved multiple fatalities. The largest accident during the time period was a refinery explosion in Texas City, Texas, in 2005 that killed 15 employees.[77] In 2010, a Tesoro refinery explosion in Anacortes, Washington, killed 7 employees[78], and a 2004 explosion at Formosa Plastics in Illiopolis, Illinois, killed 5 employees.[79] There were 5 accidents that killed 2 workers each, and the remaining employee deaths were single-fatality incidents. There were two on-site deaths to members of the public who were truck drivers loading a tank truck with ammonia when a line failure occurred.[80]

The RMP rule does not require facilities to disaggregate on-site injuries by severity so it is not possible to determine from the RMP data alone, the severity of the on-site injuries. However, under the RMP accident history requirements, a RMP reportable accident *injury* means "any effect on a human that results either from direct exposure to toxic concentration; radiant heat; or overpressure from accidental

[77] CSB. March 2007. Investigation Report: Refinery Explosion and Fire, Texas City, Texas, March 23, 2005. http://www.csb.gov/assets/1/19/CSBFinalReportBP.pdf

[78] CSB. May 2014. Investigation Report: Catastrophic Rupture of Heat Exchanger, Tesoro Anacortes Refinery, Anacortes, Washington, April 2, 2010. http://www.csb.gov/assets/1/7/Tesoro_Anacortes_2014-May-01.pdf

[79] CSB. April 2004. Investigation Report: Vinyl Chloride Monomer Explosion, Formosa Plastics Corp., Illiopolis, Illinois, April 23, 2004. http://www.csb.gov/assets/1/19/Formosa_IL_Report.pdf.

[80] http://www.startribune.com/rosemount-oklahoma-firms-fined-in-2-deaths/95895109/

releases or from the direct consequences of a vapor cloud explosion (such as flying glass, debris, or other projectiles) from an accidental release and that requires medical treatment or hospitalization." *Medical treatment* means "treatment, other than first aid, administered by a physician or registered professional personnel under standing orders from a physician" (40 CFR 68.3). For some accidents, where accident reports could be located from other sources, it appears that serious injuries (i.e., those requiring hospitalization) range from none (e.g., Leprino Foods August 2013 and Tysons Meats 2012 where all workers were treated and released) to at least 50 percent of reported injuries (Delek Refining 2008); in the largest accident (BP 2005), 66 workers were hospitalized, and 110 others were treated for minor injuries.[81]. Injuries described in reports varied from those that were treated with first aid alone at the scene to severe burns and permanent disability. Although the RMP rule limits reportable injuries to those that require medical treatment other than first aid, in some accidents, minor injuries treated with first aid have been reported. Regarding on-site property damage, the property affected included buildings, machinery, equipment and other plant infrastructure. Almost $677 million of the $2 billion in property damage reported occurred in accidents that had no other reportable impacts on-site or offsite.

6.2.2 Offsite Reportable Impacts in the 10-Year Baseline

Exhibit 6-3 presents the reported offsite impacts for the 10-year baseline including members of the public or emergency responders who were injured or killed offsite, were required to evacuate or shelter-in-place, or who incurred property damage as a result of the accidents. Of the 1,517 reportable releases, 473 had reportable offsite impacts. One member of the public was killed as a result of a release of a regulated substance; that person drove into an ammonia cloud moving across a highway[82]. There were approximately 50 incidents that listed offsite environmental damage but no other impacts. Because environmental damage is reported only as true/false, there is no basis for estimating the costs associated with the damage; they are not presented in either Exhibit 6-2 or 6-3.

[81] CSB, OSHA, and press reports were reviewed for larger accidents. CSB has investigated relatively few of the accidents in the database and does not always detail the severity of injuries. OSHA focuses investigations primarily on fatal accidents or those involving multiple hospitalizations.

[82] http://www.ntsb.gov/investigations/AccidentReports/Pages/HZM1201s.aspx

Exhibit 6-3: Offsite Impacts by Year

Year	Impact Accidents with Offsite Impacts	Number of Deaths	Hospital Visits	People undergoing Other Medical Treatment	Number of people Evacuated	Number of people Sheltered in place	Value of Property Damage
2004	66	0	43	239	5,656	96,958	$1,414,834
2005	54	0	4	32	3,927	135,260	$687,996
2006	53	0	7	26	1,533	11,792	$833,000
2007	61	0	33	212	15,464	32,682	$122,980
2008	45	0	8	74	2,798	4,771	$318,191
2009	44	1	27	37	3,102	8,984	$7,750
2010	36	0	42	112	3,564	4,180	$2,475,500
2011	36	0	2	11	699	47,833	$235,104
2012	36	0	19	14,013	1,008	98,120	$1,536,600
2013	42	0	4	51	838	11,085	$3,720,150
Annual Average	47.3	0.1	18.9	1,480.7	3,859	45,167	$1,135,211
Total Reportable	**473**	**1**	**189**	**14,807**	**38,589**	**451,665**	**$11,352,105**

In the 10-year baseline, the total number of off-site people seeking medical treatment, other than hospitalization, is skewed by a single incident where 14,000 people sought treatment for exposure to smoke and particles from a fire at a Chevron refinery in Richmond, CA, in 2012.[83] For sheltering in place, six different accidents at the BP refinery in Texas City account for 257,000 people taking shelter which explains the high numbers for 2004 and 2005.[84]

6.2.3 Distribution of Accident Impacts across Sectors

In the 10-year baseline, the data indicate that fatal accidents occurred primarily in the petroleum refining, chemical manufacturing, and pulp and paper sectors. Accidents in these sectors accounted for all but 10 of the fatalities. These sectors also account for 87 percent of the onsite property damage (refineries alone account for 59 percent of the total). This is not surprising as these facilities handle highly flammable gases that can explode and burn. These are also large facilities with interconnected processes that can incur extensive damage in an explosion. The fatalities reported as RMP reportable impacts at refineries represent one third of all employee on-the-job fatalities reported to the Bureau of Labor Statistics for that sector for the 10-year period of 2004 to 2013. In the chemical manufacturing

[83] CSB. January 2014. Regulatory Report: Chevron Richmond Refinery Pipe Rupture and Fire, Chevron Richmond Refinery #4 Crude Unit, Richmond, California, August 6, 2012. Report No. 2012-03-I-CA. http://www.csb.gov/assets/1/19/CSB_Chevron_Richmond_Refinery_Regulatory_Report.pdf.

[84] CSB. March 2007. Investigation Report: Refinery Explosion and Fire, Texas City, Texas, March 23, 2005. http://www.csb.gov/assets/1/19/CSBFinalReportBP.pdf.

sector, RMP reported fatalities represent about 6 percent of worker on-the-job deaths in the sector for the period. [85] Exhibit 6-4 presents a breakdown of RMP reportable accidents, deaths, and injuries by sector. The food and beverage manufacturers and warehouses are generally ammonia refrigeration systems; the agricultural chemical distributors store ammonia for use as a fertilizer.

Exhibit 6-4: Accidents, Fatalities, and Injuries by Sector

Sector	Total 10-Year Accidents	Accidents per Facility	Onsite Fatalities [86]	Injuries Onsite	Injuries Offsite
NAICS 324- Petroleum and Coal Products Manufacturing	169	1.08	29	325	14,026
NAICS 325 - Chemical Manufacturing	530	0.36	15	585	378
NAICS 311, 312 - Food/Beverage Manufacturers	270	0.18	3	598	326
NAICS 322 –Paper Manufacturing	46	0.66	1	59	2
NAICS 331, 332, 333, 334, 336, 339 - Other Manufacturing	53	0.14	1	66	14
NAICS 11, 12, 15, 42491 - Agricultural Chemical Distributors	156	0.04	2	157	161
NAICS 4246, 4247 - Chemical/petroleum wholesale	38	0.06	0	30	31
NAICS 4244, 4245 -Other wholesale	20	0.07	0	62	15
NAICS 493 – Warehouse	72	0.07	2	77	9
NAICS 22131, 22132 - Water/POTW	75	0.04	1	89	19
NAICS 211 - Oil/Gas exploration	53	0.07	1	25	11
Other	35	0.06	1	30	4
Total	**1,517**		**56**	**2,103**	**14,996**

6.2.4 Monetized Costs of Chemical Accidents

While the RMP data base provides values of property damage, it includes only counts of fatalities, non-fatal injuries, evacuations, and the number of people required to shelter-in-place. EPA has applied estimates of the values of these impacts to better understand the magnitude of accident impacts during the 10-year baseline. To monetize fatalities, EPA applied the value of statistical life (VSL) recommended in EPA's *Guidelines for Preparing Economic Analysis* (2010) (hereafter the *Guidelines*). For non-fatal injuries, EPA gathered data on hospital costs from the US Department of Health and Human Services

[85] The BLS data reflect only facility employees killed, not contractors, who are accounted for under other NAICS codes. Therefore, these data understate the number of workers who died in refinery accidents. http://www.bls.gov/iif/oshcfoi1.htm

[86] Column excludes 3 public fatalities (see Exhibits 6-2 and 6-3).

(HHS) Agency for Healthcare and Research and Quality Data (2012).[87] Finally, for evacuations and shelter-in-place events, values of labor time were drawn from the Bureau of Labor Statistics (2014).[88]

6.2.4.1 Fatalities and Injuries

Fatalities were valued using the *Guideline's* value of a statistical life ($7.9 million in 2008 dollars) inflated to 2014 dollars ($8.6 million).

In principle, valuation of injuries includes multiple components. The *Guidelines* explain that the willingness to pay (WTP) to reduce the risk of experiencing an illness is the preferred measure of value for morbidity effects: "As described in Freeman (2003), this measure consists of four components:

- "Averting costs" to reduce the risk of illness;
- "Mitigating costs" for treatments such as medical care and medication;
- Indirect costs such as lost time from paid work, maintaining a home, and pursuing leisure activities; and
- Less easily measured but equally real costs of discomfort, anxiety, pain, and suffering."

Unfortunately, data were not available to estimate the components identified in the first, third, and final bullets. These cost categories are omitted from EPA's estimates, which rely solely on the costs of medical care. For on-site injury and offsite hospitalization, the analysis reviewed the accident data to determine the percentage of the accidents that involved explosions and fires and the percentage that involved the release of toxics. The analysis then used the HHS data on the current costs for hospitalizations for poisoning (other than by medicinal substances) to transfer to injuries from toxic releases, for burns to transfer to injuries associated with fire, and for open wounds to transfer to injuries from explosions.[89] Because the costs for open wounds and poisoning were close ($37,700 and $35,300, respectively), the analysis used the average of these two values for on-site injuries; the costs for burns was $100,000. The analysis then created a weighted value of an on-site injury based on the propensity for a burn-related injury versus other impacts (fires were involved in 18 percent of the injury incidents, open wounds were assumed to be the remainder of injury costs). This was approximately $50,000. The analysis used the cost of hospitalization for poisoning (rounded to $35,000) for hospitalizations associated with offsite injuries because in the 10-year baseline these injuries were usually related to exposure to toxic chemicals. For medical treatment, other than hospitalization (offsite), the analysis used an estimate of $1,000, which is above the $750 per person paid to the 14,000 people who sought medical treatment from the Richmond refinery fire, and slightly below the average emergency room cost; people offsite are generally seeking treatment for exposure to fumes, which usually involves relatively low cost treatments (e.g., oxygen, eye washes, skin washes).

[87] http://hcupnet.ahrq.gov

[88] http://www.bls.gov/oes/current/oes_nat.htm

[89] http://hcupnet.ahrq.gov/ See HCUP National (Nationwide) Inpatient Sample (NIS)- specific diagnosis statistics.

The $50,000 cost estimate for on-site injuries is inaccurate for several reasons. As mentioned above for all injuries, hospital costs are only one of four categories of social costs incurred. EPA's estimates are conservative by omitting three of the four categories, due to a lack of data. However, as an estimate of hospital costs, it is an over-estimate for an unknown percentage of the injuries on-site that did not require hospitalizations and may not involve any medical costs[90] Or for injuries and toxic exposures that led to hospitalizations and were minor enough that the person was released within a day (the HHS cost estimates are based on 3-day stays for poisonings and injuries, 8 days for burns). However, in the opposite direction, the $50,000 cost estimate is understated for those workers who were severely injured, for whom the medical costs would certainly have involved more than hospitalization. There would be costs associated with further medical treatment, and physical and occupational therapy.

6.2.4.2 Evacuations and Shelter-in-Place Events

The 10-year baseline data do not provide any basis for estimating the time involved in the average evacuation or sheltering. EPA assumes that sheltering-in-place is less disruptive than evacuations. To estimate costs for evacuations and sheltering-in-place, the analysis assumed the value of time of affected people was $22.65 per hour, and that the shelterings occupied 4 hours, and the evacuations 8 hours.[91]

6.2.4.3 Summary of Monetized Accident Impacts

The dominant monetized element of RMP facility reportable accidents is on-site property damage, followed by onsite fatalities. The total monetized 10-year cost of the accidents is about $2.7 billion. $2.6 billion of that is caused by on-site impacts, and about $2.5 billion is attributed to property damage and fatalities. Monetizing the values of accidents during the 10-year baseline involved a high degree of uncertainty associated with the estimated unit values for on-site injuries, off-site hospitalization, evacuations, and sheltering-in-place. However, these components of cost are small relative to the total cost of chemical accidents. Exhibit 6-5 summarizes the 10-year baseline reportable accident impacts and Exhibit 6-6 presents the monetized 10-year baseline accident costs.

[90] Even for widely investigated accidents, few details on injury levels are available. For the most serious accident in the RMP data, the March 2005 BP explosion and fire, which killed 15 workers, the level of injury among the 170 listed (in the facility RMP) is not well described. The CSB report indicates that 180 people were injured in the accident, and that 114 of these received only first aid and the injuries for the remaining individuals were serious enough to require medical treatment, days away from work, and/or restricted work hours. One press report stated that several were severely injured.

[91] BLS data put the mean hourly wage at $22.65 across all workers at the end of 2014. http://www.bls.gov/news.release/ecec.t01.htm

Exhibit 6-5: Average Impacts per Year and Accident

	10-Year Total	Average/Year	Average/Accident
On-site			
Fatalities	58	5.80	0.038
Injuries	2,103	210	1.386
Property Damage	$2,054,895,236	$205,489,524	$1,354,578
Offsite			
Fatalities	1	0.10	0.001
Hospitalizations	189	19	0.125
Medical Treatment	14,807	1,481	9.76
Evacuations	38,589	3,859	25.44
Sheltering in Place	451,665	45,167	298
Property Damage	$11,352,105	$1,135,211	$7,483

Exhibit 6-6: Monetized Accident Costs per Year and Accident

	Unit Value	10-Year Total	Average/Year	Average/Accident
On-site				
Fatalities	$8,583,113	$497,820,554	$49,782,055.40	$328,161.21
Injuries	$50,000	$105,150,000	$10,515,000	$69,314
Property Damage		$2,054,895,236	$205,489,524	$1,354,578
On-site Total		**$2,657,865,790**	**$265,786,579**	**$1,752,053**
Offsite				
Fatalities	$8,583,113	$8,583,113	$858,311	$5,658
Hospitalizations	$36,000	$6,804,000	$680,400	$4,485
Medical Treatment	$1,000	$14,807,000	$1,480,700	$9,761
Evacuations	$181	$6,992,327	$699,233	$4,609
Sheltering in Place	$91	$40,920,849	$4,092,085	$26,975
Property Damage		$11,352,105	$1,135,211	$7,483
Offsite Total		**$89,459,394**	**$8,945,939**	**$58,971**
Total		**$2,747,325,184**	**$274,732,518**	**$1,811,024**

6.3 Benefits Compared to Costs

The 10-year RMP baseline suggests that considering only the monetized impacts of RMP accidents would mean that the rule's costs likely outweigh the portion of impacts from improved prevention and mitigation that were monetized. The annualized cost of the proposed rule (estimated to range from $130 million with no new responders to $162 million if 50 percent of non-responders must become responders) is between 47 % and 60 % of the average annual monetized costs in the 10-year baseline. However, the monetized impacts of RMP accidents omit important benefit categories including avoided impacts of non-RMP accidents at RMP facilities; the information benefits described above; and

additional benefit categories not reported in the RMP data that result from accident prevention and mitigation. Additional benefit categories include lost productivity; avoided responder costs; avoided transaction costs; protected property values; and avoided environmental impacts; In addition, the proposed rule may cause a reduction in the probability or magnitude of a major catastrophe such as the toxic gas release at Bhopal or the explosion at Phillips in Pasadena, TX in 1989. No such major catastrophes are reflected in the 10-year baseline. The following sections describe major catastrophes and additional benefit categories not covered by the RMP data that derive from accident prevention and mitigation.

6.4 Avoided Catastrophes

Congress, in enacting section 112(r), was focused on catastrophic accidents such as Bhopal, which are extremely rare, but very high consequence events. The large chemical facility accidents that have occurred in the US and Europe, since the beginning of the chemical era, have not approached this level of damage, although it is possible that one could do so. The single largest U.S. chemical accident, the explosion at Phillips, Pasadena, TX, in 1989 killed 23 workers ($197 million in current dollars), injured at least 150 more ($7.5 million), and did $1.4 billion in property damage.[92] The 10-year baseline does not include a major catastrophe such as these. If the proposed revisions were to prevent or substantially mitigate even one accident of this magnitude, the benefits generated would be dramatic.

6.5 Additional Benefit Categories Associated with Accident Prevention and Mitigation

The sections below present a discussion of benefits from the proposed rule provisions for which there is either limited or no information in the RMP data. EPA qualitatively describes each category as a cost of accidents. The proposed rule is expected to reduce costs in each of these categories by an uncertain amount. In each case, data were unavailable to quantify expected impacts of the rule.

6.5.1.1 Avoided Lost Productivity

A major cost associated with some chemical releases that is not captured in the 10-year-baseline estimates presented above, is lost productivity that can result if a facility or process unit must be shut down or is destroyed. The RMP data include estimates of property damage but specifically exclude estimates of lost productivity.[93] EPA has not estimated these costs because of a lack of data. Such costs are highly variable based on the type of release, the extent of the damage, the location of the facility, and product being produced. Marsh, a risk management and energy consultancy, has collected data on

[92] Marsh, The 100 Largest Losses, 1974-2013, Large Property Damage Losses in the Hydrocarbon Industry, 23rd Edition.
https://uk.marsh.com/Portals/18/Documents/100%20Largest%20Losses%2023rd%20Edition%202014.pdf

[93] EPA instructions for RMP submissions specifically direct the owner or operator not to include any losses incurred as a result of business interruption. See page 74 of the RMP*eSubmit User's Manual (EPA, March 2014); http://www.epa.gov/rmp/rmpesubmit-users-manual.

10,000 accidents in the petrochemical sector over 40 years and published 23 editions of its "100 Largest Losses" reports. These limited data suggest that lost productivity may range from zero to four to five times the cost of property damage.[94] Many releases of toxics do not result in property damage and, therefore, have a limited impact on business beyond the loss of the chemical itself. Explosions and fires, however, can produce substantial damage.

The Marsh accident summaries provide examples of the extent of damage and the impact on production, as well as on the variability in those impacts. One refinery facility had $240 million in damage, but continued to operate; another with the same level of damage was shut down for 6 months. Production units affected by major explosions have been shut down for weeks or months or more than a year. Some accident reports indicate production continued but at a reduced rate for weeks or months. A refinery accident that shuts down one or more units will affect the firm involved, especially if it has no other refinery in the area or its other units do not have the capacity to increase production. Such reduced production may, however, be offset by increased production at other firms. Refining capacity in the US is located primarily in the Gulf Coast and West Coast regions; accidents that shut down units in those areas are less likely to have economic impacts beyond the firm owning the refinery if other nearby refineries can increase production. Accidents at refineries in other regions could impose social costs because even if other refineries can produce more, there may be higher costs of transporting products longer distances.

Broader losses could occur in the petrochemical sector where some facilities may be one of the only sources for some products. Even in that sector, however, losses may be limited to the firm involved. For example, the 1989 explosion at the Phillips plant in Pasadena, TX, which destroyed two units at the facility appears to have had a limited impact on the economy even though it was the only domestic source for one product.[95] Appendix A provides a list of the major US accidents cited by Marsh in its 2013 publication, with losses adjusted by Marsh to 2013 dollars. These accidents are limited to those that might have occurred at RMP facilities (offshore oil and distribution accidents were omitted) and to those that were not the result of natural disasters where the damage was the result of flooding or wind, rather than chemical releases. The accident list does not include all serious accidents because Marsh excluded any accident that produced less than $130 million in property damage. (The publication covers accidents worldwide.) Nonetheless, the list indicates the range of property damage and the lost productivity.

6.5.1.2 Avoided Emergency Response Costs

EPA was unable to locate data summarizing the costs associated with responding to a chemical release, fire, or explosion. Very likely these costs vary widely depending on the incident. A response may involve facility fire brigades, community fire departments, volunteer fire departments, and mutual aid

[94] Marsh, The 100 Largest Losses, 1974-2013, Large property damage losses in the Hydrocarbon Industry 23rd Edition. Marsh provides estimates of property damage in current dollars and in a few cases, business loss costs.

[95] http://www.nytimes.com/1989/10/25/us/reverberations-for-industries-but-not-for-us-households.html

groups. There is also the cost associated with equipment depreciation and fire suppressant used. The level of effort and equipment use can be seen in two incidents reported by Marsh. For a 1999 refinery fire in CA, approximately 300 firefighters and 33 fire trucks participated in the two-and-a-half-hour effort to control the fire. Foam concentrate consumption totaled 3,200 gallons. A 1989 explosion at a Louisiana refinery used approximately 48,000 gallons of foam concentrate, 200 fire brigade members, and 13 pumper units during the firefighting effort, which extinguished the fire approximately 14 hours after the initial explosion. Foam concentrate costs between $20 and $60 per gallon; the cost of the fire suppressant alone for these two fires ranged from $64,000 to almost $2.9 million. In sum, EPA expects that these costs are significant.

6.5.1.3 Avoided Transaction Costs

One consequence of chemical accidents is often litigation. Particularly when the public is affected, facilities are often sued. For example, a 1988 refinery explosion led to more than 5,000 property claims[96]. There are substantial costs associated with making and responding to such claims and the litigation surrounding them, both on behalf of plaintiffs and defendants. Rule provisions that reduce the number or severity of accidents could reduce the number of lawsuits and the amount of resources directed toward litigation.

6.5.1.4 Avoided Property Value Impacts

Following an explosion or other chemical release at an RMP facility, the marketplace for nearby properties will adjust to reflect changes in perceived risk, changes in the aesthetic appeal of the surrounding area, and potentially reduced ecological services. An established literature in economics has estimated the impacts on nearby property values of a wide variety of contaminated, toxic, or potentially toxic sites.[97] A variety of papers have specifically examined the impact on property prices of hazardous industrial facilities, usually finding that prices increase with distance from the facility.[98] To improve understanding of the benefits of the proposed rule, we targeted research on the property value impact of *accidents*, not simply proximity to hazardous facilities. Several studies are particularly relevant. Carroll et al (1996) studied property prices in neighborhoods surrounding the Pepcon chemical facility in Nevada before and after a dramatic explosion in 1988.[99] Data were for almost 5,000 property

[96] See Marsh, Shell Norco explosion.

[97] For reviews of the literature, see Boyle, M. A. and K. A. Kiel. 2001. A Survey of House Price Hedonic Studies of the Impact of Environmental Externalities. Journal of Real Estate Literature 9(2): 117-144.
or Banzhaf, S. and E. McCormick, January 2007. Moving Beyond Cleanup: Identifying the Crucibles of Environmental Gentrification, NCEE Working Paper Series 200702, National Center for Environmental Economics, U.S. Environmental Protection Agency.

[98] See Grislain-Letrémy, C. and A. Katossky 2014. The impact of hazardous industrial facilities on housing prices: A comparison of parametric and semiparametric hedonic price models. Regional Science and Urban Economics 49: 93-107 for a review of the literature. (Their Appendix A.1 summarizes findings.)

[99] Carroll, T.M., Clauretie, T.M., Jensen, J. and Waddoups, M. September 1996. The Economic Impact of a Transient Hazard on Property Values: The 1988 PEPCON Explosion in Henderson, Nevada. The Journal of Real Estate Finance and Economics, Volume 13, Issue 2, pp 143-167.

transactions from 1986 to 1990. The explosion was followed by a 17.6% decline in property values in the two closest towns of Green Valley and Henderson (located a mean distance from the Pepcon plant of 3.2 miles and 3.5 miles respectively). It was later announced that the Pepcon facility would be rebuilt over 100 miles away. Local home prices rebounded by 38% after the announcement, suggesting that proximity to the plant prior to the explosion was suppressing property values.

Hansen et al. (2006) studied the effect of a 1999 fuel pipeline explosion in Bellingham, Washington.[100] While the explosion was not from a chemical facility, its property value impacts may be comparable.[101] The data analyzed were a sample of Bellingham single family home sales located within a mile of two pipelines. The sales transacted from 5 and a half years prior to the explosion to 5 years after. Following the event, property prices were significantly adversely affected, with the mean property price discounted by 4.6% for a property 50 feet from the pipeline or 2.3% at 100 feet, 1.2% at 200 feet and 0.2% at 1,000 feet. The authors concluded that the effect diminished over time.

These studies suggest that preventing or mitigating an accident at a chemical facility may prevent or mitigate property value losses in nearby neighborhoods. Note that any avoided property value losses represent part of society's combined valuation of reduced risks to human health, reduced ecosystem services, and negative impacts on aesthetic appeal. Property value losses would represent only nearby homeowners, not any other affected parties such as employees who do not reside in the immediate neighborhood.

6.5.1.5 Avoided Environmental Impacts

In addition to information on deaths, injuries, property damage, evacuations, and sheltering in place, the RMP rule requires owners and operators to report within the five-year accident history accidental releases that result in environmental damage. However, the environmental damage information contained in the RMP database is limited, for two reasons. First, most releases of RMP-regulated substances do not result in lingering contamination issues because most regulated substances are either highly volatile toxics that will rapidly disperse in air, or highly flammable substances that ignite if released in the presence of an ignition source. The other reason is that RMP accident history reports indicate general categories of environmental damage (e.g., fish or animal kills, tree, lawn, shrub, or crop damage, etc.), but do not contain any estimates of damage valuation, or other specific information on reported impacts.

Notwithstanding these limitations, some RMP accidents do result in environmental damage. For example, in the 10-year baseline there were approximately 50 incidents in which offsite environmental

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[100] Hansen, J. L., E. D. Benson and D. A. Hagen. 2006. Environmental Hazards and Residential Property Values: Evidence from a Major Pipeline Event. Land Economics 82(4): 529-541.

[101] An important difference between a pipeline and a chemical facility is that pipelines may not be as noticeable. Parts of the pipelines in Bellingham were buried. Unlike homes near the Pepcon plant, for the five-year period prior to the Bellingham pipeline explosion, nearby property prices showed no effect of proximity to a pipeline. However, we are interested here in the impact of accidents or, for evaluating the proposed rule, the impact of accident prevention, so the house price effects of a pipeline explosion seem informative.

damage was the only impact reported. Rule provisions that prevent or mitigate the extent of accidental releases are therefore likely to prevent or reduce the environmental impacts associated with those releases, but these benefits cannot be quantified using the available data.

6.6 Conclusions

It is not possible to estimate quantitative benefits for the proposed rule. EPA has no data to project the specific impact on accidents made by each proposed rule provision. The accidents themselves have highly variable impacts that are difficult to predict. However, it is clear from the RMP accident data and other data, such as that reported by Marsh, that chemical accidents can impose substantial costs on firms, employees, emergency responders, the community, and the broader economy. Reducing the risk of such accidents and the severity of the impacts when accidents occur, and improving information provision, as the proposed provisions intend, would provide benefits to the potentially affected members of society.

Exhibit 6-9 summarizes all of the benefit or accident cost categories described in this chapter. There are four broad benefit categories related to accident prevention and mitigation including RMP accidents, non-RMP accidents at RMP facilities, and potential major catastrophes. The exhibit explains each and identifies ten associated specific benefit categories. Exhibit 6-7 also highlights and explains the information disclosure benefit category and identifies two specific benefits associated with it.

Exhibit 6-7: Summary of Social Benefits

Broad Benefit Category	Explanation	Specific Benefit Categories
Accident Prevention	Prevention of future RMP facility accidents	• Reduced Fatalities • Reduced Injuries • Reduced Property Damage • Fewer People Sheltered in Place • Fewer Evacuations • Avoided Lost Productivity • Avoided Emergency Response Costs • Avoided Transaction Costs • Avoided Property Value Impacts* • Avoided Environmental Impacts
Accident Mitigation	Mitigation of future RMP facility accidents	
Non-RMP accident prevention and mitigation	Prevention and mitigation of future non-RMP accidents at RMP facilities	
Avoided Catastrophes	Prevention of rare but extremely high consequence events	
Information Disclosure	Provision of information to the public and LEPCs	• Improved efficiency of property markets • Improved resource allocation

* These impacts partially overlap with several other categories, such as reduced health and environmental impacts

To get a sense of the size of the population affected by the proposed rule provisions, EPA determined the number of people that would be affected by facility worst case scenarios and alternative release scenarios. A worst case scenario generally identifies the largest potential reach and effect of a hypothetical accidental release. The alternative release scenario identifies the potential reach and effect under more realistic circumstances than the worst-case scenario. Using RMP data and MARPLOT, EPA was able to determine that the aggregate U.S. population potentially impacted by worst case scenarios is approximately 177 million. The aggregate U.S. population potentially impacted by alternative release scenarios is approximately 40 million.[102] Although the 10-year baseline of accidents does not include a major catastrophe – such as the Pasadena, TX explosion – the population estimates do demonstrate that a significant portion of the U.S. population are at risk for these scenarios. Many of the provisions proposed in this rule are intended to reduce the risks and impacts for this large portion of the country.

[102] EPA. January 27, 2016. Technical Background Document for Notice of Proposed Rulemaking: Risk Management Programs under the Clean Air Act, Section 112(r)(7).

CHAPTER 7: SMALL ENTITY IMPACTS

The Regulatory Flexibility Act as amended (RFA) (5 U.S.C. 601-612) requires agencies to determine whether a proposed rule will have a "significant economic impact on a substantial number of small entities." The Small Business Administration (SBA) sets the standard for defining a small entity by 5 or 6-digit NAICS code, for businesses (13 CFR part 121); governments are considered small if they serve fewer than 50,000 residents.[103] Although "significant economic impact" is not defined by either the RFA or SBA, EPA guidance provides example thresholds of one percent and three percent of revenues.[104] This analysis, however, uses the more stringent one percent threshold because almost 39 percent of the small entities affected by the rule are agricultural chemical distributors; data from the Department of Agriculture indicates that net income in this sector is less than three percent of sales.[105]

This chapter presents the analysis of potential impacts of the rule on small entities. The first section discusses the industrial sectors reported by RMP facilities. The second section describes the approach to determining how many facilities and firms subject to the rule are small based on SBA standards. The third section discusses the economic impacts of the rule on small entities.

7.1 RMP Affected Sectors

The RMP rule affects a broad range of sectors (296 separate NAICS codes are listed in RMP filings; 240 of these are associated with small entities). The primary sectors subject to the rule and the SBA standards for defining a small firm are shown in Exhibit 7-1. A dollar value standard refers to firm revenues in millions; the full-time-equivalent (FTE) employees applies to the firm's total FTE, not the number at any one location. For governments, the standard is based on the population served. The NAICS codes are presented at the 2 to 6-digit level based on whether the SBA standard varies for the 5 and 6-digit codes and whether there are a substantial number of RMP facilities in the sector.[106] For example, the SBA standard for the wholesale trade sector, NAICS code 42, is the same across all codes (100 FTE).

[103] Some small governments serve substantial populations associated with businesses, particularly irrigation districts that serve large farming areas, but few residences, and small cities that have large tourist-related businesses.

[104] See Chapter 2 of *Final Guidance for EPA Rulewriters: Regulatory Flexibility Act,* http://www.epa.gov/rfa/documents/Guidance-RegFlexAct.pdf.

[105] http://www.usda.gov/wps/portal/usda/usdahome?contentid=2013/10/0199.xml

[106] In some cases, NAICS codes are disaggregated to 5 digits and in others 6 digits. SBA does not include all 6-digit codes in its regulation.

Exhibit 7-1: Industry Sector Small Entity Standards

NAICS	Sector	Standard	NAICS	Sector	Standard
111	Crop Production	$0.75m	3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	500 FTE
112	Animal Production and Aquaculture	$0.75m-$15m	3254	Pharmaceutical and Medicine Manufacturing	750 FTE
115	Support Activities for Agriculture and Forestry	$7.5m	3255	Paint, Coating, and Adhesive Manufacturing	500 FTE
211111	Crude Petroleum and Natural Gas Extraction	500 FTE	3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing	500-750 FTE
221112	Fossil Fuel Electric Power Generation	750 FTE	3259	Other Chemical Product and Preparation Manufacturing	500-750 FTE
22131	Water Supply and Irrigation Systems	$27.5m	326	Plastics and Rubber Products Manufacturing	500 -1000 FTE
22132	Sewage Treatment Facilities	$20.5m	327	Nonmetallic Mineral Product Manufacturing	500 -1000 FTE
3111	Animal Food Manufacturing	500 FTE	331	Primary Metal Manufacturing	500 -1000 FTE
3112	Grain and Oilseed Milling	500 -1000 FTE	332	Fabricated Metal Product Manufacturing	500 -1000 FTE
3113	Sugar and Confectionery Product Manufacturing	500-750 FTE	333	Machinery Manufacturing	500 -1000 FTE
3114	Fruit and Vegetable Preserving and Specialty Food Manufacturing	500 -1000 FTE	334	Computer and Electronic Product Manufacturing	500 -1000 FTE
3115	Dairy Product Manufacturing	500 FTE	335	Electrical Equipment, Appliance, and Component Manufacturing	500 -1000 FTE
3116	Animal Slaughtering and Processing	500 FTE	336	Transportation Equipment Manufacturing	500 -1000 FTE
3117	Seafood Product Preparation and Packaging	500 FTE	337	Furniture and Related Product Manufacturing	500 FTE
3118	Bakeries and Tortilla Manufacturing	500-750 FTE	339	Miscellaneous Manufacturing	500 FTE

NAICS	Sector	Standard	NAICS	Sector	Standard
3119	Other Food Manufacturing	500 FTE	42	Wholesale Trade	100 FTE
3121	Beverage Manufacturing	500 FTE	44422	Nursery, Garden Center, and Farm Supply Stores	$11m
322	Paper Manufacturing	500-750 FTE	45431	Fuel Dealers	50 FTE
32411	Petroleum Refineries	1500 FTE	48691	Pipeline Transportation of Refined Product	1,500 FTE
32412	Asphalt Paving, Roofing, and Saturated Materials Manufacturing	500 FTE	48821	Support Activities for Rail Transportation	$15m
32419	Other Petroleum and Coal Products Manufacturing	500-750 FTE	4931	General Warehousing and Storage	$27.5m
3251	Basic Chemical Manufacturing	750-1000 FTE	56179	Other Services to Buildings and Dwellings	$7.5m
3252	Resin and Synthetic Rubber Manufacturing	750-1000 FTE	5621 5622	Waste Management	$38.5m
			92	Governments	<50,000 residents served

The codes that some facilities listed in their RMP filings are problematic. First, many firms list multiple NAICS codes for their facilities. Particularly for agricultural chemical distributors there is often no clear reason for assigning facilities to different NAICS codes when the activities appear to be the same (e.g., facilities named as agricultural co-ops appear in NAICS 111, 115, 32531, 325312, 325313, 325314, 325193, 42451, 42459, 42491, 444, 453, and 493). For other facilities, the parent firm has listed its facilities in the code appropriate for activities occurring at a specific location, but not appropriate for the firm (e.g., integrated gas exploration, production, and distribution companies have facilities in NAICS 211, 424, 486, and 488; integrated oil firms list facilities in NAICS 211, 213, 221, 324, 325, 424, and 541). Second, not all of the NAICS codes listed exist; some are clearly earlier versions of current codes (42269 rather than 42469) and were recoded, but others represent subsectors that do not exist, making them difficult to define. Third, checks of some facilities indicate that the sector listed is incorrect; the only facility with less than 5 FTEs listed for NAICS 32511 (petrochemicals) is variously described in Internet sources as an aerosol packager (an official Missouri report), a paperboard company, or an agricultural chemical distributor (it was recoded to NAICS 32599). Finally, almost all of the governmental entities, which should be listed under NAICS code 92, listed themselves under other codes, primarily 2213 (water and wastewater treatment), but also under chemical manufacturing and waste management; all of these were recoded to NAICS 924. Some of the other facilities listed under NAICS 2213 belong to manufacturing plants. The decision rules applied to re-categorize firms into correct NAICS codes are discussed below.

7.2 Estimating the Number of Small Entities

The RFA and the SBA standards apply to firms, not facilities (or establishments, the term used by the Economic Census) because the costs of the rule are ultimately borne by the firm, rather than the facility. Therefore, to determine the number of small entities, the analysis identified the number of firms and the size of those entities. The RMP data include facility and parent company name as well as the number of full time equivalents (FTE) for the facility and the NAICS codes. Although this information facilitates the small entity analysis, a review of the data indicated a substantial number of issues. Parent company information was often missing and when present, incorrect. For example, for one company with 68 facilities, 15 listed no parent company, 52 listed the company name, and only 1 listed the name of the foreign firm that owns the company. Two cooperatives with 20 and 30 RMP facilities listed zero FTEs for every facility; research indicated that one is among the largest firms in its sector, with revenues of about $1 billion and a senior management team of 15 people. The size of the parent cooperative for the second could not be determined and, therefore, it was categorized as small. Research on one facility determined that it was owned by another firm; that firm in turn was determined to own 8 companies, most of which have RMP facilities but none of which had identified the parent company. Particularly in the oil and gas sectors, where corporate structures include multiple divisions that are separate legal entities for management and tax purposes, and where mergers are frequent, facilities often list the intermediate entities rather than the actual parent company or the entity that purchased the site rather than the current owner.

To develop an estimate of the number of small entities, the analysis required a series of reviews of the data to identify the large entities and the small entities that were part of small firms owning multiple facilities. First, any facility that exceeded 1,500 FTE was categorized as large; 1,500 FTE is the highest threshold for large entities when the SBA standard is based on FTE. Based on Economic Census data, it was determined that any facility of that size would also generate revenues high enough to exceed the highest revenue threshold of any covered sector. Second, SBA sets its standards to ensure that while most firms in a sector are classified as small, the largest firms in a sector are not. Any facility that belonged to the largest firms in the sector were classified as large (e.g., each of the 96 facilities that belong to Tysons Foods). Industry data on the largest firms in each of the major sectors (agricultural chemical distributors, food manufacturers, chemical manufacturers, and oil and gas companies) were used to identify those firms. The largest government entities were also identified in this screen (e.g., all federal entities; any State-owned facility; water systems serving Los Angeles, New York City, Chicago, etc.).

The data were reviewed to identify parent companies that were clear from the facility name, but not included in the parent company field. That made it possible to determine the total FTE for facilities belonging to the same parent company and compare that number to the SBA standard (when in FTEs). If the total FTE exceeded the standard, all the facilities were classified as large. Where the facilities listed different NAICS codes, the analysis applied either the code used for a majority of the facilities or, if no single code dominated, the code with the highest threshold. For example, if a firm had facilities in

sectors where the standards were 500 and 1000 FTE, the 1000 FTE standard was used to determine if the firm was large.

For remaining facilities, if there were multiple facilities belonging to a single firm and the total FTE approached the threshold or if the name included "USA" or "US holdings", which implied an international company, Internet searches were conducted to identify whether the facilities belonged to a firm with other facilities or employees. For example, a chemical company with 7 facilities with a total of less than 300 FTE was determined to belong to a Finnish firm with more 4,000 employees. For oil and gas exploration facilities (NAICS 211), which often have general names (e.g., gas plant 1), EPA's facility registry system was checked to determine which firm owned the facility. [107]

The RFA defines small governments as governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.[108] Most governmental RMP facilities are water and wastewater treatment systems and listed a city or county as the owning entity. A check of budgets that were available for some of the smallest cities indicated that the systems (1) are sub agencies of the city/county and (2) obtain some revenues from the general fund although most of their revenues are derived from user fees. To determine which facilities belong to small governments, the population for the associated city or county was determined by checking the 2014 estimates from the Census. For special water and irrigation districts, their Internet sites were checked for information on the population served. Exhibit 7-2 presents the number of small and large facilities by program level. Exhibit 7-3 presents the small/large breakdown by sectors.

Exhibit 7-2: Number of Facilities Owned by Small and Large Entities by Program Level

RMP Program	Small	Large	Total
Program 3	3,996	6,619	10,615
Program 2	695	590	1285
Program 1	219	423	642
Total	**4,910**	**7,632**	**12,542**

The number of small entities is likely to be overstated. Particularly in the agricultural chemical distributor sector, it was not possible to determine common ownership among facilities with common names (e.g., Farmers Cooperative). Not all of these facilities have websites and, when they do, they do not always provide information on ownership or locations. Unless the names were identical and the facilities located in the same State, the analysis assumed that they belonged to separate firms. It is also likely that for many of these facilities the FTE reported are too low. A number of the agricultural chemical distributors listed multiple facilities at zero FTE even though they are open more than 8 hours a day, 5 days a week.

[107] http://www.epa.gov/enviro/html/fii/index.html

[108] 5 U.S.C. 602.

The classification of facilities as Program 1, 2, or 3 is based solely on the RMP data submitted, but, as explained in Chapter 3, EPA has reclassified the wholesale facilities and certain others based on OSHA's revised interpretation of the PSM retail exemption, which will move these facilities from Program 2 to Program 3. A review of other facilities indicates that, in some cases, classifications in the RMP database are inappropriate. For example, of the 701 water/wastewater facilities in State-plan states, 661 listed themselves correctly as P3, but 40 (including those in a major city) listed themselves as P2.[109] Of the 1,194 publicly owned facilities in States where Federal OSHA implements the PSM standard, 893 listed themselves correctly as P2, but 301 said they are P3. In addition, there are more than 500 other facilities that listed themselves as P2 (outside of the primary agricultural retail sectors); although many of these are, in fact, agricultural chemical distributors, others appear to be facilities that should be subject to Program 3.

Exhibit 7-3: Program Level and Size by Sector

		Program 1		Program 2		Program 3		Total
NAICS	Description	Small	Large	Small	Large	Small	Large	
311	Food Mfg.	1	2	6	5	357	1,014	1,385
312	Beverage/Ice	0	0	0	0	11	80	91
322	Paper/Pulp	0	1	0	1	5	63	70
324	Petroleum	5	8	0	3	21	119	156
325	Chemical	32	21	49	27	458	878	1,465
313, 321, 326, 327, 33	Other Manufacturing	33	29	34	39	113	136	384
4246	Chemical Distributors	2	4	0	0	91	236	333
4247	Petroleum Distributors	3	11	0	0	69	193	276
11, 12, 15, 42491	Agricultural	9	1	0	0	1,809	1,848	3,667
211	Oil and Gas Exploration	88	222	13	28	104	286	741
2213	Water/Wastewater	0	1	6	4	12	79	102
221 222	Utilities	22	16	35	37	80	153	343
493	Warehousing	11	59	0	0	267	719	1,056
423, 424	Other Wholesale	0	5	0	0	100	197	302
92	Governments	6	9	521	414	451	522	1,923
Other		7	34	31	32	48	96	248
Total		**219**	**423**	**695**	**590**	**3,996**	**6,619**	**12,542**

[109] About half of the States have accepted delegation to enforce OSHA rules; OSHA refers to these as State-plan States. As a condition of delegation, the State must impose OSHA standards on State and local governments. Federal OSHA has no authority over those governments, so in States where OSHA enforces the rules, they do not apply to governments.

7.2.1. FIRMS

The RFA applies to firms, not facilities (or establishments, the term used by the Economic Census). For facilities owned by small firms, the analysis identified 1,296 parent companies and 1,184 facilities with no parent company, for a total of 2,480 firms that are small entities. Because firms own facilities in different program levels it is not possible to disaggregate firms by program level accurately. Exhibit 7-4 presents the data on small firms, disaggregated by the total FTE for all the RMP facilities operated by the firms. The exhibit presents firms in four groups: single locations where no parent company was identified; firms with single locations whose name indicated that it owned other presumably non-RMP facilities at other locations;[110] facilities that listed a parent company, but had only one RMP location; and firms that listed a parent company and have multiple RMP facilities. Firms with multiple locations were separated because the FTE counts for these (and for parent companies) will understate the total FTE of the firm and, therefore, the revenue base. Note that this exhibit does not include small governments.

Exhibit 7-4: Small Firms by FTE Totals

Firms	<5 FTE	5-19 FTE	20-99 FTE	100+ FTE	Total Firms	Total RMP Facilities
No Parent Company						
Single Location	187	355	376	230	1,148	1,148
Multiple locations	30	2	5	1	38	38
Parent Company						
Single RMP Location	67	238	325	188	818	818
Multiple RMP locations	53	154	193	76	476	1,928
Total	**337**	**749**	**899**	**495**	**2480**	**3,932***

* Total RMP facilities excludes the 978 small government facilities.

This analysis also divides facilities by responder status. There are a total of 1,404 small responding facilities and 3,289 small non-responding facilities (includes governments, but excludes P1 facilities). Exhibit 7-5 breaks down the number of small non-government facilities that indicated in their RMPs that they are not responders, by FTE. (Government facilities are excluded because FTEs do not reflect the size of the governmental entity.) If any current non-responding facilities should become responders as a result of the proposed revisions to the regulation, then costs to purchase and maintain equipment, train personnel, and conduct exercises increase based on the number of people at the facility. Appendix A provides a breakdown of the number of facilities by 3 and 5/6-digit NAICS code by FTE and responder status for non-governmental facilities.

[110] For example, X Cooperative, Y terminal/plant/location.

Exhibit 7-5: Non-Governmental Non-Responding Facilities by FTE

Non-Responders	
0-19 FTE	1,869
20-99 FTE	489
100+ FTE	179
Total	**2,537**

The proposed rule would impose the STAA requirements on facilities with P3 processes in three NAICS codes – 322 (paper and pulp), 324 (petroleum), and 325 (chemicals). Exhibit 7-6 presents the breakdown of facilities owned by small firms in those sectors by facility FTE.

Exhibit 7-6: P3 Facilities Owned by Small Firms and Subject to STAA by Facility Size and Sector

STAA Facilities	Facility Size		
	0-19 FTE	20-99 FTE	100+
NAICS 322			5
NAICS 324	1	9	11
NAICS 3251/3252	39	222	54
NAICS 3253-3259	40	66	37

7.2.2 GOVERNMENTS

As shown in Exhibit 7-3, there are a combined total of 972 facilities with P2 and P3 processes that are owned and operated by small governments (i.e., the government serves less than 50,000 residents). Because governments that serve populations above 15,000 have revenues well above $10 million so that the costs of the rule would never exceed 1%, the analysis focused on those that served fewer than 15,000 people. Exhibit 7-7 presents the number of all small governments and the number serving less than 15,000 by the number of RMP facilities they operate. Three government facilities included in the number of small governments and number of small government non-responders could not be classified by population; each is a special district for which information could not be located to determine residents served. Two are in very small rural areas and likely serve fewer than 5,000; the third is in a suburb of Salt Lake City and appears to serve at least 25,000 residents.

Exhibit 7-7: Small Governments by the Number of RMP Facilities (P2 and P3) Operated

Category	Number of Governments	Number of Facilities
All Small Governments	689	972
Non Responders	524	750
Non Responders <15,000 Residents	257	364
Non Responders <10,000 Residents	165	210
Non Responders <5,000 Residents	58	75

Unlike the facilities operated by small firms that have multiple RMP facilities, water and wastewater systems operated by small governments are generally in the same town. Where a small firm with multiple facilities may have to train response teams for each facility it operates, a small city or town is more likely to train a single response team to cover all of its facilities.

In addition to cities and local districts with RMP-regulated facilities, cities and towns where other RMP-regulated facilities are located may also incur indirect costs associated with participation in exercises and with reviewing information submitted to the LEPCs or emergency response officials. LEPCs are organized at both the city and county level depending on the location. RMP facilities are located in more than 1,000 counties and more than 5,000 cities/towns/villages. The counties have from 1 to 187 facilities (the latter is Harris County, TX, which covers Houston). Although in general the smallest counties have only one or two facilities, there are a few small counties with more than five.

7.3 Economic Impact on Small Entities

7.3.1 Costs for Small Entities

Under the proposed rule, all facilities would be required to make certain information available to the public and, upon request, to the LEPC. Practically, P1 facilities would not have to spend more than an hour a year on this disclosure because the information disclosed to the public is information every facility should have readily available and because the additional information disclosed to the LEPC relates to provisions that do not apply to P1 facilities. Therefore, the RIA has not considered P1 small facilities in the analysis of impacts.

P2 and P3 facilities would incur the same costs for the other proposed provisions except the STAA. Each facility would be required to disclose information to the public annually, disclose information to LEPCs or emergency response officials upon request, coordinate with the local responders, and conduct a notification drill annually. If the facility is a responder, it would have to hold an annual exercise, including at least one full field exercise every 5 years. P3 facilities in NAICS codes 322, 324, and 325 would have to conduct an STAA as part their PHA every 5 years.

If a facility has an RMP reportable accident, it would incur costs for obtaining a third-party to conduct their next scheduled compliance audit. It would also incur additional costs to conduct a root cause analysis as part of the incident investigation, and to hold a public meeting within 30 days of the accident. Facilities would also be required to conduct investigations of near misses, including a root cause analysis. Finally, if a facility has to become a responder, it would incur costs to develop an emergency response plan, train personnel to respond, purchase and maintain equipment, and conduct exercises.

Exhibit 7-8 presents three sets of costs: low year, annualized, and high year (excludes costs incurred after an accident or a near miss). Low-year costs represent costs for years in which routine annual costs apply. These include costs for coordinating with local responders, conducting notification exercises (applies to all P2 and P3 facilities), conducting tabletop exercises (applies only to responders), and

updating disclosure information to the LEPC and the public. High-year costs represent a year in which every applicable provision would occur, except costs incurred after an accident or "near miss." This includes the routine annual costs and periodic costs that apply either every 3 or 5 years (i.e., field exercise in lieu of a tabletop exercise, public disclosure requirements, and STAA). Because the STAA provisions would only apply to a subset of facilities (i.e., those in NAICS 322, 324, and 325), these facilities are broken out separately in the last two rows of the exhibit. Complex facilities are those categorized as NAICS 324 or 325 and simple facilities are all others. Annualized costs average the low costs incurred for four years with the high costs incurred every fifth year.

Exhibit 7-8: Low, Annualized, and High Year Combined Costs for Small Entities by Group

	Low Year Cost		Annualized		High Year Cost	
	Simple	Complex	Simple	Complex	Simple	Complex
P2 and P3 facilities (excludes P3 facilities subject to STAA)						
Non Responder	$808	$1,223	$808	$1,223	$808	$1,223
Responder 0-19 FTE	$6,743	$9,289	$8,158	$10,898	$9,572	$12,507
Responder 20+ FTE	$7,870	$10,761	$11,885	$15,261	$15,900	$19,761
P3 facilities subject to STAA						
Non Responder	n/a	$1,223	n/a	$17,295	n/a	$33,366
Responder <20 FTE	n/a	$9,289	n/a	$26,970	n/a	$44,650

Exhibit 7-9 presents the incremental costs that current non-responding facilities would incur to become responders. These costs include developing an emergency response program pursuant to §68.95, employee training, and purchasing and maintaining response and personal protective equipment, but do not include the cost of exercises. The incremental cost would be added to the responder costs shown in Exhibit 7-8. The high-year costs are the first year costs when the emergency response program would be developed, personnel trained, and equipment purchased. The low-year cost covers refresher training, training for new employees, and equipment maintenance and replacement. The annualized cost is annualized over 10 years assuming the high year costs occur in the first year and the low year costs in the nine subsequent years.

Exhibit 7-9: Incremental Costs to Become a Responder

	Low	Annualized	High Year
Simple <20	$5,402	$9,799	$49,367
Simple 20+	$6,038	$10,689	$52,546
Complex <20	$8,657	$15,877	$80,853
Governments	$8,010	$14,449	$72,405

Governments are presented separately in Exhibit 7-9 because they would incur higher costs than other simple facilities as a consequence of operating a water treatment facility. This is, in part, because they would need more equipment, specifically chlorine cylinder repair kits as well as personal protective equipment for a higher number of people. Governments are expected to train more people to ensure

that an adequate number of personnel are available at all times; firefighters may be busy with other critical responses when a release occurs so backups would be needed. Governments also have fewer options than other RMP facility owners/operators. A privately owned facility that is a non-responder can choose to remain a non-responder if the local government is capable to respond or if the owner/operator can help fund the local government to develop hazmat response capability. If a public water system is operated by a city or town that does not have appropriate response capability (e.g., a hazardous materials, or hazmat, response team), the local government would need to develop a hazmat response capability unless the town is close to another community that has a hazmat team and is willing to respond. Both public and private facilities could hire emergency response-action contractors to respond, but many and perhaps most of the small RMP facilities are in rural areas that are too far from contractors to make that a realistic option for releases that require a rapid response. As discussed in Chapter 6, more than three quarters of RMP reportable accidents last less than an hour.

As can be seen in Exhibit 7-8, a non-responder with a simple process[111] would only need revenues of $81,000 for the annualized costs to be below one percent of its revenues. If that facility had to become a responder it would need revenues of $1 million to $5 million to have revenues that exceed one percent of costs (based on annualized and high-year costs). As seen in Exhibits 7-8 and 7-9, small governments would need revenues of $816,000 to $957,000 if they are already responders, but $1.5 million to $7.3 million if they have to become responders. Small chemical companies subject to STAA would need revenues above $2.7 million to $4.5 million if they do not need to become responders and almost $10 million if they do become responders.

If a simple facility has an accident its one-year cost could be as high $52,000; for a complex facility, the cost could be as high as $88,000. Because the third-party audit would not necessarily occur in the same year as the accident, however, these costs could be distributed over time.

7.3.2 Estimating Revenues for Small Entities

As is the case for most rules that affect small entities, almost all of the small entities are privately held and little if any information is available on their revenues. Revenue per establishment was calculated from the 2007 Economic Census by dividing total revenue by the number of establishments. A deflator was applied to increase revenues to 2013 dollars. (The Economic Census uses "establishment" to describe single locations and presents data on establishment and firm levels; it does not, however, provide firm-level data for all sectors.)

Exhibit 7-10 presents the data for the sectors with entities small enough to have revenues that might fall below the one percent threshold. For some sectors, the Economic Census provides data only for 0-4 FTE; for others, it provides data for 1 FTE establishments, 2 FTE, and 3-4 FTE. The Economic Census does not cover the agricultural sectors. As noted above, most of the facilities in the agricultural sector appear to be agricultural wholesalers, so the analysis used the revenue estimate for NAICS 42491 for these. The

[111] There are no simple processes at very small facilities that are subject to STAA.

values listed for NAICS 325199 are for the chemical sector as a whole (NAICS 325) because the Census did not include data for establishments this small for this sector. Where cells are blank in the Exhibit, either there are no facilities that fall into the category or the Census does not list revenue data for the category.[112] Shaded cells indicate revenues that would exceed costs of the proposed rule by a factor of 100 or more even in the highest cost year for facilities that needed to become responders, so any facility in that size category or above would not be potentially subject to a cost that would exceed one percent of revenues. Because the revenues for NAICS 211 are so high for the smallest facilities, no other data are listed for that sector. One percent of the highlighted revenues would exceed the cost of the proposed rule even in the highest cost year for facilities that needed to become responders, so any facility in that size category or above would not be potentially subject to a cost that would exceed one percent of revenues.

Column 2 provides two numbers: first, the number of facilities in the sector that are in size categories with revenues low enough that the cost of the rule could exceed one percent of revenues; and, second, the number of non-responders out of that total. For example, there are 1,174 small agricultural chemical distributors in NAICS 42491 with fewer than 10 FTE; 1,062 of them are non-responders. Any non-responder that remains a non-responder in that sector or any current responder should have revenues above the one percent threshold. Any non-responder that has to become a responder, however, would incur first year costs that exceed one percent of revenues.

The analysis used facility rather than firm-level revenue for two reasons. First, firm-level data are not available for all sectors, particularly manufacturing. Second, it is not possible to determine firm sizes for many of the facilities. Focusing on facility level revenue is conservative. If the costs for individual facilities that a firm owns do not exceed one percent of the facility revenues, the costs will not exceed one percent at the firm level. For example, if a firm owns three facilities, each of which has costs that do not exceed one percent of the revenue generated by the facility, the cost will not exceed one percent at the firm level where revenues will be at least the total of revenues from each facility. It may not be the case, however, that if a firm owns facilities where the cost of the rule would exceed one percent at some facilities but not others that the costs would exceed one percent at the firm level.

The Census Bureau has not published recent data on revenues for cities (the most recent data are from 2002) and does not cover cities of less than 25,000 population. The Census provides revenue data for total local government revenues by county (covering all governmental entities including special districts within the country) and a per capita revenue estimate. The Census data indicated that the lowest per capita revenue for a covered county was about $1,024 in 2002 dollars (DeKalb County, MO, with 2 facilities) ($1350 in 2014 dollars).[113] Two other sources (one of which covers all Massachusetts cities and

[112] Usually data are not presented because there are too few establishments in the size category and listing the data could reveal confidential information.

[113] http://censtats.census.gov/usa/usa.shtml

towns) indicated a range of $900 to more than $2,500 for expenditures per person.[114] The smallest town covered by the rule has about 150 residents and a number of others have fewer than 1,000, but in many of these cases it is not clear whether the town owns and operates the facility or whether it is operated by a district that serves multiple communities. In a few cases, EPA was able to locate budget data from small towns and special districts. Revenues per resident ranged from $196 for a special district that serves 9,200 people to $1400. The sample, however, is so small that it would not be appropriate to generalize from it. There are some exceptions on the high end as well. One city with a population of less than 8,000 has revenues of close to $200 million (based on tourist business); another small city operates a combined water system, power system, and cable system; although the water system produces revenues of $2.5 million, the combined system reported revenues of $190 million. For the purpose of the RFA determination, EPA has assumed that revenues per person would not exceed $1,000 and that any city of less than 10,000 that might need to become a responder could incur costs in the high cost year that would exceed one percent of revenues. As shown in Exhibit 7-7, there are 165 small governments operating 210 facilities that are non-responders and that serve fewer than 10,000 people.

There are a number of small governments that operate multiple RMP facilities. Although government revenues do not increase based on the number of facilities, costs to local governments are not likely to scale in the same way as they do for private companies. A local government that operates two or more water and wastewater treatment plants would, if needed, develop a single hazmat team because the facilities are generally in the same town. The government could issue combined public information and hold joint exercises.

Small cities and counties may also participate in emergency response exercises held by RMP facilities and may review information provided by these facilities to LEPCs or other local agencies. These activities are voluntary, but it is reasonable to assume that local agencies will spend some time on them. Involvement in exercises would generally require less than 8 hours of any participant's time or considerably less than one percent of any person's annual working hours. Reviewing information disclosed would take only one to four hours per facility. Unless a city has a substantial number of RMP facilities the effort required would not impose significant costs.

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114 http://parca.samford.edu/LocalGovernment/municipal/Report%20Montgomery%20Revenue%20Comparisons%202010%204.2.10.pdf?AspxAutoDetectCookieSupport=1
http://www.boston.com/yourtown/specials/snapshot/massachusetts_snapshot_expenditures_2012/
(expenditures per resident)

Exhibit 7-10: Average Revenue/Establishment for FTE Class (Economic Census)

	Total # facilities/ # of non-responders where rule costs could > 1% rev	FTEs							
NAICS Code		0-4	1	2	3-4	5-9	10-19	20-49	50-99
111	46/37			$1,495,000	$3,329,000	$5,960,000	$11,640,000	$22,735,000	
112	1/1			$1,495,000	$3,329,000	$5,960,000	$11,640,000	$22,735,000	
115	113/78			$1,495,000	$3,329,000	$5,960,000	$11,640,000	$22,735,000	
211112	0	$13,888,000							
221119	17/14	$1,837,168				$3,330,268	$6,225,566	$9,896,888	
22121	0	$7,505,716				$22,926,662			
32512	30/11	$2,692,000				$6,941,000	$13,381,000	$23,392,000	
32518	13/3	$1,652,000				$6,207,000	$11,475,000	$23,285,000	
325181	3/2	$1,652,000				$6,606,000			
325188	2/1	$2,257,000				$6,207,000	$11,475,000	$23,285,000	
32519	0	$1,424,000					$11,437,000	$34,910,000	
325193	0	$14,208,000					$21,051,000	$88,511,000	
325199	7/1	$1,424,000					$11,437,000	$34,910,000	
325314	45/32	$1,192,000				$3,424,000	$6,211,000	$15,952,000	
32532	5/1	$942,000						$28,422,000	
32551	4/2	$662,000				$2,381,000	$5,342,000	$13,223,000	
32552	2/2	$854,000				$3,099,000	$6,545,000	$16,207,000	
32599	9/2	$720,000				$2,507,000	$6,907,000	$14,578,000	
325998	6/2	$1,424,000				$3,329,000	$8,379,000	$17,995,000	
42399	2/1			$851,039	$1,428,979				
42451	20/20			$4,744,000	$9,671,000	$18,349,000	$42,265,000	$74,456,000	

NAICS Code	Total # facilities/ # of non-responders where rule costs could > 1% rev	FTEs							
		0-4	1	2	3-4	5-9	10-19	20-49	50-99
42459	19/16		$1,148,000	$5,184,000	$6,655,000	$15,718,000	$17,531,000	$56,881,000	
42469	79/31			$1,973,000	$4,949,000	$5,806,000	$18,120,000	$28,325,000	
42471		$11,807,000		$15,665,000	$11,807,000	$19,088,000	$37,556,000	$127,559,000	
42491	1537/1371			$1,495,000	$3,329,000	$5,960,000	$11,640,000	$22,735,000	
44422	16/5		$305,000	$595,000	$991,000	$1,798,000	$3,681,000	$6,247,000	
453998	7/5			$478,000	$675,000	$1,134,000	$2,223,000		
49311	30/22		$208,000	$378,000	$529,000	$836,000	$1,422,000	$2,477,000	$3,550,000
49312	272/44		$279,000	$420,000	$579,000	$1,125,000	$2,418,000	$4,516,000	$6,666,000
49313	82/59			$725,000	$781,000	$1,673,000	$2,373,000	$4,018,000	
49319	45/13			$444,000	$736,000	$949,000	$1,220,000	$1,906,000	
56179	14/14		$132,642	$239,000	$366,000	$661,000	$1,393,000	$3,176,000	

Highlighted cells indicate facility categories where 1 percent of revenues, for any facility in that size category, or above, would exceed the costs of the proposed rule even in the highest cost year (including costs for non-responders to become responders).

7.3.3 Initial Regulatory Flexibility Analysis

Pursuant to section 603 of the RFA, the EPA prepared an initial regulatory flexibility analysis (IRFA) that examines the impact of the proposed rule on small entities along with regulatory alternatives that could minimize that impact.

7.3.3.1 Why EPA is Considering this Action

The purpose of this action is to improve safety at facilities that use and distribute hazardous chemicals. In response to catastrophic chemical facility incidents in the United States, including the explosion that occurred at the West Fertilizer facility in West, Texas, on April 17, 2013 that killed 15 people, President Obama issued EO 13650, "Improving Chemical Facility Safety and Security," on August 1, 2013. Section 6(a)(i) of EO 13650 requires that various Federal agencies develop options for improved chemical facility safety and security, including modernizing regulations. As a result, EPA is proposing revisions to the Risk Management Program (40 CFR part 68). For more information on EO 13650, see Section 1.1 of this document.

7.3.3.2 Objectives of, and Legal Basis for, the Proposed Rule

EPA believes that the RMP regulations have been effective in preventing and mitigating chemical accidents in the United States; however, EPA believes that revisions could further protect human health and the environment from chemical hazards through the advancement of process safety based on lessons learned. These revisions are a result of a review of the existing Risk Management Program and information gathered from the RFI and EO listening sessions, and are proposed under the statutory authority provided by CAA section 112(r) as amended (42 U.S.C. 7412(r)).

7.3.3.3 Estimate of the Number of Small Entities to which the Proposed Rule Will Apply

The RMP rule affects a broad range of sectors (296 separate NAICS codes are listed in RMP filings; 240 of these are associated with small entities). The RMP data include facility and parent company name as well as the number of full time equivalents (FTE) for the facility and the NAICS codes. To develop an estimate of the number of small entities, the analysis required a series of reviews of the data to identify the large entities and the small entities that were part of small firms owning multiple facilities. For more information on the analysis to estimate the number of small entities, see Section 7.2 of this document.

7.3.3.4 Projected Reporting, Recordkeeping and Other Compliance Requirements of the Proposed Rule

Under the proposed rule, all facilities would be required to make certain information available to the public and, upon request, to the LEPC or local emergency response officials. Program 1 facilities would not likely have to spend more than an hour a year on this disclosure because the information disclosed to the public is information every facility should have readily available and because the additional information that would be provided, upon request, to the LEPC relates to provisions that do not apply to

Program 1 facilities. Therefore, the IRFA has not considered Program 1 small facilities in the analysis of impacts.

Program 2 and Program 3 facilities would incur the same costs for the other proposed provisions except the STAA. Each facility would be required to update information to be disclosed annually, coordinate with the local responders, and conduct a notification drill annually. If the facility is a responder, it would have to hold an annual exercise, including at least one full field exercise every 5 years. Program 3 facilities in NAICS codes 322, 324, and 325 would have to conduct an STAA as part their PHA every 5 years.

If a facility has an accident, it would incur costs to hold a public meeting within 30 days of an RMP reportable accident. It would also incur costs for obtaining a third-party to conduct their next scheduled compliance audit and to conduct a root cause analysis as part of the incident investigation. Facilities would also be required to conduct root cause investigations of near misses. Finally, if a facility has to become a responder, it would incur costs to develop an emergency response plan, train personnel to respond, purchase and maintain equipment, and conduct exercises.

Section 7.3.1 of this document describes the costs of the proposed rule for small entities.

7.3.3.5 Related Federal Rules

The Risk Management Program is one of several programs regarding chemical facility safety and security. EO 13650 directed Federal agencies to identify ways to modernize policies, regulations, and standards to enhance safety and security in chemical facilities. The EO established a Chemical Facility Safety and Security Working Group to oversee this effort, which is tri-chaired by the EPA, DOL, and DHS. Members of the Working Group (at the management and staff level) regularly share information in order to coordinate activities on any work involving revisions in regulations, such as revisions to OSHA's PSM standard and DHS' CFATS regulations. These efforts also serve to avoid unnecessary duplication, overlap and conflicts with the Risk Management Program requirements.

OSHA's 29 CFR 1910.119 PSM standard

Mandated by the CAAA of 1990 and issued in 1992, the PSM standard sets requirements for the management of highly hazardous substances to prevent and mitigate hazards associated with catastrophic releases of flammable, explosive, reactive, and toxic chemicals that may endanger workers. The PSM standard covers the manufacturing of explosives and processes involving threshold quantities of flammable liquids and flammable gasses, as well as 137 other highly hazardous chemicals.

The OSHA PSM standard, similar to the EPA RMP rule, aims to prevent or minimize the consequences of accidental chemical releases through implementation of management program elements that integrate technologies, procedures, and management practices. The EPA RMP regulation closely tracks the accident prevention measures contained in the OSHA PSM standard because Section 112(r)(7)(D) of the CAA requires EPA to coordinate the RMP regulation with "any requirements established for comparable

purposes" by OSHA. Consequently, the OSHA PSM standard and EPA RMP regulation are closely aligned in content, policy interpretations, Agency guidance, and enforcement.

Since the inception of these regulations, EPA and OSHA have coordinated closely on their implementation in order to minimize regulatory burden and avoid conflicting requirements for regulated facilities. For example, owners and operators of RMP covered processes also subject to the OSHA PSM standard will generally have met their RMP accident prevention program obligations if they have properly implemented their PSM program.

Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264 and 265)

These regulations establish minimum national standards which define the acceptable management of hazardous waste including requirements for arrangements that owners and operators of hazardous waste facilities make with local authorities. In sections 264.37 and 265.37, hazardous waste generators are required to attempt to make arrangements for emergency response activities with local authorities, and document the refusal of local or State authorities to complete such arrangements in the operating record.

Occupational Safety and Health Act General Duty Clause

Section 5(a)(1) of the Occupational Safety and Health (OSH) Act requires employers to provide its employees with a workplace free from recognized hazards that are causing, or are likely to, cause death or serious physical harm.

EPA's EPCRA regulations (40 CFR 350-372)

Following the 1984 release of approximately 40 tons of MIC into the air in Bhopal, India, that killed over 3,700 people and the 1985 leak of 500 gallons of aldicarb oxime from a Union Carbide facility in Institute, West Virginia, Congress passed EPCRA in October 1986.[115] The purpose of EPCRA is twofold: (1) to encourage and support emergency planning efforts at the state and local levels, and (2) to provide the public and local governments with information concerning potential chemical hazards present in their communities.

EPCRA created state and local infrastructure designed to (1) prepare for and mitigate the effects of a chemical incident and (2) ensure that information on chemical risks in the community is provided to the first responders and the public. These state and local entities are the State Emergency Response Commissions (SERCs), Tribal Emergency Response Commissions (TERCs), LEPCs, and Tribal Emergency Planning Committees (TEPCs). Representatives on the LEPCs include local officials and planners, facility

[115] http://www.nytimes.com/1985/08/12/us/toxic-cloud-leaks-at-carbide-plant-in-west-virginia.html

owners and operators, first responders, health and hospital personnel, environmental groups, and citizen/members of the public.

A central requirement of LEPCs and TEPCs is to develop a local emergency response plan. These plans are required to:

- Identify facilities and transportation routes of extremely hazardous substances and assess the risk based on chemical information from facilities;
- Describe on-site and offsite emergency response procedures;
- Designate a community coordinator and facility emergency coordinator(s) to implement the plan;
- Describe emergency notification procedures;
- Describe how to determine the probable affected area and population by releases (including identification of critical community receptors and assets);
- Describe local emergency equipment and facilities and the persons responsible for them;
- Describe evacuation plans;
- Identify the training program for emergency responders (including schedules); and
- Identify the methods and schedules for exercising emergency response plans.

Under the community right-to-know section of EPCRA, certain facilities that manufacture, process, or store any hazardous chemicals are required to submit an SDS or list of hazardous chemicals, grouped into hazard categories, to SERCs, TERCs, LEPCs, TEPCs, and local fire departments. Under the Hazard Communication Standard, OSHA requires SDSs that describe the properties, hazards, and health effects of these chemicals as well as emergency response procedures and appropriate personal protection equipment. Facilities must also annually report their inventories of all on-site chemicals for which SDSs are required that are stored above reporting threshold quantities to SERCs, LEPCs, and local fire departments. LEPCs must use information about chemical inventories at facilities and SDSs in developing their local emergency plans; this information must also be available to the public.

CAA Section 112(r)(1) general duty clause

The statute requires facility owners and operators to identify hazards; design, maintain and safely operate a facility; and prevent and minimize releases of any regulated substances under §112(r)(3) (40 CFR Part 130) and "any other extremely hazardous substance."[116]

DHS's CFATS regulations 6 CFR part 27

[116] Although the term "any other extremely hazardous substance" is not defined, the legislative history of the 1990 CAA amendments indicates that the term would include any agent "which may or may not be listed or otherwise identified by any Government agency which may as the result of short-term exposures associated with releases to the air cause death, injury or property damage due to its toxicity, reactivity, flammability, volatility, or corrosivity." See: http://www2.epa.gov/sites/production/files/2013-10/documents/gdcregionalguidance.pdf.

The CFATS program, established in 2007, regulates chemical facilities that present a high level of security risk to ensure they have security measures in place to reduce the risks associated with their possession of chemicals of interest (COI). There are 325 COI and 137 of the 140 RMP regulated substances are included on the list of COI.

The CFATS program requires the development, submission, and implementation of Site Security Plans (SSPs) (or Alternative Security Programs in lieu of SSPs), which document the security measures high-risk chemical facilities use to satisfy the applicable risk-based performance standards (RBPS) under CFATS. These plans are not "one-size-fits-all," but in-depth, highly customized, and dependent on each facility's unique circumstances.

Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) requirements for explosives

ATF is responsible for enforcing Federal explosives laws that govern commerce in explosives in the United States, including licensing, storage, recordkeeping, and conduct of business. ATF conducts inspections of Federal explosives licensees who manufacture, import, sell, or store explosives in the United States to ensure that explosives are managed in accordance with Federal regulations found at 27 CFR part 555.

7.3.3.6 Description of Alternatives to the Proposed Rule

In section 2.1, we describe the various regulatory alternatives that were analyzed for each provision. In most cases, EPA chose regulatory alternatives that had reduced impacts on small businesses relative to other alternatives that EPA considered. In this section, we discuss each regulatory provision, explain whether and how the proposed provision minimizes impacts on small businesses, and discuss additional recommendations resulting from the Small Business Advocacy Review (SBAR) Panel that could further mitigate small business impacts. EPA has requested comment on these recommendations in the preamble to the proposed rule.

Third-Party Audits

EPA evaluated three options for this provision and selected the lowest cost alternative, which would apply the requirement only to sources with P2 and/or P3 processes that have had an RMP reportable accident. The other alternatives would have required that all compliance audits be conducted by third-parties for sources with either P3 processes or P2 and P3 processes. Limiting the applicability of this proposed provision to sources that have had RMP reportable accidents minimizes its impact to the overall universe of RMP facilities, and particularly to small businesses. As indicated in Exhibit 5-25, the estimated cost of the high option ($96.2 million annualized) is nearly 20 times higher than the estimated costs of the proposed option ($5.0 million annualized). Furthermore, a majority of the costs for the proposed option would likely be borne by large businesses, as historically, most RMP accidents have occurred at facilities that do not meet SBA small business criteria. Exhibit 7-11 shows the percentage of accidents from 2004-2013 that occurred at small and large facilities.

Exhibit 7-11: Percentage of Accidents at Small and Large RMP facilities, 2004 – 2013

Sector	P1		P2		P3		Total
	Small	Large	Small	Large	Small	Large	
NAICS 325 - Chemical Manufacturing	0	6	1	5	53	465	530
NAICS 311, 312 - Food/Beverage Manufacturers	0	0	2	0	58	210	270
NAICS 322 –Paper Manufacturing	0	0	0	0	9	37	46
NAICS 331, 332, 333, 334, 336, 339 - Other Manufacturing	0	0	4	0	12	27	43
NAICS 11, 12, 15, 42491 - Agricultural Chemical Distributors	0	0	0	0	91	65	156
NAICS 4246, 4247 - Chemical/petroleum wholesale	0	2	0	0	7	29	38
NAICS 4244, 4245 -Other wholesale	0	0	0	0	7	13	20
NAICS 493 – Warehouse	0	1	0	0	18	53	72
NAICS 324- Petroleum and Coal Products Manufacturing	2	6	0	0	15	146	169
NAICS 22131, 22132 - Water/POTW	0	0	14	20	17	24	75
NAICS 211 - Oil/Gas exploration	4	4	1	0	10	34	53
Other	3	7	7	4	7	17	45
Total	9	26	29	29	304	1,120	1,517

While the proposed third-party audit provision should have fairly low impact on small businesses, the SBAR Panel made additional recommendations to further minimize the impacts of this provision on small businesses. The Panel recommended that EPA consider proposing streamlined independence requirements for small businesses (i.e. based on size of the facility). The Panel also recommended that EPA limit the independence criteria to individuals participating in the audit rather than the entire company. The Panel further recommended that EPA seek comments on:

- Eliminating the independence requirement, in its entirety, and retaining existing requirement for compliance audits;
- Limiting applicability of the third-party audit provision by only requiring third-party audits, for Program 3 facilities, triggered by major accidents that have offsite impacts and how to define or characterize “major accidents with offsite impacts”;
- Deleting the current PE requirement and considering other independent accreditation for third-party auditors which also carry ethical requirements, such as CSP, CIH, CFPS, CHMM, CPEA, or CPSA; and

- The impacts a third-party auditor may have on a facility's security and the measures that should be included in the rule provision to protect facilities from terrorism or release of CBI from a third-party auditor.

EPA incorporated preamble language to address these Panel recommendations in section IV.B of the preamble.

Incident Investigation/Root Cause Analysis

In this case, EPA considered two potential regulatory options, and proposed the higher cost option, which would apply the requirement for an incident root cause analysis to all RMP reportable accidents and near misses involving P2 and P3 processes. The lower cost option would apply the requirement to accidents and near misses at only P3 processes. Although the Agency chose the higher cost option, this provision is estimated to be one of the least costly provisions of the proposed rule. In fact, the costs for both options considered were nearly indistinguishable – as indicated in Exhibit 5-25, both the low and proposed options are estimated to cost approximately $0.8 million annually. Therefore, EPA believes that the additional safety benefit of requiring owners and operators of P2 processes to also conduct root cause analyses after incidents and near misses was warranted.

The SBAR Panel also made recommendations to further minimize the impacts of this provision on small businesses. The Panel recommended that EPA clarify our intent that incident investigations are not intended to cover minor accidents or minor near misses that could not reasonably have resulted in a catastrophic release. The Panel further recommended that EPA consider proposing to require root cause analysis only for reportable releases, not including near misses. The Panel recommended that EPA clarify in the preamble the comparative advantages of a root cause analysis to the current incident investigation requirements in §§68.60 and 68.81 of the rule. Finally, the Panel recommended that EPA seek comments on:

- Whether the root cause analysis requirement should be eliminated;
- The revised definition of catastrophic release and whether it should be limited to loss of life, serious injury or significant damage or loss of offsite property; and
- Examples of near misses.

EPA incorporated preamble language to address these Panel recommendations in section IV.A of the preamble.

STAA

For STAA, EPA examined three potential alternative regulatory options, and chose the least costly option. The proposed option, which would apply the STAA requirement to P3 processes in NAICS 322 (paper manufacturing), 324 (petroleum and coal products manufacturing), and 325 (chemical manufacturing), costs $34.8 million annually and is approximately half as costly as the medium option ($71.7 million annually), which would apply the requirement to all P3 processes, and likely far less costly

than the high option, which would require implementation of feasible safer alternatives for all P3 processes.

The low-cost STAA option not only minimizes the overall number of sources that are subject to it, but is also biased toward larger sources. This is because the three sectors selected for regulation under this proposed provision all have a lower percentage of small entities than the overall percentage of small entities within the RMP facility universe. As indicated in Exhibit 7-12, approximately 39% of facilities regulated under the RMP regulation are owned by small entities. In comparison, NAICS 322 (paper manufacturing) has about 20% RMP-regulated small businesses within the sector, while NAICS 324 (petroleum and coal products manufacturing) and 325 (chemical manufacturing) each have approximately 10% small businesses.

Exhibit 7-12: Percentage of Small Businesses in NAICS 322, 324, 325 and Overall

Sector	Small	Total	Percentage Small
NAICS 322 –Paper Manufacturing	9	46	19.6%
NAICS 324- Petroleum and Coal Products Manufacturing	17	169	10.1%
NAICS 325 - Chemical Manufacturing	54	530	10.2%
All Sectors	4,910	12,542	39.1%

The SBAR Panel also made recommendations to further minimize the impacts of this provision on small businesses. The Panel recommended that EPA explain what evidence we have that caused us to reconsider the 1996 assessment that IST analysis was unlikely to yield additional benefits. The Panel further recommended that EPA seek comments on:

- Whether to eliminate this requirement;
- Limiting this provision to require analyses only to be conducted at the design stage of new processes; and
- Exempting batch toll manufacturers from this requirement.

EPA incorporated preamble language to address these Panel recommendations in section IV.C of the preamble.

Emergency Response Program Coordination with Local Responders

The proposed option (medium option) would require all facilities with P2 or P3 processes to coordinate with local response agencies annually and document coordination activities. This option would also allow the LEPC or local emergency response officials to require that the RMP-facility owner or operator

comply with the emergency response program requirements of §68.95. EPA considered, but did not propose, the more stringent option of requiring all facilities with P2 or P3 processes to implement an emergency response program and respond to accidental releases at the facility. The proposed option is estimated to cost $6.3 million annually and is far less costly than the high option, which would likely have exceeded $100 million annually. Therefore, by selecting the medium option, EPA substantially reduced the cost impact for the many small entities that may rely on local response organizations to respond to accidental releases at the source (see Exhibit 3-8 and Appendix B for more information on the number, size, and industrial categories of non-responding facilities).

While EPA does not believe it is necessary to require that all facilities develop an in-house response capability, the Agency believes that non-responding facilities, even if they are small businesses, must still coordinate with local public responders so that they are prepared to handle emergencies at the facility. EPA expects that these coordination activities will result in some sources, including some small entities, becoming responding facilities, which may involve additional costs for those facilities (see section 5.6). EPA believes this is necessary to meet the objectives of Clean Air Act section 112(r), which requires the Agency to promulgate regulations to (among other things) provide for a prompt emergency response to any accidental releases in order to protect human health and the environment. We also note that the 2013 accident at West Fertilizer, which was one of several accidents that triggered the Executive Order that ultimately led to this rule proposal, occurred at a facility that would likely have been considered a small entity under the established SBA criteria. The Agency believes it is appropriate to require that such facilities conduct adequate emergency coordination, and if necessary, develop adequate emergency response capabilities, even if they are small.

The SBAR Panel also made recommendations to further minimize the impacts of this provision on small businesses. The Panel recommended that EPA explain how coordination should occur between local emergency response officials and small facilities and clarify requirements for facilities that make a "good faith" effort to coordinate with local emergency response officials. The Panel also recommended that EPA seek comment on the proposed frequency for annual coordination. EPA incorporated preamble language to address these Panel recommendations in section V.A of the preamble.

Exercises

Notification Exercises

The proposed rule would require all facilities with P2 or P3 processes to annually conduct an emergency notification exercise to ensure that their emergency contact list is complete, accurate, and up-to-date. This proposed provision is expected to be one of the least costly rule provisions at $1.4 million annually (only the incident investigation root cause analysis and public meetings provisions are estimated to cost less). Therefore EPA did not consider any alternatives to reduce the impact of this provision on small businesses, nor did the SBAR panel make any such recommendations.

Tabletop and Field Exercises

The proposed option was the medium option, and would require responding facilities to conduct a full field exercise at least once every five years and tabletop exercises annually in the interim years. This option was substantially less costly than the high option ($61 million vs $104 million annually), which would require annual field exercises. As this provision only affects responding facilities, which tend to more often be large facilities (see Exhibit 3-8), EPA has proposed an option that mitigates the impact on small entities. EPA also considered a low option that would only require annual tabletop exercises. This option would have saved approximately $11 million annually. We did not propose the low option because the Agency believes that periodic field exercises are an important component of a comprehensive emergency response program. Nevertheless, this was also a recommendation from the SBAR panel and we have requested comment on the low option provision in the preamble to the proposed rule.

The SBAR Panel also made other recommendations to further minimize the impacts of this provision on small businesses. The Panel recommended that EPA clarify that participation by local responders is not required for a facility to comply with exercise requirements and that field exercises and drills required by other state and Federal regulations could meet this requirement if the facility's emergency response plan is tested as part of those exercises. The Panel also recommended that EPA seek comments on:

- Whether the exercise provision should be eliminated;
- How to address postponement and rescheduling issues (which SERs have indicated may take up to a year);
- Limiting the requirement to only tabletop exercises; and
- The frequency of required field and tabletop exercises.

EPA incorporated preamble language to address these Panel recommendations in section V.B of the preamble.

Information Availability

There are three proposed information disclosure requirements. Under the proposed requirements, all facilities would be required to make certain information available to the public. Upon receiving a request from their LEPC or local emergency response official, regulated facilities would also be required to provide certain information to the LEPC or emergency response officials. Lastly, facilities would be required to hold public meetings within 30 days of any RMP reportable accident. In the preamble to the proposed rule, EPA has requested public comments on whether all regulated facilities should be required to hold a public meeting every five years and after an RMP reportable accident, or whether a requirement for periodic and post-accident public meetings should be limited to only P2 and P3 facilities. Although EPA has not proposed specific alternatives to minimize the impact of the information disclosure provisions on small businesses, the Agency believes that in general, smaller facilities will bear lower costs to comply with these provisions. By requiring certain information disclosure elements (i.e., incident investigation and public meeting provisions) only following an RMP reportable accident, EPA is minimizing the impact to the overall universe of RMP facilities, and particularly to small businesses.

Most RMP reportable accidents have generally occurred at facilities that do not meet SBA small business criteria (see Exhibit 7-11). Also, small facilities will generally have fewer processes, fewer chemicals, fewer accidental releases, etc., on which to provide information to LEPCs and the public.

The SBAR panel also made recommendations to further minimize the impacts of this provision on small businesses. The Panel recommended that EPA:

- Consider only requiring facilities to develop chemical hazard information summaries and allowing LEPCs to make reasonable requests for additional information;
- Make chemical hazard information available upon request by the LEPC rather than requiring it to be automatically submitted by the facility;
- Require that a public meeting be held only after an RMP reportable accident; and
- Allow public meetings to be combined with any meeting open to the general public (e.g. city council, municipal board, or LEPC meeting).

The Panel also recommended that EPA seeks comments on:

- Narrowing the approach to require a one page summary of each significant chemical hazard during a fire identifying the product, its properties, its location and firefighting measures for responders-- a one-page summary of information that addresses chemical hazard information and emergency response measures;
- Limiting the amount of information to be shared with LEPCs;
- Whether EPA should specify a format for summary information to make it easier for local officials to find and interpret the information that they need:
- Ways to limit the scope of the information elements shared with the public as well as the format in which information should be provided (e.g. a one-page summary of information that addresses chemical hazard information and emergency response measures);
- Whether the existing RMP data, including the executive summary, are adequate for the public in the absence of a specific request, and
- Whether additional information should only be provided to the public upon request.
- Whether it is appropriate to require public meetings;
- Whether to eliminate the public meeting requirement and instead require the facility to schedule a meeting with the LEPC and/or emergency responders 60 to 90 days after an accident or incident;
- Whether public meetings should be held upon request (e.g., LEPC or its community equivalent) rather than automatically within an established timeframe; and
- Extending the timeframe from 30 to 90 days or whether there is a more appropriate timeframe for scheduling a meeting following an RMP reportable accident and who should be included in the invitation (e.g. limit to local emergency response officials and LEPCs).

EPA incorporated preamble language to address these Panel recommendations in section VI of the preamble. EPA also revised the proposed rule to incorporate the following two Panel recommendations as the proposed options:

- Make chemical hazard information available upon request by the LEPC rather than requiring it to be automatically submitted by the facility; and
- Require that a public meeting be held only after an RMP reportable accident.

7.4 Conclusion

It is possible that the costs of the rule would exceed one percent of revenues for some RMP small entities that are currently not responders. The maximum number affected would be 1,442. In years where the STAA analysis occurs or a field exercise occurs, the cost could exceed the threshold for a larger number of facilities. The most significant cost for small entities, however, will be incurred by those that have to become responders; in the first year of compliance, when they have to pay for training and response equipment, the costs are likely to exceed one percent of revenues for many of the facilities with fewer than 20 FTE. Facilities owned and operated by governments serving fewer than 10,000 people may incur costs above one percent of their revenues in the initial year if the government has to train and equip a hazmat team. These governments may be able to obtain funding to cover some training costs through grants from the Pipeline and Hazardous Materials Safety Administration of the U.S. Department of Transportation; local responders may also attend training courses offered by the Federal Emergency Management Agency at no cost (other than travel and expenses).

In developing the proposed rule, EPA considered alternatives to reduce the impacts on small entities. The proposal limits the STAA provision to high risk sectors, removing what could be a substantial burden on other sectors that would probably have to hire consultants to conduct the analyses. EPA considered limiting applicability of some provisions to P3 facilities, but with the shift in OSHA's interpretation of the retail facility exemption under the PSM standard, the effect of such a change was reduced (most P2 facilities will shift to P3). A substantial majority of P2 facilities that will remain are government water and wastewater treatment systems; because the only difference between those systems in P2 and those in P3 is the applicability of OSHA PSM (i.e., there is no difference in the risk posed), EPA could not justify providing regulatory relief to these facilities who are in P3. EPA did not consider exempting small facilities or governments from the requirement to become responders if the local agencies are not capable of responding or ask the facility to handle any accidents in-house. The smallest facilities that are not responders are too often in rural areas where there may be no hazmat response capability within a reasonable distance and, in some cases, in areas with no local fire department. When it enacted section 112(r), Congress clearly required facilities to ensure that there was a capability to respond to releases.

CHAPTER 8: ENVIRONMENTAL JUSTICE

8.1 Background and Context

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (February, 1994) places a responsibility on federal agencies for "identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States[.]" This section explains how EPA has addressed environmental justice issues associated with this rulemaking.

Environmental risks may result from industrial or commercial activities by private actors, or from governmental activities or programs. When those risks are disproportionately borne by particular subpopulations, environmental justice is achieved through *Fair Treatment* and *Meaningful Involvement.*[117]

> ***Fair treatment*** refers to efforts to prevent environmental risks and harms from disproportionately affecting a particular group of people.
>
> ***Meaningful involvement*** refers to inclusion of potentially affected populations in decisions about activities or programs to address those risks. Meaningful involvement may include facilitating the involvement of populations potentially affected by those activities or programs. It also entails ensuring that potentially affected populations have an opportunity to participate in decisions and influence decisions about those activities or programs. "Empowering communities" is a specific goal established by the OSWER Environmental Justice Task Force [118]

EPA used these principles in identifying and ameliorating environmental justice issues associated with RMP facilities.

8.2 Identifying Potential Environmental Justice Concerns Associated with RMP Facilities

At all facilities regulated under the Risk Management Program, an accidental release of a regulated substance creates a hazard to surrounding communities and environments. These hazards include, for example, exposure to toxic substances, fires, explosions, and noxious gas clouds.

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[117] *Guidance on Considering Environmental Justice During the Development of Regulatory Actions,* US EPA, May 2015.

[118] "OSWER Environmental Justice Task Force Draft Final Report", EPA 540/R-94/004, April 1994. Also see "Integration of Environmental Justice into OSWER Policy, Guidance, and Regulatory Development" (OSWER directive No. 9200, 3-17, Sept 21, 1994)

In undertaking actions in response to Executive Order 13650[119], EPA sought to determine if there were environmental justice concerns associated with these risks from stationary sources regulated under the RMP rule. We assessed data using EPA tools and census information, and reviewed existing academic and gray literature on risks to populations of concern.

8.2.1 Assessment of risks to relevant populations, based on proximity

Facilities that are regulated under the Risk Management Program pose risks of fire, explosion, and/or exposure to hazardous chemicals. Chemical hazards include burns, corrosive damage to people and property, as well as exposure associated with acute toxicity. Exposure from these facilities may put local populations at risk through inhalation, ingestion, or dermal contact.

Exhibit 8-1 shows the demographics in the vicinity of RMP sites, using locational data from the RMP database and demographic data from EPA's EJSCREEN tool.[120] The analysis shows that minority and low-income populations are more likely to be in proximity to those facilities (and thus at greater risk) than other populations.[121]

Exhibit 8-1: Demographic Profile of Key Populations

Location	Population	Low-income	Minority	Linguistically isolated
Total near RMP facilities[122]	31.27 million	13,757,000	14,770,000	2,482,000
US Total	309.14 million	104,256,000	112,235,000	15,905,000
Demographics of population near RMP facilities[123]		44%	47%	8%
Demographics of overall US population		34%	36%	5%
Difference in populations near RMP sites		*29% greater*	*31% greater*	*60% greater*

44% of people in proximity (defined as living within a one-mile radius) to RMP sites are low-income; the average in the US population is 34%. Low-income is defined here as less than twice the Census Bureau's poverty threshold.

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[119] "Improving Chemical Facility Safety and Security," August 2013.

[120] See http://www2.epa.gov/sites/production/files/2015-05/documents/ejscreen_technical_document_20150505.pdf.

[121] Demographic data on populations are from the American Community Survey 2008-2012, US Census Bureau. https://www.census.gov/programs-surveys/acs/news/data-releases/2012/release.html#par_textimage_0

[122] Not including facilities in Puerto Rico and Guam.

[123] This analysis counts each person for once for *each* RMP facility they are near. There is a likelihood of a small degree of double-counting, therefore, for those who are in close proximity to two or more facilities. However, this effect is likely to be small, as the data shows that less than 5% of the US population is in close proximity to two or more RMP facilities.

47% of people in proximity to RMP sites are ethnic minorities, including any designation except for "Non-Hispanic, White." It therefore includes those identifying as Hispanic white or as multiracial white. The average in the US population (overall) is 36%.

The other demographic indicator we examined was "linguistic isolation." This category consists of households where no one over age 14 speaks English well, and some other language is spoken at home. 8% of populations in proximity to RMP facilities are linguistically isolated, compared to only 5% in the general US population. This characteristic is important for understanding disproportionate impact, inasmuch as these people are less likely to be aware of risks, to understand them, and to know what to do to help protect themselves.

In comparison to the general US population, therefore, we can conclude that populations surrounding RMP facilities are:

- 29% more likely to be low-income;
- 31% more likely to be minorities; and
- 60% more likely to be linguistically isolated.

To the extent that populations living closer to facilities are more likely to be exposed if a release occurs, RMP facilities pose a greater risk to these key demographic groups.

8.2.2 Assessment of risks to relevant populations, in existing literature

Studies external to EPA have also examined these issues. A 2004 analysis by the University of Pennsylvania examined risk to surrounding minority communities, based on an assessment of the potential for releases and property damages and injuries at RMP facilities.[124] The writers also compared those risks with the demographics of surrounding communities. They found significant correlations between riskier facilities (larger and featuring more complex chemical processes) with location in counties with larger African American populations. They concluded:

> "Thus, higher risk facilities are more likely to be found in counties with sizeable poor and/or minority populations that disproportionately bear the collateral environmental, property, and health risks."

In 2014, the Environmental Justice and Health Alliance for Chemical Policy Reform found that the populations vulnerable to releases from chemical facilities are disproportionately black or Latino.[125] Compared to the US population as a whole, these vulnerable populations have higher rates of poverty,

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[124] Elliott, M.R., et al, "Environmental Justice: frequency and severity of US chemical industry accidents and the socioeconomic status of surrounding communities" Journal of Epidemiology and Community Health 2004; 58:24-30.

[125] *Who's in Danger? A Demographic Analysis of Chemical Disaster Vulnerability Zones*, May 2014. The report was produced in collaboration with Coming Clean and The Center for Effective Government. http://comingcleaninc.org/whats-new/whos-in-danger-report

lower incomes, and education levels. In particular, this report focuses on the communities closest to the facilities (at the "fence line").

8.2.3 Conclusions

Based on analysis of RMP data and other studies, EPA concludes that there is evidence that risks from RMP facilities fall on minority and low-income populations, to a significantly greater degree than those risks affect other populations.

8.3 Actions Taken to Facilitate "Fair Treatment"

Chapter 6 describes the reductions in risk that EPA anticipates to result from this rule. These include reducing the frequency of releases and accidents at RMP facilities, mitigating the damages when releases do occur, and improved information for affected communities and for emergency planners and responders.

To the extent that this rule results in reductions of risk to US populations overall, EPA anticipates that it will result in greater risk reductions for minority communities and lower-income communities, since they bear a larger portion of the risk. Note that this reduces the *absolute* disparity in risks, but not the *relative* disparity in risk that is associated with proximity to RMP facilities. Thus, EPA believes that this proposed rule will not have potential disproportionately high and adverse human health or environmental effects on minority, low income, or indigenous populations because it increases the level of environmental protection for all affected populations without having any disproportionately high and adverse human health or environmental effects on any population, including any minority, low-income or indigenous populations.

8.4 Actions Taken to Facilitate "Meaningful Involvement"

Addressing environmental justice concerns entails meaningful involvement by affected communities. EPA has taken actions to ensure that these communities have a significant role in characterizing the risks associated with RMP facilities. In addition, EPA has facilitated communities' involvement in assessing problems concerning RMP facilities and policy options for addressing these problems.

EPA took a variety of steps to consult with communities that might be threatened by hazardous substances. In coordination with other agencies undertaking reviews regarding EO 13650, EPA, along with other key federal agencies, conducted a series of listening sessions and public communication efforts regarding addressing potential hazards from RMP stationary sources and other facilities.

EPA participated in public sessions between November 2013 and January 2014 on the following dates:

- November 5, 2013, Texas City, TX
- November 15, 2013, Washington, DC
- November 19, 2013, Springfield, IL

- December 11, 2013, Orlando, FL
- January 9, 2014, Los Angeles CA
- January 14, 2014, Washington DC
- January, 2014 in Sacramento, CA
- February 27, 2014 in Newark, NJ

In addition, EPA participated in a webinar on the topic in November, 2013.

Representatives from a variety of stakeholder organizations presented information and statements to the federal agencies convening these sessions. Many of those giving testimony represented neighborhood and community groups, and especially groups with information regarding minority, low-income, and indigenous populations. Presenters from the following organizations provided information on the risk to those populations from chemical facilities:

- Center for Health Environment and Justice
- Center for the Urban Environment
- Louisiana Bucket Brigade
- Louisiana Environmental Justice Community Organizing Coalition
- Louisiana Environmental Action Network
- Mossville (LA) Environmental Action Now
- Just Transition Alliance
- East Yard Communities for Environmental Justice
- Communities for a Better Environment
- Public Citizen
- Citizens for Clean Air and Clean Water
- Texas Environmental Justice Advocacy Service
- Environmental Justice Health Alliance
- Community In-Power and Development Association
- Coalition for a Safe Environment
- Air Alliance Houston
- People not Pozos – Esperanza Community Housing Corporation
- San Pedro Homeowners United
- Citizens for Responsible & Equal Environmental Protection
- Ironbound Community Corporation

As a result of these consultations, EPA gathered important information regarding environmental justice at communities impacted by RMP facilities.[126]

[126] Notes from the consultations and public comments can be found at: http://www.regulations.gov/#!documentDetail;D=DHS-2013-0075-0001.

Topics addressed included:

- The association between high-risk areas and low-income areas.
- Insufficient information received by local communities about hazards presented by nearby facilities, and the need for enhanced information sharing.
- Cumulative effects of risks in communities affected by multiple RMP facilities.
- The need for local communities to be able to participate in planning activities, and problems that occur when those opportunities not available.
- The need to help communities with information and planning to enable them to better understand chemical facility hazards and know what to do when a release of hazardous materials occurs.
- Emphasizing the particular vulnerability of EJ communities to detrimental effects of disasters, especially regarding racial discrimination.
- The effects of existing health disparities, cumulative impacts of facilities, and limited resources available to community members to understand and help solve the risk problems.
- The process of notifying local communities when a chemical accident occurs is poor and irregular. Alarm and siren systems are often not effective.
- Inadequate communication between Local Emergency Planning Committees and local citizens.
- The need for addressing and incorporating environmental justice issues within disaster plans, such as evacuation, return and rebuilding, and understanding and addressing health consequences.

These consultations provided invaluable information about impacts on poor and minority communities, directly from affected community members and environmental justice groups. They also provided a means for involvement of these communities in developing policy options to address those risks. Several of the components of this proposed rule – and their concomitant benefits – are based on the information and issues brought to EPA's attention in these sessions.

CHAPTER 9: OTHER ANALYSES AND CONCLUSIONS

9.1 Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1531–1538) requires agencies to conduct a cost benefit analysis of any rulemaking that may impose a net costs of $100 million or more for state, local and tribal governments, in the aggregate, or the private sector in any one year. It is possible that this proposal may result in expenditures of $100 million or more in a year. The cost-benefit analysis presented in this document meets the requirement of the Act. See Appendix C of this document for more information that addresses requirements under Section 202 of UMRA.

9.2 Employment Impacts

Executive Order 13563 "Improving Regulation and Regulatory Review" (76 FR 3821; January 18, 2011) requires Federal agencies to consider the employment impacts of regulatory policy. Specifically, Executive Order 13563 states, "Our regulatory system must protect public health, welfare, safety, and our environment while promoting economic growth, innovation, competitiveness, and job creation." Economic research evaluating the employment impacts of environmental regulation has shown that the net employment effect is ambiguous. Several impacts are incurred by firms in regulated industries, and the net effect of the impacts should be evaluated jointly to determine the overall effect. Increasing production costs raise the cost of business operations; some of these new regulatory costs are labor costs, while others are capital costs. As production costs increase and firms pass along costs to consumers, output may decrease, which could cause a decrease in labor demand. There are also operational impacts incurred by regulated firms as they modify operations to comply with new regulatory requirements; the direction of that impact on labor demand is a function of the interaction between the regulatory requirements and the firm's labor intensity of production. In general, the net effect of an environmental regulation on employment in regulated sectors and the overall economy is indeterminate. See Berman and Bui (2001) for a theoretical model of employment effects of environmental regulation.

This RIA does not include a complete analysis of labor market effects of the proposed rule. In general, an environmental regulation can be understood as an increase in demand for a particular output: environmental quality. Meeting this new demand can result in increased demand for the various factors of production (including labor). EPA has determined that the proposed rule is unlikely to have significant impacts on employment. Even in a year where a large complex facility would have to conduct a field exercise, a third-party audit, a root cause analysis, and a near miss investigation, the total labor hours would represent about one FTE, but those hours would be distributed across many employees. About half of the total labor hours of that scenario is for the field exercise, which is estimated to involve more than 60 facility staff. For simple non-responding facilities the annual labor cost would average less than 10 hours distributed among several workers. At most, perhaps a facility might need to hire another employee to comply with the rule or to cover the work that would otherwise have been done by those

workers involved in compliance activities. The third-party audit and root cause analysis provisions may generate work for consultants, but the number of hours involved per facility is less than a single FTE.

9.3 Limitations and Conclusions

As discussed in detail in Chapters 3 and 7, the data on which this analysis is based are necessarily limited. EPA has attempted to correct obvious errors, such as removing accidents reported more than once and reclassifying some facilities to more appropriate NAICS codes, but some issues related to facility employment size and ownership could not be resolved. EPA could not add accidents that had not been reported or correct accident impact data where they may have been inaccurate.

The estimated costs for third-party audits, root cause analysis and public meetings project past accident rates into the future. The near miss estimates assume one near miss for each accident, but whether this is accurate will depend on how individual facilities interpret what constitutes a near miss. Some industry publications project much higher ratios of near misses to actual releases. EPA has not defined near miss, but even if it had, deciding whether a series of events could have produced a release that would meet the definition of catastrophic release will always be a matter of opinion. Similarly, what constitutes safer technology is open to interpretation as is what is considered to be feasible. In these circumstances, some operators may adopt a narrow interpretation, while others may adopt a broad interpretation. Questions related to interpretation apply to most performance-based rules where there are few if any bright lines that define what constitutes compliance. The result is that some facilities may spend far more than estimated, while others may spend less.

The number of non-responding facilities that may become responders and the costs they will incur are unknown. For the former, the analysis provides a range of conversion estimates to indicate the potential total costs. In order to assess the cost to any individual facility for coming into compliance, however, EPA necessarily had to use estimates of the number of people who would be trained and the amount of equipment that would be purchased. The analysis does not address the possibility that a facility might have to acquire fire-fighting expertise and equipment, which would impose additional costs. The sensitivity analysis conducted in Chapter 5 analyzed costs for 25 percent, 50 percent, and 75 percent of current non-responders in counties without a Hazmat team to become responders.

The number of regulated facilities that will receive a request from their LEPC or emergency response officials to provide chemical hazard information is also unknown. Unlike the approach to the non-responder conversions, EPA had no data to narrow the range of estimates. However, facility owners or operators would be required to update this information annually; therefore, EPA expects that all regulated facilities would incur costs for this provision.

Finally, the analysis used a model facility approach so that each estimate represents the average for a group of facilities, not a point estimate for any one facility. This analysis has attempted to develop reasonable central estimates recognizing that the range of costs incurred by individual facilities could be wide. For example, the estimated third-party auditor cost for a complex facility is the same for all

complex facilities, but it is unlikely that an auditor would charge the largest facility, which has more than 30 covered processes, the same amount as it would a facility with only one or two covered processes. The number of people who would participate in field exercises will vary considerably based on facility size and location. Facilities of any size and complexity in urban industrial areas may involve more people in a field exercise than the same facilities would if located at a considerable distance from other facilities.

The benefits analysis is qualitative. There were no data to connect the specific rule elements with specific reductions in expected probabilities or magnitudes of RMP chemical accidents. In addition, many of the accident impacts expected to be reduced by the rule, such as lost productivity or emergency response costs, could not be quantified even for the 10-year baseline accident record. Lack of data also meant that other benefits of the rule such as improved information could not be quantified.

APPENDIX A

PROPERTY AND BUSINESS LOSSES IN THE PETROCHEMICAL INDUSTRY

APPENDIX A—PROPERTY AND BUSINESS LOSSES IN THE PETROCHEMICAL INDUSTRY

	Location	Date	Property Damage $M (2013 Dollars)	Business Loss $M	Notes
Refinery	Texas City	5/30/1978	$190		
Petrochemical	Delaware	10/29/1980	$140		
Refinery	Romeoville	7/23/1984	$450		
Petrochemical	Pampa	11/14/1987	$480	$240	
Petrochemical	Henderson	5/4/1988	$640		plant destroyed
Refinery	Norco	5/5/1988	$610		
Refinery	Richmond	4/10/1989	$190		25% of capacity lost for 5 months
Petrochemical	Pasadena	10/23/1989	$1,400		full production not restored for 2 years
Refinery	Baton Rouge	12/24/1989	$140		refinery shut for 3 days, reduced capacity for 3 weeks
Petrochemical	Sea Drift	3/12/1991	$180	$165	production reduced for a year
Petrochemical	Sterlington	5/1/1991	$240	$270	one unit destroyed
Refinery	Wilmington	10/8/1992	$150		production reduced by more than half for 7 months
Petrochemical	Belpre	5/27/1994	$330		production unit destroyed
Petrochemical	Cedar Bayou	10/20/1994	$240		includes business loss
Petrochemical	Port Neal	12/13/1994	$370		
Petrochemical	Deer Park	9/22/1997	$230		
Refinery	Richmond	3/25/1999	$190		unit shut down for year
Refinery	Carson City	4/23/2001	$190		unit shut down for 2 months
Refinery	Lemont IL	8/14/2001	$370		unit shut down for year
Petrochemical	Illiopolis	4/23/2004	$200		most of plant destroyed
Refinery	BP/TX	3/23/2005	$260		
Petrochemical	TX	4/29/2006	$250		plant closed for 6 months
Refinery	TX	2/28/2008	$240		plant continued to operate
Petrochemical	Geismar	6/13/2013	$510		plant closed for almost a year

Source: Marsh, The 100 Largest Losses, 1974-2013, Large Property Damage Losses in the Hydrocarbon Industry, 23rd Edition.
https://uk.marsh.com/Portals/18/Documents/100%20Largest%20Losses%2023rd%20Edition%202014.pdf
The table includes 24 accidents that reflect only U.S. incidents in the refinery and petrochemical sectors from 1978 forward, only incidents that may have been related to a release of a regulated substance, and only damage unrelated to natural disasters.

APPENDIX B

Number of Small Entities by NAICS Code and Facility FTE

Total and Non-Responders

Number of Small Entities by Facility FTE and NAICS Code, Total and Non Responders

All					Non-Responders				
NAICS	0-4 FTE	5-9 FTE	10-19 FTE	20-99 FTE	NAICS	0-4 FTE	5-9 FTE	10-19 FTE	20-99 FTE
111	41	34	14	7	111	34	28	12	6
112	1	0	0	0	112	1			
115	61	69	53	53	115	42	43	36	44
211	56	18	22	27	211	36	8	8	11
213	1	1	2	2	213	1			
221	8	11	22	70	221	4	11	17	35
2213	9	0	6	2	2213	4	0	4	1
236	1				236	0	0	0	0
311	3	4	9	114	311	1	3	6	52
312	0	0	1	5	312	0	0	1	1
313				1	313	0	0	0	0
324			1	9	324				2
32512	1	2	0	1	32512	1	1	0	0
32518	4	3	6	21	32518	1	1	1	1
325181	0	0	2	3	325181	0	0	2	0
325188	0	1	4	15	325188	0	1	2	4
32519	0	0	2	5	32519	0	0	0	2
325193	0	0	2	110	325193	0	0	1	87
325199	1	1	6	39	325199	0	1	3	11
325314	4	6	8	5	325314	3	6	6	5
32532	2	1	1	7	32532	1	0	0	2
32551	1	1	2	9	32551	0	1	1	1
32552	0	0	1	5	32552	0	0	1	2
32599	1	2	3	6	32599	0	1	2	1
325998	0	1	5	24	325998	0	1	3	9
326	0	1	3	35	326	0	0	1	18
327				1	327	0	0	0	0
331	0	1	2	8	331	1	0	1	4
332	0	0	6	9	332	0	0	4	4
333	0	0	0	2	333	0	0	0	1
334	0	0	0	4	334	0	0	0	2
335	0	0	0	1	335	0	0	0	0
336	0	0	0	1	336	0	0	0	0
339			2	8	339	0	0	1	2
423	2	0	0	2	423	1	0	0	1
424	42	32	18	4	424	33	25	14	4
4246	21	25	21	24	4246	17	16	12	12

All					Non-Responders				
NAICS	**0-4 FTE**	**5-9 FTE**	**10-19 FTE**	**20-99 FTE**	**NAICS**	**0-4 FTE**	**5-9 FTE**	**10-19 FTE**	**20-99 FTE**
4247	34	15	13	7	4247	18	6	8	3
4249	766	408	212	79	4249	711	351	189	64
444	4	2	1		444	4	1	0	0
447			1		447	0	0	1	0
453	4	2	3		453	4	1	2	0
484	1	1	5	5	484	0	1	3	1
486	0	0	2	2	486	0	0	0	0
488	0	3	1	1	488	0	1	0	0
49311	3	3	3	5	49311	3	3	3	4
49312	9	5	17	52	49312	9	5	17	52
49313	18	10	3	5	49313	15	5	2	3
49319	6	5	6	12	49319	2	2	2	6
541	0	2	0	2	541	0	1	0	2
561	10	0	4	0	561	10	0	4	0
562	0	1	0	2	562	0	0	0	0

APPENDIX C

UMRA Written Statement

UMRA Written Statement

I. Introduction

Title II of the 1995 Unfunded Mandates Reform Act (UMRA; 2 U.S.C. 1531-1538) requires Federal agencies, unless otherwise prohibited by law, to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Specifically, Section 202 of UMRA generally requires Federal agencies to prepare a written statement, including a cost-benefit analysis, for each proposed and final rule with "Federal mandates" that may result in expenditures by State, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Section 202 requires that "Written Statements" contain five elements of information:

1. An identification of the provision of Federal law under which the rule is being promulgated;
2. A qualitative and quantitative assessment of the anticipated costs and benefits of the Federal mandate, including the costs and benefits to State, local, and tribal governments or the private sector, as well as the effect of the Federal mandate on health, safety, and the natural environment;
3. Estimates by the agency, if and to the extent that the agency determines that accurate estimates are reasonably feasible, of:
    (a) the future compliance costs of the Federal mandate; and
    (b) any disproportionate budgetary effects of the Federal mandate upon any particular regions of the nation or particular State, local, or tribal governments, urban or rural or other types of communities, or particular segments of the private sector;
4. Estimates by the agency of the effect on the national economy, such as the effect on productivity, economic growth, full employment, creation of productive jobs, and international competitiveness of United States goods and services, if and to the extent that the agency in its sole discretion determines that accurate estimates are reasonably feasible and that such effect is relevant and material; and
5. Description of the extent of the agency's prior consultation with elected representatives (under section 204) of the affected State, local, and tribal governments, including a summary of the comments and concerns that were presented by State, local, or tribal governments either orally or in writing to the agency; and a summary of the agency's evaluation of those comments and concerns.

This document constitutes the "Written Statement" to meet this requirement for the RMP proposed rule. The Environmental Protection Agency (EPA) has conducted a cost-benefit analysis for this action, which has been submitted in the docket entitled "Regulatory Impact Analysis" (RIA).

II. Response to Five Information Elements

A. Identification of the Provision of Federal Law Under Which the Rule is Being Promulgated

The statutory authority for the RMP rule is provided by section 112(r) of the CAA as amended (42 U.S.C. 7412(r)). Each of the portions of the Risk Management Program rule we propose to modify in this notice are based on EPA's rulemaking authority under section 112(r)(7) of the CAA (42 U.S.C. 7412(r)(7)).

B. Cost to State, Local, and Tribal Governments and the Private Sector

As estimated in the RIA, there are approximately 12,500 facilities that have filed RMPs with EPA and are potentially affected by the proposed rule changes. These facilities range from petroleum refineries and large chemical manufacturers to water and wastewater treatment systems; chemical and petroleum wholesalers and terminals; food manufacturers, packing plants, and other cold storage facilities with ammonia refrigeration systems; agricultural chemical distributors; midstream gas plants; and a limited number of other sources that use RMP-regulated substances.

EPA estimates annualized costs of $158.3 million at a 3% discount rate and $161.0 million at a 7% discount rate. Of this amount, average annualized costs to State/local governments total $19.8 million at a 3% discount rate and $20.2 million at 7% discount rate consisting of estimated regulatory compliance costs for State/local governments that currently own or operate RMP-regulated sources plus costs to local governments (i.e., LEPCs, emergency response officials and state implementing agencies) for rule familiarization and voluntary participation in coordination activities, exercises and review of information submitted to LEPCs. The estimated average annualized cost to the private sector totals approximately $138.5 million at a 3% discount rate and $140.8 million at a 7% discount rate.

Although there are RMP facilities located on tribal lands, EPA does not have information on the number of tribal-owned regulated facilities, and therefore, has not estimated costs to tribes in the RIA for the proposed rule.

C. Extent to Which Costs to State, Local, and Tribal Governments May be Paid by EPA or Other Federal Agencies, or to Which there are Available Federal/EPA Resources to Carry out a Federal Intergovernmental Mandate

EPA does not provide funding to state, local or tribal governments for implementation of the Risk Management Program rule; or to fund costs for participation in emergency response coordination activities and facility exercises; or review information submitted to LEPCs.

D. Estimates of Future Compliance Costs and Budgetary Effects on Particular Regions of the Country, or Particular State, Local, or Tribal Governments or Communities, or Particular Segments of the Private Sector

The RIA assessed potential effects of the RMP rule on regulated entities (including government entities subject to the rule) and voluntary costs to state and local governments that participate in emergency

response coordination activities, facility exercises and review of reports submitted to LEPCs or local emergency response officials.

E. Extent of EPA's Prior Consultation with Affected State, Local, and Tribal Governments

Over the 16 years of implementing the RMP program and, most recently through EO 13650 listening sessions, webinars, and consultations, EPA has engaged states and local communities to discuss chemical safety issues. In the nine EO 13650 Improving Chemical Facility Safety and Security listening sessions and webinars, held between November 2013 and January 2014, states and local communities identified lack of chemical facility participation and coordination in local emergency contingency planning as a key barrier to successful local community preparedness. Additionally, EPA has had consultations with states and local communities through participation in the NASTTPO annual meetings to discuss key issues related to chemical facility and local community coordination and what areas of the RMP regulations need to be modernized to facilitate this coordination and improve local emergency preparedness and prevention. Key priority options discussed with NASTTPO states and local communities included: improving emergency response coordination between RMP facilities and LEPCs/first responder and requiring emergency response exercises of the RMP facility plan to involve LEPCs, first responders and emergency response personnel.

This action may significantly or uniquely affect small governments. The EPA consulted with small governments concerning the regulatory requirements that might significantly or uniquely affect them. Through the July 31, 2014 RFI (79 FR 44604), EPA sought feedback from governmental entities while formulating the proposed revisions in this action. Additionally, EPA participated in ongoing consultations with affected small entity representatives (including small governmental entities) through a Small Business Advocacy Review (SBAR) panel. EPA convened an SBAR panel in accordance with the requirements of the RFA, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).