



**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Part 68**

**[EPA-HQ-OEM-2014-0328; FRL-9911-62-OSWER]**

**RIN 2050-ZA07**

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

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Request for information.

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**SUMMARY:** The Environmental Protection Agency (EPA), in response to Executive Order 13650, requests comment on potential revisions to its Risk Management Program regulations and related programs. In this Request for Information (RFI), the Agency asks for information and data on specific regulatory elements and process safety management approaches, the public and environmental health and safety risks they address, and the costs and burdens they may entail. The EPA will use the information received in response to this RFI to inform what action, if any, it may take.

**DATES:** Comments and additional material must be received on or before [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** Submit comments and additional materials, identified by docket EPA-HQ-OEM-2014-0328 by any of the following methods:

- <http://www.regulations.gov>: Follow the on-line instructions for submitting comments.

- Mail: Send comments to: OSWER Docket, EPA Docket Center, Mail Code 2822-1T, Environmental Protection Agency, 1200 Pennsylvania Avenue, N.W., Washington DC 20460, Attention Docket ID No. EPA–HQ–OEM–2014–0328. Please include two copies of your comments.
- Hand delivery: Deliver two copies of your comments to: Environmental Protection Agency, EPA Docket Center, Room 3334, 1301 Constitution Avenue, NW, Washington DC, Attention Docket ID No. EPA–HQ–OEM–2014–0328. Such deliveries are only accepted during the docket’s normal hours of operation and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA-HQ-OEM-2014-0328. The EPA’s policy is that all comments received will be included in the public docket without change and may be made available online at <http://www.regulations.gov>, including any personal information provided, unless the comment includes information claimed to be confidential business information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through [www.regulations.gov](http://www.regulations.gov). The <http://www.regulations.gov> website is an “anonymous access” system, which means the EPA will not know your identity or contact information unless you provide it in the body of your comment. If you submit an electronic comment, the EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If the EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, the EPA may not be able to consider your comment. Electronic files should not include special characters or any form of

encryption and be free of any defects or viruses. For additional information about the EPA's public docket, visit the EPA Docket Center homepage at: <http://www.epa.gov/dockets>.

Docket: The EPA has established a docket for this information request under Docket ID Number EPA-HQ-OEM-2014-0328. All documents in the docket are listed in the regulations.gov index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in regulations.gov or in hard copy at the EPA Docket Center, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the EPA Docket Center is (202) 566-1742.

**FOR FURTHER INFORMATION:** For more detailed information on specific aspects of this RFI, contact Mr. James Belke, Chemical Engineer, United States Environmental Protection Agency, Office of Emergency Management, 1200 Pennsylvania Ave., NW, Washington, DC, 20460; telephone: (202) 564-8023; email: [belke.jim@epa.gov](mailto:belke.jim@epa.gov).

Electronic copies of this RFI and related news releases are available at EPA's Web page at <http://www.epa.gov/emergencies>. Copies of this RFI are also available at <http://www.regulations.gov>.

**SUPPLEMENTARY INFORMATION:** Here are the contents of today's notice.

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## I. Background

### A. Statutory Authority

The statutory authority for this action is provided by section 112(r) of the Clean Air Act (CAA) as amended (42 U.S.C. 7412(r)) and by the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), (42 U.S.C. 11001 - 11050), which was enacted as Title III of the Superfund Amendments and Reauthorization Act of 1986 (Pub. L. 99– 499), (SARA).

## B. Executive Order 13650

On August 1, 2013, President Obama signed Executive Order 13650, entitled Improving Chemical Facility Safety and Security. The Executive Order 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 composed of senior representatives of other Federal departments, agencies, and offices. The Executive Order requires the Working Group to carry out a number of tasks whose overall aim is to prevent chemical accidents, such as the explosion that occurred at the West Fertilizer facility in West, Texas, on April 17, 2013.

Section 6 of the Executive Order is entitled “Policy, Regulation, and Standards Modernization”, and among other things, requires certain federal agencies to consider possible changes to existing chemical safety and security regulations. Specifically, section 6(e)(ii) of the Executive Order requires the Secretary of Labor to issue a RFI designed to identify issues related to modernization of the Process Safety Management (PSM) standard and related standards necessary to meet the goal of preventing major chemical accidents. The Occupational Safety and Health Administration (OSHA) published a RFI responsive to this portion of the order on December 9, 2013 (78 FR 73756; <http://www.gpo.gov/fdsys/pkg/FR-2013-12-09/pdf/2013-29197.pdf> ). The OSHA RFI requested information on 17 potential policy and rulemaking topics relating to modernization of the PSM standard and other related OSHA standards.

While Executive Order 13650 does not specifically direct EPA to publish a similar RFI, EPA believes it is an appropriate step for several reasons. First, section 6(a)(i) of the order 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.” With regard to EPA specifically, section 6(c) of the order requires the Administrator of EPA and the Secretary of Labor to “review the chemical hazards covered by the Risk Management Program (RMP) and the Process Safety Management Standard (PSM) and determine if the RMP or PSM can and should be expanded to address additional regulated substances and types of hazards.” Information collected through this action will inform the results of this review.

Second, 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. This RFI will allow EPA to evaluate any potential updates to the RMP regulation in parallel to OSHA’s evaluation of potential updates to the PSM standard. Lastly, this RFI addresses a number of added topics in which the Agency is interested that are not raised in the OSHA RFI.

Topics are divided into two categories – those addressed in parallel to the OSHA RFI, and additional topics not raised by OSHA. Readers are encouraged to review the OSHA RFI in detail, as this notice does not always reiterate OSHA’s full justification on the same or similar topics.

Information collected under this RFI will inform EPA as it considers what actions, if any, may be necessary to update the RMP regulations. It does not commit the Agency to rulemaking. If the Agency elects to undertake rulemaking, it will do so in accordance with established rulemaking procedures as set forth in the Clean Air Act section 307(d), 42 U.S.C. 7607(d).

### C. EPA Risk Management Program Regulations

Both EPA's 40 CFR part 68 RMP regulation<sup>1</sup> and OSHA's 29 CFR 1910.119 PSM standard were authorized in the Clean Air Act (CAA) Amendments of 1990 (1990 CAAA), in response to a number of catastrophic chemical accidents occurring worldwide that had resulted in public and worker fatalities and injuries, environmental damage, and other community impacts. OSHA published the PSM standard in 1992 (57 FR 6356, February 24, 1992), as required by section 304 of the 1990 CAAA, using its authority under 29 U.S.C. 653.

The 1990 CAAA added to the accidental release provisions under CAA section 112(r). The statute required EPA to develop a list of at least 100 regulated substances for accident prevention and related thresholds (CAA section 112(r)(3)-(5)), authorized accident prevention regulations (CAA section 112(r)(7)(A)), and required EPA to develop "reasonable regulations" requiring facilities with over a threshold quantity (TQ) of a regulated substance to undertake accident prevention steps and submit a "risk management plan" to various local, state, and federal planning entities (CAA section 112(r)(7)(B)).

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<sup>1</sup> 40 CFR part 68 is titled, "Chemical Accident Prevention Provisions," but is more commonly known as the "RMP regulation," the "Risk Management Program," or "the RMP." The RMP may also refer to the document required to be submitted under subpart F of 40 CFR part 68, the Risk Management Plan. This document generally uses RMP or Risk Management Program to refer to 40 CFR part 68. See <http://www.epa.gov/oem/content/rmp/> for more information on the Risk Management Program.

EPA published the RMP regulation in two stages. The Agency published the list of regulated substances and TQs in 1994 (59 FR 4478, January 31, 1994) (the “list rule”)<sup>2</sup> and published the RMP final regulation, containing risk management requirements for covered sources, in 1996 (61 FR 31668, June 20, 1996).<sup>3,4</sup> Both the OSHA PSM standard and the EPA RMP regulation aim to prevent or minimize the consequences of accidental chemical releases through implementation of management program elements that integrate technologies, procedures, and management practices. In addition to requiring implementation of management program elements, the RMP regulation requires covered sources to submit a document summarizing the source’s risk management program – called a risk management plan – to EPA. The RMP regulation required covered sources to comply with its requirements and submit initial risk management plans to EPA by June 21, 1999.

The RMP establishes three “program levels” for regulated processes:

Program level 1 applies 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. Program 1 imposes limited hazard assessment requirements and minimal prevention and emergency response requirements.

Program level 2 applies to processes not eligible for Program 1 or subject to Program 3, and imposes streamlined prevention program requirements, including safety information, hazard review, operating procedures, training, maintenance, compliance audits, and incident

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<sup>2</sup> Documents and information related to development of the list rule can be found in the EPA docket for the rulemaking, docket number A-91-74.

<sup>3</sup> Documents and information related to development of the RMP regulation can be found in EPA docket number A-91-73.

<sup>4</sup> The 40 CFR Part 68 RMP regulations apply to owners and operators of stationary sources that have more than a TQ of a regulated substance within a process. The regulations do not apply to chemical hazards other than listed substances held above a TQ within a regulated process.

investigation elements. Program 2 also imposes additional hazard assessment, management, and emergency response requirements.

Program level 3 applies to processes not eligible for Program 1 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 listed at 40 CFR 68.10(d)(1). Program 3 imposes elements nearly identical to those in OSHA's PSM standard as the accident prevention program. The Program 3 prevention program includes requirements relating to process safety information, process hazard analysis, operating procedures, training, mechanical integrity, management of change, pre-startup review, compliance audits, incident investigations, employee participation, hot work permits, and contractors. Program 3 also imposes the same hazard assessment, management, and emergency response requirements that are required for Program 2.

EPA believes the RMP regulation has been effective in preventing and mitigating chemical accidents in the United States and protecting human health and the environment from chemical hazards. However, major incidents, such as the West, Texas explosion, highlight the importance of reviewing and evaluating current practices and regulatory requirements, and applying lessons learned to advance process safety management where needed. This RFI seeks public input on process safety and risk management issues relevant to the RMP regulation to inform potential actions that may further reduce the number of chemical accidents within the United States.

## II. Discussion and Request for Data, Information, and Comments

### A. Introduction

This section discusses each RMP item and provides specific questions to collect data, information, and comments. The Agency invites the public to respond to any questions for which they have specific knowledge, data, or information, regardless of their involvement in RMP-covered operations. Note that at several points in this document, we discuss whether modifying, clarifying, strengthening, or making more explicit a requirement is an appropriate way to address an issue. The solicitation of comment on these matters should not be read as EPA, OSHA, the Department of Justice, or any other federal entity suggesting legal ambiguity in the relevant regulations or recognizing a particular interpretation by any regulated entity of either CAA section 112(r) or the RMP regulation. For purposes of this comment solicitation, exploration of ways to further clarify particular aspects of the current regulations should not be viewed as an indication that the current language is inadequate, or in any way undermines our ability to enforce these regulations as written.

#### B. Potential Costs and Economic Effects of Regulatory and Policy Changes

As part of this RFI, the Agency is requesting data and information on the potential costs and economic impacts of amending regulatory requirements relevant to the various issues identified, including any possible significant economic impact on a substantial number of small entities. EPA requests that commenters discuss potential economic impacts, whenever possible, in terms of quantitative benefits (e.g., reductions in injuries, fatalities, and property damage), costs (e.g., compliance costs, including paperwork burden, or decreases in production), and offsets to costs (e.g., less need for maintenance and repairs, less loss or waste of product) when responding to the questions in this RFI. EPA also requests that commenters provide data and information on economic effects that any amendments may have on market conditions or services (e.g., market structure and concentration), and in particular, any special circumstances

related to small entities, such as potential market-structure disruptions or uniquely high costs that small entities may bear.

EPA requests that commenters discuss economic impacts in as specific terms as possible. For example, if a regulatory or policy change would necessitate additional employee training, then helpful information would include the following: the training courses necessary; the types of employees or contractors who would receive the training; topics covered; any retraining necessary; and the training costs if conducted by a third-party vendor or in-house trainer. The Agency invites comment on the time and level of expertise required to implement potential regulatory or policy changes discussed in this RFI, even if dollar-cost estimates are not available. For discussion of equipment-related costs, EPA requests that commenters estimate relevant factors, such as purchase price, cost of installation, cost of equipment maintenance, cost of training, and expected life of the equipment. The Agency also requests that, when responding to the questions in this RFI, commenters discuss any disproportionate impacts to communities near chemical facilities, particularly with respect to economically distressed, low-income, or predominantly minority communities. For example, disproportionate impacts could be changes that affect the number of local residents employed at a facility or the number of residents affected by a release from a facility. Commenters should also include specific information about any technical feasibility issues or implementation challenges associated with any of the possible revisions discussed in this RFI. EPA also welcomes input on which potential amendments to regulatory requirements should be given priority for further development over any others along with the basis for such prioritization. For example, identify those issues posing a greater safety risk than others; those requiring less time or effort to amend; those with less costs to industry; or other reasons.

### C. Items in OSHA's RFI relevant to EPA's RMP regulation

This section discusses items that are the same or related to items in the OSHA RFI that could also apply to or affect the RMP regulation. Each item discussion is followed by specific questions to collect data, information, and comments on each item

#### 1. Update the List of Regulated Substances

Section 112(r)(3) of the 1990 CAAA authorized EPA to develop a list of at least 100 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 to the environment. EPA was required to use, but was not limited to, the list of extremely hazardous substances (EHSs) published under the Emergency Planning and Community Right-to-Know Act (EPCRA), with modifications as appropriate. The initial list was also to include 16 substances specified by statute. EPA was to consider the following criteria: 1) the severity of any acute adverse health effects associated with accidental releases of the substances; 2) the likelihood of accidental releases of the substances; and 3) the potential magnitude of human exposure to accidental releases of the substances. The TQ for each substance was to account for the toxicity, reactivity, volatility, dispersibility, combustibility, or flammability of the substance, and the amount that if accidentally released could cause death, injury or serious adverse effects on human health. The list may not include any air pollutant for which a national primary ambient air quality standard has been established (except anhydrous sulfur dioxide which is required by statute to be included on the list), nor any CAA title VI stratospheric ozone pollutants. The list may be revised by EPA or by petition and it must be reviewed at least every 5 years.

The August 1999 Chemical Safety Information, Site Security and Fuels Regulatory Relief Act amended section 112(r)(4) of the CAA to exempt from RMP reporting “a flammable substance when used as a fuel or held for sale as a fuel at a retail facility... because of the explosive or flammable properties of the substance, unless a fire or explosion caused by the substance will result in acute adverse health effects from human exposure to the substance, including the unburned fuel or its combustion byproducts, other than those caused by the heat of the fire or impact of the explosion.” However, flammable substances used as a feedstock or held for sale as fuel at a wholesale facility are still covered.

The list now consists of two categories of chemicals – 77 toxic substances and 63 flammable substances. The regulated substances and TQs are found in 40 CFR 68.130. The list of toxic substances is based on a subset of the EHS acute toxics found in 40 CFR part 355. The RMP list of substances was further limited to gases and volatile liquids (vapor pressure equal to or greater than 10 mm of mercury (Hg) at 25°C), focusing accident prevention regulations on those chemicals that were more likely to become airborne and have an adverse effect beyond a facility’s fence line in the event of an accidental release.

Flammable gases and volatile flammable liquids with the National Fire Protection Association (NFPA) flammability ratings of 4 (i.e., gases and liquids having a flash point below 73°F (22.8°C) and a boiling point below 100°F (37.8°C)) were listed. Only chemicals in commercial production were included on the list and several non-EHS toxic chemicals were listed based on high production volumes and accident history. Most of the sixteen substances mandated by statute were also identified through the listing criteria for toxic or flammable substances.

The 1994 final list rule included as covered chemicals, any “high explosives” which were explosives classified by the Department of Transportation (DOT) as Class 1, Division 1.1 and listed as such in 49 CFR 172.101 (the Hazardous Materials Table). Subsequently, the explosives were deleted from coverage in 1998 (63 FR 640, January 6, 1998)<sup>5</sup> due to settlement of litigation with the Institute for Manufacturers of Explosives (IME) (discussed in more detail below).

EPA is requesting information on whether the Agency should modify the list of regulated substances by:

- Adding other toxic or flammable substances
- Adding high and/or low explosives
- Adding ammonium nitrate
- Adding reactive substances and reactivity hazards
- Adding other categories of substances
- Removing certain substances from the list or raising their TQ
- Lowering the TQ for substances currently on the list

Each of these areas is briefly discussed below.

a. Adding Other Toxic or Flammable Substances

EPA is interested in determining whether there are other substances that meet the established acute toxicity or flammability criteria for listing, are in commerce, and are present in sufficient quantities that would present a risk to the community if accidentally released.

EPA requests information on the following questions:

- i. What other chemical lists or other sources of information should be reviewed to identify acutely toxic or flammable chemicals meeting the RMP listing criteria?

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<sup>5</sup> Documents and information related to deleting explosives from the list of RMP-regulated substances can be found in EPA docket number A-96-08.

- ii. What chemicals, if any, should EPA add to the RMP list of regulated toxic and flammable substances? Please provide references to the acute toxicity studies, sources of flammability information or summary results of such studies, information showing that the chemical meets the listing criteria or examples of incidents related to the hazards associated with the chemicals.
- iii. Please provide any information on the annual amount of the individual substance manufactured, imported or used, the extent of its availability in commerce and the types of U.S. industries that manufacture, import, or use the substance.
- iv. What would be the economic impacts of adding other toxic or flammable chemicals to the RMP list of substances? Are there any special circumstances involving small entities that EPA should consider with respect to adding such chemicals to the RMP list of substances?

b. Adding High and/or Low Explosives

In light of the April 17, 2013 explosion in West, Texas involving ammonium nitrate (AN) fertilizer, EPA is reconsidering whether it should include explosives on the RMP list. In addition to raising concerns about AN, this accident has shifted attention to how well facilities handling other potentially explosive materials are safeguarding communities from their hazards and whether emergency responders are prepared to deal with accidents involving such materials, whether or not they are designed to be used as explosives. This subsection of the RFI addresses explosives other than AN - Further discussion of regulating AN, including AN fertilizer, is covered later in this section.

EPA listed high explosives on the RMP list in 1994 but removed them on January 6, 1998 (63 FR 640) (see discussion below regarding settlement of litigation with IME).

The 1994 final RMP list rule (59 FR 4478, January 31, 1994) included Division 1.1 explosives - a category of high explosives defined by DOT classification. DOT Division 1.1 explosives are those that present a mass explosion hazard, which is an explosion that affects almost the entire load instantaneously. Explosives were initially listed because of their potential to cause off-site effects from blast waves. In addition, EPA believed that potential gaps existed in emergency planning and response communication that made risk management planning appropriate for sources with explosives.

EPA chose to list only DOT Division 1.1 explosives because EPA's analysis indicated that low explosives, which primarily pose a fire hazard rather than a mass explosion hazard, were less likely to cause a catastrophic event when compared to the same quantity of high explosives. The deflagration or burning of a low explosive generates lower pressures and is less destructive than the detonation of a high explosive, although the Agency recognized that it may be possible for some low explosives to detonate under unusual conditions, with effects similar to the detonation of a high explosive. The DOT Division 1.1 explosives were listed because of their potential to readily detonate, causing off-site impacts. High explosives were listed as a class, rather than as individual substances, because explosives are usually mixtures or formulations rather than specific chemicals. An individual chemical could be a component of a high explosive or a low explosive, or could be non-explosive, depending on various factors, such as particle size, concentration, and other components of the formulation.

The Institute of Makers of Explosives (IME) petitioned for judicial review challenging the final listing of high explosives (*IME v. EPA*, D.C. Cir. No. 94-1276). Among IME's objections to the rule were that existing regulations by the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), DOT, Mine Safety and Health Administration (MSHA), and

OSHA already adequately regulated DOT Division 1.1 explosives. In a settlement with IME, the Agency agreed to propose delisting explosives and IME agreed to undertake certain measures to enhance local emergency response and dismiss its case if EPA ultimately delisted high explosives (61 FR 13858, March 28, 1996). The measures that IME agreed to take included the following:

- IME member companies would post at their facilities warning signs at all normal access routes stating, “Danger. Never Fight Explosive Fires. Explosives are stored on this site,” and providing an emergency phone number.
- Whenever a new Division 1.1 commercial explosives storage or manufacturing location is established at a temporary job site, IME member companies will notify Local Emergency Planning Committees (LEPCs) and other local authorities (e.g., fire departments and law enforcement agencies) of the type, quantity, and location of explosives on site.
- At Division 1.1 commercial explosives storage or manufacturing locations with 5,000 pounds or more of Division 1.1 explosives (not including temporary job sites) where preparation of emergency response plans is not already required, IME member companies would prepare emergency response plans, notify LEPCs and other local authorities of the type, quantity, and location of explosives on site, provide the emergency response plans to local emergency responders, and respond to reasonable requests for information from said authorities.
- IME member companies also would inform their customers and IME would inform other non-IME commercial explosives manufacturers of the contents of the Settlement Agreement and the actions to be taken.

EPA proposed to delist high explosives from the RMP list on April 15, 1996 (61 FR 16598) and removed high explosives in a January 6, 1998 final rule (63 FR 640). The preambles to both rules discuss the measures IME was to take to enhance local emergency response.

Even after the removal of high explosives from the RMP list, most forms of explosives (not just high explosives) remain subject to hazardous chemical inventory reporting requirements under EPCRA. The owner or operator of any facility with more than a reporting threshold of any hazardous chemical requiring a safety data sheet (formerly material safety data sheet) under the OSHA Hazard Communication Standard is required to submit safety data sheets to their State Emergency Response Commission (SERC), LEPC, and local fire department, and to annually report their inventory of hazardous chemicals to their SERC, LEPC, and local fire department.<sup>6</sup> This information should better prepare local authorities to respond to emergencies at facilities that handle hazardous chemicals, including explosives.

ATF regulates “explosive materials” which are defined as explosives, blasting agents, water gels and detonators. Explosive materials include, but are not limited to, all items in the “List of Explosive Materials,” which is published annually<sup>7</sup>.

ATF regulations<sup>8</sup> provide specific construction requirements for storage of explosive materials in magazines and limit the amount of these materials that can be stored in each magazine. Such magazines must be regularly inspected and meet the Table of Distance requirements which specify distances that the materials must be stored away from inhabited buildings, public highways, and passenger railways, to ensure an accidental explosion will not produce blast waves that are hazardous to people at distances where the public could be affected.

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<sup>6</sup> See 40 CFR part 370

<sup>7</sup> The 2013 List of Explosive Materials can be found at <http://www.gpo.gov/fdsys/pkg/FR-2013-10-28/pdf/2013-25370.pdf>

<sup>8</sup> 27 CFR 555, Subpart K

ATF inspects licensed facilities to ensure the safe and secure storage of explosives, their proper inventory and control, and accurate recordkeeping. However, ATF does not inspect or regulate manufacturing processes.<sup>9</sup>

OSHA regulates the manufacture, keeping, having, storage, sale, transportation, and use of explosives and blasting agents under its Occupational Safety and Health Standards for explosives and blasting agents (29 CFR 1910.109). Section 1910.109(k)(2) of this standard also requires that explosive manufacturers meet the requirements of the PSM standard (29 CFR 1910.119). OSHA regulations provide construction requirements for explosive materials storage magazines and specify minimum distances between magazines with explosives and blasting agents, between stores of AN and blasting agents, and between blasting agents and inhabited buildings, passenger railroads, and public highways. Regulations involving the storage of all grades of AN, including fertilizer grade, but not blasting agents, are found at 29 CFR 1910.109(i).

Significant accidents involving explosives have raised questions concerning whether existing safety regulations are adequate. An April 8, 2011 explosion at Donaldson Enterprises in Waikale, Hawaii, killed five workers who were disposing of fireworks. The U.S. Chemical Safety and Hazard Investigation Board (CSB) investigated the explosion and determined that gaps in federal regulations – specifically with regard to dismantling and disposal of explosives – contributed to the accident<sup>10</sup>. The January 7, 1998, explosion at the Sierra Chemical Company's Kean Canyon explosives manufacturing plant prompted the state of Nevada to develop

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<sup>9</sup> Sierra Chemical Co. Final Investigation Report, CSB, 9-23-1988.

<sup>10</sup> CSB Report No. 2011-06-I-HI

regulations covering certain explosives manufacturing facilities under the state's Chemical Accident Prevention Program<sup>11</sup>, which is similar to EPA's RMP regulation.

EPA is seeking information relating to the potential regulation of explosives under the RMP. EPA requests information on the following questions:

- i. Should EPA reconsider listing explosives on the RMP list? What are the safety gaps in current regulations and practice (e.g., EPCRA, other federal programs, state programs, and industry efforts) that can best be filled by expansion of the RMP? Are there other approaches for filling any such safety gaps? What type of explosive materials should be covered and why? How many facilities manufacture, store or use explosives and what are the typical quantities stored on-site by type of facility or industry? What TQs should be established, and what should be the basis for the TQs? If EPA were to list explosives and establish a TQ at 5000 pounds (the same TQ that was established for explosives in the 1994 list rule), how many facilities would exceed that TQ and potentially be regulated?
- ii. Are there other incidents involving the manufacture and processing of explosive materials that should be reviewed to determine if covering these operations under the RMP would decrease the risk of an accidental explosion affecting an off-site community? Does the presence of explosives impose unique risks on rural, disadvantaged, or otherwise environmentally burdened communities?
- iii. Should the RMP regulation apply to manufacturers of explosives, end users, and/or explosive recyclers?
- iv. If the RMP regulation is amended to cover explosives, should EPA consider establishing requirements for safe separation distances between explosive materials

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<sup>11</sup> <http://ndep.nv.gov/bapc/capp/capmore.html>

and public receptors similar to those required by ATF and OSHA (see section II.D.4 of this RFI for additional discussion of stationary source location requirements)?

What other requirements should EPA consider? Which if any of these requirements could have prevented or minimized the impacts of specific historical accidents?

- v. What would be the economic impacts of adding explosives to the RMP list of substances? Are there any special circumstances involving small entities that EPA should consider with respect to adding explosives to the RMP list of substances?
- vi. As an alternative to expanding the scope of the RMP, would expanded use of EPCRA information (such as better integration of information on explosive hazards into local emergency plans) and other governmental and industry programs (including voluntary programs) be able to address safety gaps? What are the advantages and disadvantages of such an approach relative to expansion of the RMP?

c. Adding Ammonium Nitrate

As previously discussed, EPA listed high explosives on the RMP list in 1994 but removed them on January 6, 1998 (63 FR 640). Some forms of AN formulated as explosives would have been covered under the 1994 RMP list rule, but the rule would not have included AN fertilizer, which was not classified as and was not intended to function as an explosive. However, the explosion at West Fertilizer has highlighted the explosive properties of AN fertilizer under certain conditions (heat, shock, contamination and/or confinement) and its potential to adversely impact communities if it decomposes and detonates.

Industry manufactures millions of tons of AN annually in the United States. High-density or fertilizer-grade AN, with Chemical Abstracts Service Registry Number (CASRN) 6484-52-2, is commonly used in fertilizer; low-density or technical-grade AN is used to manufacture

explosives or blasting agents. Approximately 80% of AN is used in explosives and blasting agents and 20% is used as a fertilizer.

Blasting agents are relatively low sensitivity explosives which cannot be initiated by blasting caps and are unlikely to explode except under special conditions. A blasting agent is a fuel plus oxidizer, intended for blasting, and not otherwise classified as an explosive. Blasting agents are frequently formulated with AN as the oxidizer.

Ammonium nitrate/fuel oil (ANFO or AN/FO) is a blasting agent widely used in coal mining, quarrying, metal mining, and civil construction. Mining and construction sites that use ANFO may not be as likely to have explosions adversely affecting the public because they are often remote.

AN has an NFPA instability rating of 3, indicating it is capable of detonation, explosive decomposition, or explosive reaction; ignition requires a strong initiating source or heating the substance under confinement. Stored AN is generally stable, but explosions of AN can be severe and have resulted in many injuries and fatalities.

There are several examples of accidents involving AN. As discussed earlier, on April 17, 2013, an AN explosion at the West Fertilizer Company storage and distribution facility in West, Texas involving about 30 tons of AN killed 15 people and injured over 160 others. As an initial action, EPA and its partner agencies OSHA and ATF issued an updated chemical advisory on the safe storage, handling, and management of AN.<sup>12</sup>

The deadliest industrial accident in United States history was an AN explosion in Texas City, Texas, on April 16, 1947. In that case, the initial explosion of a ship carrying AN, and the subsequent chain reaction of fires and explosions in other ships and nearby oil-storage facilities,

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<sup>12</sup> Chemical Advisory: Safe Storage, Handling, and Management of Ammonium Nitrate, EPA 550-S-13-001, published by EPA, OSHA, and ATF, August 2013. [http://www.epa.gov/oem/docs/chem/AN\\_advisory.pdf](http://www.epa.gov/oem/docs/chem/AN_advisory.pdf)

killed at least 581 people and injured thousands of others. The AN was coated with wax, a combustible material, to prevent caking. New process technologies and safe practices introduced in the 1950s eliminated the use of wax coatings and AN currently produced for fertilizer use contains less than 0.2 percent combustible material. Ammonium nitrate with more than 0.2 percent combustible substances is now regulated by DOT as an explosive material with specific storage requirements and restrictions in cargo vessels.

On September 21, 2001, a massive explosion occurred in a warehouse at the Azote de France fertilizer factory in Toulouse, France, involving 200-300 tons of AN, which was stored in bulk in a hangar. The explosion resulted in the death of 30 people, 2,500 injuries, the destruction of the factory, and an additional 10,000 buildings being heavily damaged. The exact cause of this accident remains unknown. Storage of incompatible material with AN is believed to have been a factor.

On December 13, 1994 at Terra Industries in Port Neal, Iowa, AN solution exploded in a neutralizer vessel in a manufacturing process that was in standby mode, causing four deaths<sup>13</sup>. The blast resulted in major plant damage, including damage to on-site ammonia tanks, creating an ammonia cloud that resulted in the evacuation of 2,500 people.

EPA is requesting information on how to best address the safe storage, handling and risk management of AN. Despite its widespread use as an explosive and as a fertilizer, AN explosions are rare, but when they do occur, can result in deaths, injuries, and extensive property damage.

Currently, AN is not a listed substance under the RMP regulation. 29 CFR part 1910.109(k)(2) requires that the manufacture of explosives shall also meet the requirements

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<sup>13</sup> <http://www.epa.gov/oem/docs/chem/cterra.pdf>

contained in §1910.119, thus manufacturing of explosives containing AN would be covered under PSM regulations. OSHA does not regulate AN storage and handling by distributors and users under the PSM standard, but it does regulate certain processes and activities involving AN under other specific standards (see below). Therefore, under federal regulations, AN distributors, such as bulk fertilizer retailers, are not required to implement any RMP or PSM accident prevention program elements (such as conducting a process hazard analyses, developing written operating procedures, etc.), perform an off-site consequence analysis, or develop an emergency action plan or emergency response plan.

ATF regulates the storage and handling of AN as an explosive material (either as part of an explosive or as a blasting agent) (27 CFR 555.201-224). The ATF regulations specify construction requirements for storage magazines, limitations on the type and amount of material that can be stored in each type of magazine and minimum distances that must be maintained between AN in explosive materials and public receptors and between AN and explosives and blasting agents.

OSHA regulates the storage, handling, and transportation of AN when it is used in explosives, water slurries, gels or blasting agents (29CFR 1910.109 (a) – (h), (k)) or when stored on-site with explosives or blasting agents, including their storage at use sites and mixing and packaging operations. The requirements detail various procedures and safeguards that must be followed for these operations. The OSHA standard requires minimum specified separation distances between AN and explosives or blasting agents stored on the same site. Construction requirements for buildings and bulk storage bins containing blasting agents (which can contain AN) are also specified.

OSHA also regulates bulk storage of AN over 1000 pounds in a building or structure in the form of crystals, flakes, grains, or prills including fertilizer grade, dynamite grade, nitrous oxide grade, technical grade, and other mixtures, but not blasting agents, containing 60 percent, or more, AN by weight, in 29 CFR 1910.109(i). This standard limits the dimensions of piles of bagged AN and bulk AN in storage bins, and specifies the conditions for storage and the type of the construction materials for storage bins. The standard does not specify minimum separation distances between stored AN and public receptors such as are required for explosives and blasting agents. The standard requires separation of AN from incompatible or combustible materials and use of fire-resistive building materials if combustible materials are stored within a certain distance. A building with more than 2,500 tons of bagged ammonium nitrate must be equipped with an automatic sprinkler system.

OSHA's PSM standard covers some reactive chemicals. Ammonium nitrate, although it is a reactive chemical (oxidizer) and met the original criteria that OSHA used to add substances for coverage, was not covered by the PSM standard. The Explosives and Blasting Agents standard is a specification standard based on a consensus standard, while PSM is a performance-based standard and would require employers to put management systems in place that would include requirements to evaluate hazards and follow industry recognized best practices. As explained above, OSHA issued an RFI seeking, among other items, comments on potential revisions to its PSM standard and its Explosives and Blasting Agents standard. The RFI specifically invited comments on safe work practices for storing, handling, and managing ammonium nitrate and on regulatory requirements to improve its approach to preventing the hazards associated with ammonium nitrate. OSHA is working to determine whether ammonium nitrate hazards are best handled in the Explosives and Blasting Agents standard, the PSM

standard, or a combination of both, and will pursue any appropriate regulatory changes as expeditiously as possible. As OSHA develops its approach to improve workplace safety associated with ammonium nitrate hazards, EPA will consider if additional action to protect the community is needed to complement OSHA regulations. EPA is considering whether the coverage provided to ammonium nitrate facilities will be sufficient or whether ammonium nitrate should be included in the RMP regulation.

Because past AN accidents with adverse effects off-site, such as blast waves, have typically involved its storage in large quantities, EPA could list AN on the RMP list with a high threshold in order to prioritize process safety requirements for those facilities and locations where large amounts of AN are stored. When EPA had included high explosives on the RMP list, the TQ was based on a trinitrotoluene (TNT) equivalent weight; EPA could determine a threshold amount for AN, based on a TNT-equivalent weight calculation adjusted for AN<sup>14</sup>. The RMP requirements for AN could be established at the statutory minima with more specific provisions tailored to particular types of facilities, e.g., manufacturers, fertilizer distributors and other facilities that have large amounts of explosives, blasting agents or fertilizers. EPA is authorized under CAA section 112(r)(5) to establish a greater TQ for, or to exempt entirely, any substance that is a nutrient used in agriculture when held by a farmer. Therefore, farmers who hold AN for use as a fertilizer could be exempted entirely in the same way as EPA has exempted farmers holding ammonia for use as a fertilizer (see 40 CFR 68.125).

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<sup>14</sup> TNT equivalent-weight calculation is a method for estimating the quantity of an explosive required to produce blast effects at various distances from the source of the explosion. The method uses the scaling law of distances, which relates quantity of explosive material and distance for a given overpressure. For explosives other than TNT, an empirically-derived equivalency factor is used to account for differences between the explosive characteristics of the actual explosive and those of an equivalent weight of TNT. Additional information on EPA's threshold methodology for high explosives can be found in [the Technical Background Document, Development of Threshold Quantities for List of Regulated Substances for Accidental Release Prevention, Clean Air Act Section 112\(r\)](#). See: Technical Background Document for the Development of Threshold Quantities for List of Regulated Substances for Accidental Release Prevention, Clean Air Act Section 112(r). Original Docket# A-91-74, document # III-B-2, June 21, 1992.

Alternatively, under CAA 112(r)(7)(A), EPA could require safe storage practices of solid AN forms similar to the practices required in the OSHA standard for Explosives and Blasting Agents at 29 CFR 1910.109(i) or in the NFPA 400 Hazardous Materials Code, Chapter 11. Promulgating regulations separate from the RMP requirements may be more appropriate to cover facilities whose handling of this chemical does not involve typical manufacturing and processing operations normally seen with chemicals that are hazardous gases and liquids, such as fertilizer distribution facilities. However, manufacturers of AN who handle molten and liquid AN in processes involving chemical reactions, at elevated temperature and pressure, or in process vessels, tanks, pumps and associated control equipment may be more appropriately covered by the RMP regulation.

EPA requests information on the following questions:

- i. Are there safety gaps in the current regulations for AN that could be addressed using regulations under CAA section 112(r)? Should EPA regulate AN under CAA section 112(r) authority to improve chemical safety practices at facilities handling AN? What types of AN and AN facilities should be subject to the RMP regulations to prevent chemical accidents involving AN that could have adverse effects, such as blast overpressure, on the public, environment and off-site property? Should EPA consider safety regulations to cover the storage and handling of AN fertilizer only and continue to rely on ATF regulations and OSHA standards to cover AN in explosives and blasting agents? What role should voluntary industry programs (such as the one undertaken by IME for high explosives) have in a decision on whether safety gaps exist that warrant regulation under the RMP? Please discuss the economic impacts

associated with the potential regulation of AN under CAA section 112(r), including any special circumstances involving small entities that EPA should consider.

- ii. Should EPA amend the RMP requirements to address the hazard posed by AN? If so, what specific requirements would be appropriate for AN? Alternatively, should EPA use its regulatory authority under CAA 112(r)(7)(A) to require more tailored safety steps for facilities handling AN and list AN at a high threshold to better focus these requirements on fewer holders of large quantities that pose the greatest risk? What would be the benefits of regulating AN under the RMP regulations as opposed to only maintaining the current SDS and hazardous chemical inventory reporting already required under EPCRA?
- iii. If EPA were to regulate AN under 40 CFR part 68, what quantity of AN poses a sufficient hazard to be covered? What would be the basis for establishing this TQ?
- iv. Does your facility store, handle, or manage AN? If so, in what form (e.g., solid, liquid) and in what grade (e.g., high density, low density)? If you are not a manufacturer of AN, how does your facility process or use AN? What quantities of AN are typically stored at your facility at one time?
- v. Are there any other standards, including consensus standards, applicable to AN storage, handling, and management that your facility follows? If so, which ones?
- vi. Please provide any data or information on accidents involving the storage, handling, and management of AN that affected people or property.
- vii. Please provide data on the population surrounding AN sites, including socio-economic information and other environmental burdens on surrounding communities.

viii. If EPA were to regulate AN under CAA Section 112(r), should EPA exempt farmers who store AN for use as a fertilizer? How many farmers would be eligible for such an exemption? Should there be any limits on such an exemption, such as maximum quantity on-site at any given time? Please provide the reasoning and any available data supporting your views.

d. Adding Reactive Substances and Reactivity Hazards

Although the chemicals listed in 40 CFR 68.130 were listed based on their toxicity or flammability, a number of them could be considered reactive chemicals based on a variety of metrics, including consensus standard sources. For example, the RMP list currently includes three chlorosilanes listed as toxic substances<sup>15</sup>. These compounds are included on the list because their levels of acute toxicity based on animal studies met the RMP listing criteria. However, they primarily produce acute toxic effects on exposed populations because of their rapid and intensive reaction with moisture in the air to produce hydrogen chloride, which can cause acute injury to any body tissue contacted as well as nasal, throat, or lung irritation, coughing, wheezing, and shortness of breath. Nevertheless, while certain listed substances such as these are reactive, the RMP list does not specifically focus on reactive chemicals. There are other chemicals that do not meet the RMP listing criteria, but could potentially be listed based on the hazards of their reaction byproducts (e.g., other chlorosilanes that produce hydrochloric acid upon release to the air).

EPA has long been aware of the hazards associated with reactive chemicals. In the January 19, 1993 proposed rule for listing substances (58 FR 5102), we considered whether to include on the list chemicals whose reactive properties could cause effects, in the event of an

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<sup>15</sup>These include methyltrichlorosilane (CASRN 75-79-6), dimethyldichlorosilane (CASRN75-78-5), and trimethylchlorosilane (CASRN 75-77-4).

accident, that would impact nearby communities. In order to meet the conditions in CAA section 112(r)(3) for the listing of substances, EPA sought to determine the common physical-chemical characteristics or properties that would be used as criteria to identify a set of chemicals to be listed and to provide the technical basis for these criteria. For toxic and flammable substances, the listing criteria included inherent properties of the chemical substances, such as physical state or boiling point, that are indicators of the potential to pose a severe threat to the community. EPA attempted to evaluate the hazards associated with reactive substances and develop an adequate technical basis to determine potential effects on the community. One difficulty is that it is not feasible for national listing decisions to take into account process- and site-specific factors, which can vary widely. EPA has instead addressed these factors in the accident prevention regulations (e.g., owners and operators implement hazard controls based on a PHA or hazard review that identifies the specific hazards of their regulated processes). Using criteria from other organizations, for example, an NFPA instability rating of 4 assigned to materials that are readily capable of detonation, explosive decomposition, or explosive reaction at normal pressures and temperatures provides important information but gives little indication of the potential impact on a community from an accident that takes place inside an industrial facility. The 1993 proposed rule requested comments from the public on approaches that could be used to evaluate the consequences to communities from incidents involving reactive substances. However, very few comments were received and no specific methods or listing criteria were identified by commenters. Several commenters suggested that a small number of highly reactive chemicals, specifically those that have toxic byproducts as a result of degradation or combustion, and have been involved in serious accidents, be added to the list. Several other commenters suggested deferring the listing of reactive substances based on the complexity of the technical issues, the

lack of a methodology to screen reactive hazards, and the expectation that reactive substances are unlikely to migrate off-site.

Serious accidents involving reactive chemicals have called attention to their hazards and raised questions regarding whether reactive chemicals are adequately regulated. In response to a 1995 chemical explosion that killed five workers at Napp Technologies, Inc., in Lodi, New Jersey, OSHA and EPA investigated the accident and concluded in a jointly-issued report<sup>16</sup> that the explosion was most likely triggered by an uncontrolled chemical reaction of water, sodium hydrosulfite, and aluminum powder. However this investigation did not result in any changes in OSHA or EPA regulations.

In August 2000, after investigating a runaway reaction at Morton International in Patterson, New Jersey that injured nine employees, the CSB initiated a comprehensive review of reactive hazards nationwide and issued a final report<sup>17</sup> in 2002 with recommendations to reduce the number and severity of such incidents. The report recommended that EPA revise the RMP regulation to address catastrophic reactive hazards that have the potential to seriously impact the public, including those resulting from self-reactive chemicals and combinations of chemicals and process-specific conditions. It also recommended coverage of chemicals based on a class of highly reactive properties, similar to the way the existing PSM standard defines a class of flammable liquids or gases. The CSB argued that a performance-based approach to evaluating reactive hazards would allow for both a comprehensive analysis and flexibility in implementation, but cautioned that a proper analysis would require expertise in reactivity hazards.

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<sup>16</sup> EPA/OSHA, EPA/OSHA Joint Chemical Accident Investigation Report – Napp Technologies, Inc., Lodi, New Jersey (EPA-550-R-97-002, October, 1997).

<sup>17</sup> CSB, Hazard Investigation – Improving Reactive Hazard Management, U.S. Chemical Safety and Hazard Investigation Board (Report No. 2001-01-H, October 2002).  
<http://www.csb.gov/assets/1/19/ReactiveHazardInvestigationReport.pdf>

CSB also recommended that EPA modify the accident reporting requirements in risk management plans and in “RMP\*Info” (EPA’s database for risk management plans) to define and record reactive incidents and add the term "reactive incident" to the four existing "release events" in EPA's current 5-year accident reporting requirements (Gas Release, Liquid Spill/Evaporation, Fire, and Explosion). According to CSB, structuring the information collection in this way would allow EPA and its stakeholders to identify and focus resources on industry sectors that experienced the incidents; chemicals and processes involved; and impacts on the public, the workforce, and the environment. Consequently, in 2004 EPA amended the format for risk management plan submissions to include uncontrolled chemical reactions on the list of possible accident causes that covered sources may select when completing five-year accident history reports. Since amending the format, 29 reactive chemical incidents have been reported in RMPs submitted to EPA. In total, these accidents resulted in zero deaths, 48 injuries, 190 people evacuated, approximately \$3 million in off-site property damage, and approximately \$33 million in onsite property damage. Processes in 16 different NAICS codes were involved in these incidents; however, processes in NAICS 325211 (Plastics Material and Resin Manufacturing) accounted for 9 of the incidents. No other NAICS code accounted for more than 3 incidents.

One approach to regulating reactive hazards is the approach adopted in the New Jersey Toxic Catastrophe Prevention Act (TCPA), which includes a ‘List of Individual Reactive Hazardous Substances,’ as well as a list of ‘Reactive Hazard Substances Mixture Functional Groups.’<sup>18</sup> TCPA includes substances with certain functional groups and molecular structures that have been identified as highly reactive, based on scientific research and accident history.

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<sup>18</sup> The New Jersey Toxic Catastrophe Prevention Act is the state’s process safety regulation. It adopts the federal RMP requirements, and includes additional state-level requirements. See <http://www.nj.gov/dep/rpp/brp/tcpa/index.htm>

Under the TCEQ, covered facilities must determine if any of the chemicals they are intentionally mixing include components on the Functional Group list. If so, then the facility must determine the heat of the reaction and the corresponding TQ for TCEQ coverage. This approach takes into account not only certain specific chemicals, but also their overall reactivity in determining the level of coverage.

In 2010, the NFPA published the first edition of its Hazardous Materials Code (NFPA 400). NFPA 400 was subsequently updated in 2012 (i.e., NFPA 400 Hazardous Materials Code, 2013 Edition)<sup>19</sup>. NFPA 400 specifies storage, use, and handling requirements for various categories of hazardous materials, including unstable (reactive) solids and liquids, water reactive solids and liquids, and others. EPA could adopt similar requirements as the basis for reactive hazards regulations.

EPA is considering including reactive chemicals on the RMP list and is seeking information on potential approaches to addressing reactive hazards, including the approach used in the TCEQ, application of the requirements contained in NFPA 400, or others. EPA requests information on the following questions:

- i. What are the best criteria to use in classifying reactive hazards? How do you identify a reactive chemical or a reactive mixture?
- ii. Should EPA add reactive chemicals to the list of RMP-covered chemicals in 40 CFR 68.130? If so, which chemicals? What criteria should EPA consider using to establish TQs for reactive chemicals? Should EPA add only specific chemicals, or groups of chemicals defined by particular chemical characteristics?

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<sup>19</sup> [http://www.nfpa.org/catalog/product.asp?pid=40013&cookie\\_test=1](http://www.nfpa.org/catalog/product.asp?pid=40013&cookie_test=1)

- iii. Should EPA list additional chlorosilanes as toxic substances on the RMP list due to their reactive hazard due to formation of hydrochloric acid when a chlorosilane is accidentally released into the air and reacts with moisture?
- iv. If your facility is covered by the New Jersey TCPA, have those requirements been effective in protecting human health and the environment from reactive hazards? Please describe any economic impacts associated with TCPA coverage (e.g., costs and benefits, cost savings, shifts in usage of reactive chemicals, special circumstances involving small entities, etc.).
- v. Should EPA revise the RMP regulation to use chemical functional groups similar to those in the TCPA<sup>20</sup> to define hazardous reactive mixtures? If so, which chemical functional groups should EPA use?
- vi. Does your facility follow NFPA 400 for reactive hazards? If so, please describe the economic impacts associated with following NFPA 400 (e.g., cost of additional equipment, cost of additional training, benefits of quality management, special circumstances involving small entities, etc.). Is following NFPA 400 an effective way of protecting human health and the environment from reactive hazards? Please explain.
- vii. Has your facility implemented a reactive-hazards management program other than a program specified by the TCPA and NFPA 400? If so, please describe your facility's program, whether it protects human health and the environment more or less than the TCPA and NFPA 400, whether it is voluntary or mandatory and, if the latter, under

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<sup>20</sup> The definition of "reactive hazard substance (RHS) mixture" in the TCPA references a list of chemical functional groups specified in N.J.A.C. 7:31-6.3 (a), Table I, part D, Group II. Whether any of the chemical functional groups are present determines in part coverage of an RHS mixture under the TCPA.

what authority, any economic impacts associated with the program, and any special circumstances involving small entities.

- viii. What alternative regulatory approach to TCPA or NFPA 400, if any, should EPA consider using to address reactive hazards? What would be the economic impacts of this approach and would there be any special circumstances involving small entities? Are there specific requirements that EPA should consider adding to the RMP regulations to ensure that owners and operators adequately manage reactive hazards?
- ix. Please provide any data or information on accidents, near misses, or other safety-related incidents involving reactive hazards not covered under the existing RMP regulation. What reactive-hazards management requirements might have prevented these incidents if they had been included in the RMP regulation?

e. Adding Other Categories of Substances

This section addresses substances which are not traditionally classified as highly toxic, flammable, or explosive but that have nonetheless caused or contributed to serious accidents. Other categories of substances beyond highly toxic and flammable liquids and gases could cause death, injury, or serious adverse effects to human health or the environment in the event of an accident. For example, certain types of flammable and explosive solids and non-volatile liquids can explode and cause blast waves that have the potential to injure people and cause property damage beyond a facility's fence line. Such explosions or detonations could involve categories of chemicals not currently regulated as RMP substances or previously discussed in this section as potential additions to the RMP list. Examples of these include organic peroxides, oxidizers, combustible dusts or other flammable solids.

EPA requests information on the following questions:

- i. Should EPA consider adding organic peroxides, oxidizers, combustible dusts, flammable solids, or other additional types of chemicals to the RMP list? Are there any particular chemicals belonging to these or other classes which present a high hazard that could cause adverse effects beyond a facility's fence line in the event of an accidental release?
- ii. If a particular new category of chemicals should be considered for inclusion on the RMP list, what criteria should be used to prioritize the hazard(s) and determine which chemicals should be listed?
- iii. If EPA were to add combustible dusts to the lists of covered chemicals, are there categories of dusts, such as agricultural dusts (e.g., grain dust, pesticide dust, etc.), that should be excluded? What factors, such as existing handling practices, accident history, and potential risk to surrounding communities should EPA consider in evaluating potential exclusions?
- f. Removing Certain Substances from the List or Raising their Threshold Quantity

EPA is also seeking information on whether certain substances should be removed from the current list of regulated substances. There are six RMP chemicals (four toxic, two flammable) for which EPA has never received a RMP report. The four toxic chemicals are arsenous trichloride (CASRN 7784-34-1), cyanogen chloride (CASRN 506-77-4), sulfur tetrafluoride (CASRN 7783-60-0), and tetramethyl lead (CASRN 75-74-1). The two flammable chemicals are: chlorine monoxide (CASRN 7791-21-1) and ethyl nitrite (CASRN 109-95-5).

EPA's 2012 Chemical Data Reporting (CDR) information on the production and use of chemicals manufactured or imported into the United States also showed no facilities reporting

any data for these six chemicals, when searched by CASRN<sup>21</sup>. EPA's Envirofacts system<sup>22</sup>, which contains reporting on chemicals from the various environmental databases and reporting systems managed by EPA, also did not show any reports for these six substances, when searched by CASRN. A search of the E-Plan database, which contains EPCRA Tier II Emergency and Hazardous Chemical Inventory reports for most states, showed that four of the six chemicals were reported in E-Plan for filing year 2012, but only one facility each reported for three of the chemicals and five facilities reported for sulfur tetrafluoride. However, E-Plan only contains reports from about 40 states, and for several of these, the database does not contain complete information. The search results show that four of the six chemicals are in commerce, although the Tier II amounts reported on site were below RMP reporting thresholds.

One of the sixteen substances mandated by Congress for the initial listing of regulated substances for accident prevention was toluene diisocyanate (TDI). In order to ensure that all forms of TDI were listed, the RMP list of toxic substances contains three listings representing this chemical, including both the 2,4 and 2,6 isomers (also listed as EHSs) and unspecified isomers or mixture of isomers (not listed as an EHS), all of which have distinct separate CAS Registry numbers.

Toluene, 2,4-diisocyanate	CASRN	584-84-9
Toluene, 2,6-diisocyanate	CASRN	91-08-7

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<sup>21</sup> <http://www.epa.gov/cdr/> However, manufacturing or production volume data was only required for CDR when 2011 site-specific production volume for reportable chemicals equaled or exceeded 25,000 pounds. Chemicals manufactured only for non-TSCA uses such as pesticides or chemicals regulated by the FDA are not required to be reported under CDR. Also, small manufacturers (including importers) are generally exempt from CDR requirements if their annual company sales do not exceed certain limits.

<sup>22</sup> <http://www.epa.gov/enviro/index.html>

Toluene diisocyanate, unspecified isomer CASRN 26471-62-5<sup>23</sup>

Although the vapor pressure for TDI is relatively low at ambient temperature (< 0.5 mm Hg) and does not meet the vapor pressure listing criteria of  $\geq 10$  mm Hg for a regulated toxic substance, EPA believed that the language of CAA section 112(r)(3) precluded the Agency from omitting TDI from the initial list of RMP substances. The Senate Report on its version of the 1990 CAAA<sup>24</sup> says “the Administrator is not authorized to remove substances from the initial list.” The format of CAA 112(r)(3), which mandates the initial list contain certain chemicals and requires a more expansive list by rulemaking, first appears in the Senate Bill. However, the statute itself does not prohibit later deletions of substances that were mandated for inclusion on the initial list. The final enacted CAA section 112(r)(3) authorizes both additions and deletions from the list, in contrast to the version in the Senate Report that only authorized additions.<sup>25</sup> The enacted language is similar to the structure of the hazardous air pollutant (HAP) “initial list” under CAA section 112(b), which authorizes revisions and deletions and is cross-referenced in CAA section 112(b)(3) for its revision procedures. Fifty-three accidents involving TDI have been reported in RMP accident history reports since 1995, but none of these resulted in fatalities or off-site injuries.

Currently the TQ for all three TDI listings is 10,000 pounds. EPA is considering whether the TQ for TDI should be higher because its much lower vapor pressure would result in a lower volatilization rate and less potential for an air release. The current TQs were assigned based on a ranking scheme using a Level of Concern (LOC) based on acute toxicity and the potential for airborne dispersion. For each chemical, a ranking factor was calculated that equaled the LOC

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<sup>23</sup> This CASRN is used for the “generic TDI” for any mixture of the 2,4-TDI and 2,6-TDI isomers, of varying ratio between the two specific isomers.

<sup>24</sup> Senate Committee on Environment and Public Works, Clean Air Act Amendments of 1989, Senate Report No. 228, 101st Congress, 1st Session 211 (1989), page 220.

<sup>25</sup> See Senate Report at 560 (section 129(c)).

divided by an air dispersion factor (V). Chemicals were assigned TQs of 500, 1,000, 2,500, 5,000, 10,000, 15,000 or 20,000 pounds based on the order of magnitude ranges of the ranking factors. The LOC was based on the Immediately Dangerous to Life and Health (IDLH) level developed by the National Institute of Occupational Safety and Health (NIOSH) or an approximation of the IDLH based on animal toxicity data. For gases,  $V = 1$ , while for liquids, V was based on a volatilization model using the molecular weight and boiling point of the chemical. The TQ methodology is described in detail and the ranking factors for each chemical are provided in the Technical Background Documents for the Development of Threshold Quantities<sup>26</sup>, which are available in the public docket for this notice. The minimum level of TQ was set at 500 pounds to represent a drum sized container. The highest TQ of 20,000 pounds represented typical handling quantities and allowed the range of thresholds to better reflect the relative hazards among the listed toxic chemicals.

Applying EPA's TQ ranking methodology, the ranking factor for TDI was 0.73, which was midrange for the toxic substances assigned the TQ of 10,000 pounds. Other toxic chemicals assigned the 10,000 pounds TQ had ranking factors ranging from 0.3 to 0.9. The acute toxicity of TDI is relatively high compared to most of the other toxic chemicals. The LOC toxicity value of TDI is  $0.07 \text{ g/m}^3$  (10 ppm) and the LOC toxicity values for the other toxic chemicals range from  $0.0025 \text{ g/m}^3$  to  $4.9 \text{ g/m}^3$  (the lower the LOC toxicity value, the more toxic the chemical).

Although the vapor pressure of TDI is much less than the cutoff vapor pressure of 10 mm Hg used to select other liquid toxic substances, the air dispersion factor (V) does not use the vapor pressure at ambient temperature to determine the volatilization rate. Instead, the equation

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<sup>26</sup> USEPA. June 21, 1992. Technical Background Document for the Development of Threshold Quantities for List of Regulated Substances for Accidental Release Prevention, Clean Air Act Section 112(r). Original Docket# A-91-74, document # III-B-2.

USEPA. January 14, 1994. Technical Background Document Supporting Development of Threshold Quantities for Regulated Substances under Section 112(r) of the Clean Air Act. Original Docket# A-91-74, document # V-B-2.

for calculating V uses the boiling point of the chemical to reflect worst case conditions of accidental releases that are likely to involve heat (e.g., fires, exothermic runaway reactions, or upset process conditions), which cause more rapid volatilization of the liquid.

To assign TDI a TQ based on its vapor pressure, a different rationale would have to be used for determining the threshold such as using ambient liquid temperature conditions instead of boiling liquid temperatures for calculating the air dispersion factor V. EPA is requesting information on whether the methodology for assigning TQs should be changed to account for the much lower vapor pressure of TDI, and if so, information on a rationale for how it should be done.

One consideration for retaining TDI on the list of substances despite its low vapor pressure is that TDI is known as a potent dermal and lung sensitizer. In sensitized individuals, exposure to even small amounts of diisocyanates may cause allergic reactions such as asthmas and severe breathing difficulties. The LOC toxicity value for TDI was based on a 1990 IDLH value of 10 ppm, which has since been revised to 2.5 ppm<sup>27</sup>. The Acute Exposure Guideline Level -2 (AEGl-2) for a 1-hour exposure has been established at 0.083 ppm<sup>28</sup> which is a concentration above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape (see section II.D.9 later for further discussion about AEGlS). However, neither the revised IDHL or AEGl values are based on exposures of individuals or animals sensitized to TDI. Thus, some accidental releases of TDI that would not cause severe acute health effects in most individuals, may trigger breathing problems or severe allergic

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<sup>27</sup> <http://www.cdc.gov/niosh/idlh/584849.html>

<sup>28</sup> <http://www.epa.gov/oppt/aegl/pubs/tsd47.pdf>

reactions in sensitized individuals. The sensitizing nature of TDI should be considered when evaluating whether to raise the TQ of TDI and perhaps should be considered as a reason for lowering the TQ instead of raising it.

One of the flammable chemicals on the RMP list, 1,3-pentadiene (CASRN 504-60-9), fails to meet the flammability criteria discussed earlier in this section. Its inclusion in the RMP list of flammable substances was due to a typographical error in the boiling point of the substance as reported by one reference source. NFPA had listed the boiling point for 1,3-pentadiene as  $-43^{\circ}\text{C}$ <sup>29</sup>, but according to other data sources, it is actually  $+43^{\circ}\text{C}$ , which is above the cutoff of  $37.8^{\circ}\text{C}$  for an NFPA flammability 4 rating. NFPA has since corrected the boiling point and changed the flammability rating to 3.<sup>30</sup> Therefore, 1,3-pentadiene does not meet the flammability and volatility criteria for RMP-listed flammable substances.

EPA requests information on the following questions:

- i. Would it be appropriate for EPA to delete TDI (a substance mandated by Congress to be included on the initial RMP list) from the RMP toxic substances list because its vapor pressure does not meet the vapor pressure listing criteria established by EPA?
- ii. If it is not appropriate to delete TDI, would it be appropriate for EPA to continue to list TDI on the RMP list but with a higher TQ for RMP reporting? Should the methodology for assigning TQs account for the much lower vapor pressure of TDI, and if so, how should this be done? Currently, the TQ for all three TDI listings is 10,000 pounds.

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<sup>29</sup> NFPA. 1994. NFPA 325 Guide to Fire Hazard Properties of Flammable Liquids, Gases and Volatile Solids, 1994 ed. National Fire Protection Association, Pg 325-77.

<sup>30</sup> NFPA. 2010. NFPA Fire Protection Guide to Hazardous Materials, 14<sup>th</sup> ed., Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids. National Fire Protection Association. Pg. 325-95.

- iii. If it is not appropriate to delete TDI because it is a sensitizer, should EPA continue to list TDI on the RMP list but with a lower TQ because of its unique toxicity, and if so, what should be the basis for setting a lowered TQ?
- iv. Are there other listed substances that should have a higher TQ? If so, which ones, what are the appropriate TQs, and why?
- v. Should EPA delete from the RMP list any of the six substances for which the Agency has not received any RMP report if the Agency believes that they are not widespread in commerce or only stored in quantities well below the RMP TQ? EPA requests any available information about the extent of these six chemicals' manufacture and use in commerce, including any annual amounts manufactured, imported or used in the U.S.
- vi. Is there any reason that EPA should not delete 1, 3-pentadiene from the RMP list as it does not meet the listing criteria for flammable substances and was erroneously listed? Are there any other RMP substances that are known to be listed based on erroneous data?
- g. Lowering the Threshold Quantity for Substances Currently on the List

EPA is also seeking information on whether the TQ for any substances currently on the list should be reduced:

- i. Are the current TQs protective of human health and the environment, or are there certain substances for which the TQ is too high? If so, which substances? For such substances, what TQ should EPA establish and what would it be based on?
- ii. What would be the economic impacts of any lowering of the TQ which might be warranted? Are there any special circumstances involving small entities that EPA should consider with respect to lowering of a TQ?

## 2. Additional Risk Management Program Elements

Approaches to chemical process safety have continued to evolve since both the RMP regulation and OSHA PSM standard were promulgated. New management system elements and best practices are now being used to address human health, worker safety and environmental protection. Lessons learned from data collected in RMP submissions regarding safety management systems have also informed EPA's perspective on the issue. The Agency is requesting information on the management system elements OSHA has identified in their RFI, but with a focus on their applicability to the RMP requirements, and how they can enhance the protection of human health and the environment.

Like OSHA, EPA is considering three elements taken from the Risk Based Process Safety Program recommended by the Center for Chemical Process Safety (CCPS)<sup>31</sup> : (1) Measurements and Metrics; (2) Management Review and Continuous Improvement; and (3) Process Safety Competency. A "Measurements and Metrics" element would require the facility to establish performance and efficiency indicators to track the effectiveness of the risk management system and to identify opportunities for improvement of its elements and work activities. This element would guide facilities in measuring the real-time performance of their process safety management systems. An example of a measurement and metrics indicator would be to track the frequency of process upsets and near-miss accidents. A "Management Review and Continuous Improvement" element would focus on ongoing 'due diligence' management reviews that fill the gap between day-to-day work activities and periodic formal audits. This element would require facilities to regularly evaluate the management systems in place, as opposed to waiting for an incident to occur, or for scheduled audits to identify deficiencies. A

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<sup>31</sup> American Institute of Chemical Engineers, Center for Chemical Process Safety, *Guidelines for Risk Based Process Safety*, New York, Wiley, 2007

“Process Safety Competency” element would encompass three interrelated activities: (1) to continuously improve on knowledge and competency, (2) to ensure appropriate information is available to those who need it, and (3) to consistently apply lessons learned. The main focus of this competency element is organizational learning, so that the process knowledge can be applied to situations in order to effectively manage risk.

The Agency is also requesting information on two additional management-system elements that were identified by OSHA in their review of relevant safety standards promulgated by other federal agencies. Specifically, the Bureau of Safety and Environmental Enforcement (BSEE) promulgated revisions to their Safety and Environmental Management Systems (SEMS II) requirements (78 FR 20423; April 5, 2013) to help ensure the safe operations of their regulated facilities. The revisions included a number of management-system elements not addressed in the RMP regulation. The two elements the Agency is focusing on are a “Stop Work Authority” and an “Ultimate Work Authority.” In its SEMS II Fact Sheet<sup>32</sup>, BSEE describes these elements as follows:

- Developing and implementing a stop work authority that creates procedures and authorizes any and all offshore industry personnel who witness an imminent risk or dangerous activity to stop work.
- Developing and implementing an ultimate work authority that requires offshore industry operators to clearly define who has the ultimate work authority on a facility for operational safety and decision-making at any given time.

While the requirements under SEMS II focus on offshore facilities under the jurisdiction of BSEE, the concept of requiring these elements may be applicable to facilities subject to the

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<sup>32</sup> <http://www.bsee.gov/Regulations-and-Guidance/Safety-and-Environmental-Management-Systems---SEMS/Fact-Sheet/>

RMP regulation. Established procedures for any and all employees on the facility to implement a stop work authority when witnessing an activity that creates a threat of danger, and clearly defined requirements establishing who has the ultimate authority on the facility for operational safety and decision making at any given time could help to better protect human health and the environment.

In addition to the management system elements identified in the OSHA RFI, EPA is also interested in receiving public comment on whether there are other accident prevention elements that should be considered for inclusion in the RMP regulation. The Agency notes that both the CCPS Guidelines for Risk Based Process Safety and the BSEE SEMS regulations contain additional management system elements not present in the RMP regulation. One such element is “conduct of operations” which CCPS defines as “the execution of operational and management tasks in a deliberate and structured manner.” Conduct of operations includes a variety of measures such as formal communications between workers, work groups, and work shifts. It also involves establishing clear rules governing access to key process areas, such as control rooms, performing regular tours or rounds to monitor equipment status and keeping written shift logs of equipment status and ongoing process activities, maintaining clear and accurate labeling for process equipment, and maintaining good housekeeping in process areas.

Another element contained in the CCPS Guidelines is “process safety culture.” CCPS defines process safety culture as “the combination of group values and behaviors that determine the manner in which process safety is managed.” Poor safety culture can lead to accidents by allowing production pressures to overshadow safety concerns, or by limiting the free exchange of important safety information among plant personnel. Safety culture has been implicated in recent serious accidents, such as the August 2012 accident at the Chevron refinery in Richmond,

California. In that accident, the CSB found indications that a weak safety culture may have led to the normalization of deviance in the refinery's mechanical integrity management system. Consequently, the California Interagency Working Group on Refinery Safety published a report concluding that both the California OSHA PSM requirements and the California Accidental Release Prevention RMP requirements should be strengthened to require California refineries to conduct safety culture assessments at least every three years<sup>33</sup>.

The BSEE SEMS regulations contain requirements to conduct a "Job Safety Analysis." BSEE indicates that the Job Safety Analysis (JSA) is an operations/task level hazard analysis technique used to identify risks to personnel associated with their job activities. The Agency is requesting public comment on whether these or other additional management system elements should be added to the RMP regulation, and whether and how these elements relate to prevention of accidental releases.

Additionally, the Agency seeks public comment on whether management system elements that are currently contained within the RMP regulation should be modified, clarified or strengthened. For example:

- Contractors are increasingly used in a variety of roles at chemical process facilities, yet the RMP rule imposes fewer safety requirements on contractor owners and operators than on the owners and operators of the regulated stationary source. In October 2007, five contractor workers were killed at Xcel Energy, in Georgetown, Colorado, when a fire occurred inside a tunnel at the company's hydroelectric power

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<sup>33</sup> California Interagency Working Group on Refinery Safety: *Improving Public and Worker Safety at Oil Refineries*, California Environmental Protection Agency, February 2014, <http://www.calepa.ca.gov/Publications/Reports/2014/RefineryRpt.pdf>.

plant. The CSB found that inadequate contractor safety practices and oversight contributed to the accident<sup>34</sup>;

- The RMP rule requires owner/operators to conduct a Process Hazard Analysis (PHA) for Program 3 processes and a hazard review for Program 2 processes. PHAs and hazard reviews are intended to identify potential equipment malfunctions or human errors that could cause an accidental release, and safeguards needed to prevent such malfunctions and errors. However, the rule does not explicitly describe the types of failure scenarios or damage mechanisms that must be considered during PHAs and hazard reviews, and during some compliance inspections EPA has reviewed PHAs and hazard reviews that did not address failure scenarios such as natural disasters (e.g., floods, earthquakes, hurricanes, etc.), corrosion, vehicle collisions, and others. Additionally, the rule requires hazard reviews to be “updated”, and PHAs to be “updated and revalidated” at least every five years, but does not clearly define what is required in order for a hazard review to be updated or for a PHA to be updated and revalidated. EPA is interested in receiving comment on whether PHA and hazard review requirements should be clarified, and whether hazard review and PHA updates should be required more frequently than every five years, or whether certain events should trigger hazard review or PHA updates prior to the next scheduled 5-year update.
- The Pre-Startup Review element (section 68.67) requires the owner or operator to perform a pre-startup review for new stationary sources and for modified stationary sources when the modification is significant enough to require a change in the process

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<sup>34</sup> CSB, Investigation Report – Xcel Energy Hydroelectric Plant Penstock Fire, U.S. Chemical Safety and Hazard Investigation Board (Report No. 2008-01-I-CO, August 2010).  
[http://www.csb.gov/assets/1/19/Xcel\\_Energy\\_Report\\_Final.pdf](http://www.csb.gov/assets/1/19/Xcel_Energy_Report_Final.pdf)

safety information. However, the rule does not clearly state what modifications would require a change in process safety information. Also, EPA notes that process unit startup is a significantly more hazardous period compared to normal process operations, and that serious accidents such as the March 23, 2005 explosion at the BP America refinery in Texas City, Texas have occurred during process startup even when no significant equipment modifications were made to the process during the preceding turnaround.

EPA requests information on any additional management-system elements or on potentially modifying, clarifying or expanding existing elements, including those discussed in this RFI, which would serve to improve protection of human health and the environment. The Agency welcomes data and information on management-system elements from consensus standards, safety organizations, federal standards, or other sources that could increase process safety if the RMP regulation were expanded to include them. The Agency invites the public to respond to any questions for which they have specific knowledge, data, or information, regardless of their involvement in RMP-regulated operations. Specifically, EPA requests information on the following questions:

- a. Does your facility follow any management-system elements not required under part 68 for RMP-regulated operations? If so, please describe the additional management-system elements, the safety benefits, any economic impacts associated with following the elements, and any special circumstances involving small entities.
- b. Would expanding the scope of the RMP regulation to require additional management-system elements, or expanding the scope of existing RMP management-system elements, improve the protection of human health and the environment? Should EPA

- require safety culture assessments, job safety analyses, or any of the other new management system elements described above? If so, please describe the elements, the safety benefits, any economic impacts associated with expanding the scope of the RMP regulation in this way, and any special circumstances involving small entities that EPA should consider. Would current staff at a facility be able to implement these additional elements or would new staff need to be hired?
- c. In systems using management and metrics, how do facilities develop useful leading indicators? Do you track the frequency of events such as process upsets, accidental releases, and “near miss” incidents? Does tracking such events allow managers and employees to make changes that prevent accidental releases? What other metrics and indicators do you use, and how do they help prevent releases?
  - d. Would requiring RMP facilities to conduct periodic safety culture assessments meaningfully strengthen the safety culture incentives that already exist, such as avoidance of deaths, injuries, property and environmental damage, production loss, community impacts, damage to company reputation, etc., that may result from accidents?
  - e. Would expansion of the RMP employee participation provision to include requirements such as the SEMS II stop-work authority, or other efforts to involve employees in all management-system elements, enhance protection of human health and the environment?
  - f. Are there any other management-system elements in the existing RMP regulation that EPA should expand or clarify (e.g., a new requirement that facilities perform a root-cause analysis for incidents under § 68.81, clarify PHA and hazard review

requirements, require more frequent PHA and hazard review updates, strengthen contractor requirements, or require pre-startup reviews prior to all process startups)? If so, please describe the additional requirements, the safety benefits, any economic impacts associated with expanding the RMP regulation in this way, and any special circumstances involving small entities that EPA should consider.

- g. Are there any data or information on accidents, near misses, or other safety-related incidents that the facility could have prevented by following management-system elements not currently required under the RMP regulation?
- h. What would be the paperwork burden associated with the revisions to management-system elements discussed above? What special skills or training would employees need to implement these elements, including associated reporting and record-keeping requirements? What would be the costs of additional reporting and record-keeping requirements, including costs for worker training and any required data management system upgrades?

3. Define and Require Evaluation of Updates to Applicable Recognized and Generally Accepted Good Engineering Practices

The OSHA PSM standard's references to recognized and generally accepted good engineering practices (RAGAGEP) are almost identical to those contained in Subpart D of 40 CFR part 68 (i.e., Program 3 Prevention Program). § 68.65(d)(2) requires the owner or operator to "document that equipment complies with recognized and generally accepted good engineering practices." At facilities with "existing equipment designed and constructed in accordance with codes, standards, or practices that are no longer in general use," § 68.65(d)(3) further requires the owner or operator to "determine and document that the equipment is designed, maintained,

inspected, tested, and operating in a safe manner.” These requirements parallel the requirements in paragraphs (d)(3)(ii) and (d)(3)(iii) of § 1910.119, respectively, with the only difference being that OSHA uses the term “employer” where EPA uses the term “owner or operator.” The RMP rule and PSM standard also contain identical references to RAGAGEP in § 68.73 / § 1910.119(j) (i.e., Mechanical Integrity). Additionally, Subpart C of 40 CFR part 68 (i.e., Program 2 Prevention Program) contains references to RAGAGEP in § 68.48 (Safety information) and § 68.56 (Maintenance).

EPA requests information on the following questions:

- a. What does your facility use as a definition for RAGAGEP? Would adding a definition for RAGAGEP to the RMP rule improve understanding of RMP requirements and prevent accidental releases? If so, what specific definition for RAGAGEP should EPA add to the RMP rule? What would be the economic impacts of adding such a definition?
- b. From what sources (e.g., codes, standards, published technical reports, guidelines, etc.) does your facility select applicable RAGAGEP for operations covered under the PSM standard?
- c. Does your facility evaluate updates to its selected RAGAGEP? If so, how does your facility monitor any updates, and how often do you evaluate them?
- d. Please provide any data or information on accidents, near misses, or other safety-related incidents involving failure to evaluate and/or implement updates to applicable RAGAGEP for RMP-covered processes. Would requiring employers to evaluate and/or implement updates to applicable RAGAGEP prevent such accidental releases?

- e. Should owners or operators covered by the applicable provisions of the RMP regulation be required to evaluate updates to applicable RAGAGEP? Should owners and operators be required to comply with new RAGAGEP requirements that occur after the owner or operator's initial compliance with the applicable provision of the RMP regulation? How would such updates or new requirements be identified? What would be an appropriate time period in which to conduct this evaluation and/or to comply with updated RAGAGEP? What would be the economic impacts of this change?
- f. Would a requirement to evaluate updates to applicable RAGAGEP be more appropriate in another paragraph of the RMP rule? For example, should such a requirement become part of the Process Hazard Analysis revalidation requirements at § 68.67(f), or the management of change requirements at § 68.75? How would EPA incorporate such a requirement for Program 2 processes?

4. Extend Mechanical Integrity Requirements to Cover Any Safety-Critical Equipment

EPA is interested in receiving information on whether the scope of the mechanical integrity provisions of the RMP rule should be expanded to cover the mechanical integrity of any safety-critical equipment, and whether additional mechanical integrity requirements should be added to the rule's provisions. In its RFI, OSHA notes that the mechanical integrity provisions of the PSM standard apply to six specific categories of equipment, including pressure vessels and storage tanks, piping systems (including piping components such as valves), relief and vent systems and devices, emergency shutdown systems, controls (including monitoring devices and sensors, alarms, and interlocks), and pumps. While these categories of equipment encompass most safety-critical equipment within regulated processes, during some compliance inspections

EPA has observed that facilities have failed to apply mechanical integrity program measures to certain additional types of equipment and systems that could reasonably be judged to be critical to process safety. Examples of such equipment would include computer software systems that interact with process components, electrical power systems, and other utility systems that interact with pumps, valves, or control systems.

EPA notes that the RMP Program 2 maintenance requirements, which were intended as a streamlined version of the mechanical integrity requirements for Program 3 processes, apply to all process equipment, rather than being restricted to specific categories of equipment. This potentially causes the unintended result where certain aspects of a process subject to Program 2 must meet more rigorous maintenance requirements than the same equipment located in a Program 3 process. EPA is interested in receiving feedback on whether expanding the scope of the Program 3 mechanical integrity requirements or reducing the scope of the Program 2 maintenance requirements would appropriately address this potential discrepancy.

In addition to expanding the scope of the rule's existing mechanical integrity provisions to cover any safety critical equipment, EPA is also interested in whether additional requirements should be added to this section, or whether any existing requirements need to be clarified. For example, emergency shutdown systems are one type of process equipment covered under the rule's mechanical integrity provisions. However, the regulation does not explicitly require that all covered sources install emergency shutdown systems.

EPA requests information on the following questions:

- a. Should EPA amend the mechanical integrity provisions of the RMP rule to explicitly cover all safety critical process equipment? If so, what type(s) of equipment? Did you identify safety-critical equipment not explicitly covered under § 68.73? If so,

- how did your facility determine that the equipment was safety-critical, and does your facility treat the equipment as if it were RMP-covered for safety or other reasons? Did you identify the equipment as safety-critical through an RMP process hazard analysis?
- b. Please provide any data or information on accidental releases, near misses, or other safety-related incidents related to the mechanical integrity of safety-critical equipment not explicitly covered under § 68.73.
  - c. Would expanding the scope of § 68.73 to explicitly cover the integrity of all equipment critical to process safety make it more likely to prevent accidental releases?
  - d. Should EPA add additional requirements to the mechanical integrity provisions, or clarify any existing provisions? For example, should the Agency require that certain types of covered facilities install emergency shutdown systems, such as redundant power supplies, emergency flares, vents, or scrubbers, etc., in order to prevent accidental releases resulting from uncontrolled emergency shutdowns?
  - e. Are there any other provisions of this section that should be enhanced or clarified? Does labeling § 68.73 as “Mechanical Integrity” cause owners and operators to disregard or neglect the maintenance, functionality, or integrity of process components that would not typically be considered “mechanical” components, such as electrical and computer systems?
  - f. What would be the economic impacts of revising the mechanical integrity provisions as discussed above? Are there any special circumstances involving small entities that

EPA should consider with respect to revising the mechanical integrity provisions of the RMP?

5. Require Owners and Operators to Manage Organizational Changes

In its RFI, OSHA notes that while the PSM standard requires employers to establish and implement written procedures to manage change, including all modifications to equipment, technology, procedures, raw materials, and processing conditions other than replacement in kind, the standard does not explicitly require employers to follow management-of-change procedures for organizational changes, such as changes in management structure, budget cuts, or personnel changes. However, OSHA highlights a policy interpretation indicating that it is OSHA's view that the PSM standard does cover organizational changes if the changes have the potential to affect process safety. Additionally, OSHA notes the 2005 BP Texas City Refinery accident, where the CSB identified a lack of organizational management of change as a significant causal factor in the accident.

The RMP rule contains management of change requirements for Program 3 processes (see § 68.75) that are virtually identical to the PSM standard. Therefore, EPA is also interested in receiving public comment on whether the RMP rule's management of change requirements should be expanded to include management of organizational changes.

EPA requests information on the following questions:

- a. What do you consider to be an organizational change within the context of process safety management practices? For example, would you consider the following, or similar, changes to be organizational changes: reducing the number of operators in a shift; changing from 5-day to 7-day operations; changing from 8-hour to 12-hour operator shifts; replacing a unit manager; reducing the facility operations or

- maintenance budget; relocating a technical group to a remote corporate location; changing a supervisory or compensation structure; or hiring contractors to do work formerly performed by employees of the regulated facility? Are there other examples of organizational changes that may be relevant to safety management practices?
- b. If your facility has established and implemented written procedures for management of organizational changes, please describe any economic impacts associated with the procedures. Please note any implementation challenges that may be associated with requiring that such procedures be developed and followed.
  - c. Would clarifying § 68.75 with an explicit requirement that employers manage organizational changes prevent accidental releases? What would be the economic impact of such a clarification? Are there any special circumstances involving small entities that EPA should consider with respect to this option?
  - d. Please describe any organizational changes made in your facility that have had the potential to affect process operations. Were management-of-change procedures followed before making the changes?
  - e. What do you consider to be the best safety practices concerning management of organizational change?
  - f. Please provide any data or information on accidents, near misses, or other safety-related incidents involving the failure to manage organizational change. Would following management-of-change procedures under § 68.75 have prevented these incidents?
6. Require Third-Party Compliance Audits

Sections 68.58 and 68.79 of the RMP regulation (Program 2 and 3 Compliance Audits) are almost identical in language to that found in 1910.119(o) of the OSHA PSM standard, with PSM's focus on worker safety and RMP's on protecting human health and the environment. Both section 68.58 and 68.79 require that "the owner or operator shall audit the compliance with the provisions of the subpart at least every three years." In addition, both require that "the compliance audit shall be conducted by at least one person knowledgeable in the process." Neither OSHA nor EPA requires employers to use a third-party in conducting compliance audits.

There may be advantages to third-party audits. For example, OSHA's RFI discusses CSB's findings concerning a lack of rigorous compliance audits in the 2005 BP Texas City Refinery explosion accident. OSHA's settlement with BP Texas City required BP to retain a third-party compliance auditor with adequate experience<sup>35</sup>. The CCPS argues that experienced third-party auditors, like those provided by consulting companies, can provide the most objectivity<sup>36</sup>.

Additionally, BSEE's Safety and Environmental Management Systems (SEMS) standard, 30 CFR 250, Subpart S, requires that audits be conducted by independent third-parties subject to BSEE approval, or to avoid conflict of interest, personnel that are considered to be qualified by the employer. In their revisions to the SEMs II final rule, BSEE discussed its third-party-auditing requirements.

EPA seeks information on whether to revise 40 CFR 68.58 and 68.79 to require facility owners and operators to use a third-party for compliance audits, on whether requiring a third-party auditing process would increase protection of human health and the environment, and on

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<sup>35</sup> United States of America Occupational Safety and Health Administration, BP Products North America Inc. Settlement Agreement, September 21, 2005

<sup>36</sup> American Institute of Chemical Engineers, Center for Chemical Process Safety, Guidelines for Risk Based Process Safety, New York, Wiley, 2007

whether the existing compliance audit requirements are sufficiently clear or if changes should be made to strengthen the audit requirements. Specifically, EPA requests information on the following questions:

- a. Does your facility use a third-party for conducting compliance audits under § 68.58 and § 68.79 for safety or other reasons? What was the basis for that decision? How has it affected the overall safety record of your facility?
- b. Please provide any data or information on accidents, near misses, or other safety-related incidents that could have been prevented by conducting more effective compliance audits for operations covered under § 68.58 and § 68.79. What were the deficiencies in those audits? Were the audits in question conducted by in-house staff or a third party?
- c. Would revising § 68.58 and § 68.79 to require owners and operators of RMP-regulated facilities to use a third-party for compliance audits help prevent accidental releases? What would be the economic impacts of revising § 68.58 and § 68.79 in this way (e.g., typical consultant fees, additional work hours required, special circumstances involving small entities, etc.)?
- d. Should EPA revise § 68.58 and § 68.79 to require owners and operators to use compliance auditors (internal or third-party) with certain minimum credentials or certifications? If so, what minimum credentials or certifications should the Agency require?
- e. How should owners/operators of RMP-regulated facilities address the findings of the third-party auditor? Should EPA amend the RMP rule to require owners/operators to document how they addressed each of the findings of the third-party auditor? Should

- a timeframe for addressing those findings be included in the RMP regulation? Should EPA include a procedure for how an owner/operator may appeal the findings of the third-party auditor?
- f. Should EPA require facilities that have incidents or near misses to conduct a full compliance audit under § 68.58 or § 68.79, as appropriate? Would such a requirement create a perverse incentive to underreport incidents or near misses?
  - g. During compliance inspections at multiple-process sources, EPA inspectors have noted that some owners or operators have audited only a subset of covered processes at the source. Should EPA clarify § 68.58 and § 68.79 to explicitly indicate that all covered processes must receive a full compliance audit at least every three years?
  - h. Does the identity of the auditor (e.g., in-house, contractor, professionally-certified, party licensed by EPA) affect the credibility of the audit for potentially impacted communities?

7. Effects of OSHA PSM Coverage on RMP Applicability

RMP Program 2 applies to processes not eligible for Program 1 or subject to Program 3, whereas Program 3 applies to processes not eligible for Program 1 and either subject to OSHA's PSM standard under federal or state OSHA programs or classified in one of ten specified NAICS codes (see section II.B.10 for a listing of Program 3 NAICS codes). A review of the current RMP national database indicates that approximately 5360 RMP facilities have reported Program 2 processes within their RMP (in most cases, these facilities have reported a single covered process). Approximately 4000 (75 percent) of these are bulk agricultural chemical distributors such as West Fertilizer. These facilities generally store large quantities of anhydrous ammonia, as well as other agricultural chemicals, for distribution or sale. Although the presence of

anhydrous ammonia above an RMP TQ in a process would normally make that process subject to both Program 3 requirements (assuming it did not qualify for Program 1 by virtue of its remote location and lack of accident history) as well as OSHA PSM, these facilities generally claim that they are exempt from the OSHA PSM standard, and therefore eligible for RMP Program 2, based on the OSHA “retail facility” exemption in 29 CFR 1910.119(a)(2)(i).

In its RFI, OSHA has requested information on whether that Agency should change its enforcement policy for retail facilities. OSHA notes that its current application of the PSM exemption for retail facilities is inconsistent with the normal meaning of “retail” and the explanation of the purpose of the exemption provided in the preamble to the PSM standard. The OSHA RFI states: “As stated in the preamble, OSHA chose to exclude retail facilities from PSM coverage because the limited container, package, or allotment sizes of the chemicals typically found at these facilities do not present the same safety hazards as those encountered at establishments working with large, bulk quantities of materials.... As a result of increased workplace hazards associated with large, bulk quantities of highly hazardous chemicals, OSHA believes that only retail-trade facilities listed in NAICS sectors 44 and 45 that sell highly hazardous chemicals in small containers, packages, or allotments to the general public qualify for the retail-facilities exemption in 29 CFR 1910.119(a)(2)(i).”

If OSHA were to change its policy such that only facilities selling small containers, packages, or allotments to the general public would qualify for the retail facilities exemption, EPA believes that virtually every bulk agricultural chemical distribution facility process currently claiming Program 2 eligibility under the RMP regulation would henceforth be subject to Program 3 (unless the process were to meet Program 1 eligibility criteria).

Of the remaining (i.e., non-agricultural) Program 2 processes, over 70 percent are water or wastewater treatment facilities located in states without federally-delegated, state-run occupational safety and health programs. These facilities are generally not subject to PSM requirements because they are operated by state or municipal government employees, who are not subject to federal OSHA standards in states without delegated OSHA programs, (i.e., federal OSHA only regulates private employers). It is a peculiarity of the RMP regulation that two identical RMP-covered water or wastewater treatment plants – one located in a state with a state OSHA program and the other in a state without a state-delegated OSHA program – are subject to different levels of accident prevention requirements under the RMP rule. Non-PSM-covered water and wastewater treatment facilities are not classified as Program 3, by definition. Water and wastewater treatment facilities are covered under the RMP regulation due to the presence of large quantities of highly toxic substances, such as chlorine and sulfur dioxide. Processes in private industry sectors involving similar quantities of these chemicals are virtually always subject to Program 3 as a result of their risk to nearby receptors. EPA is interested in receiving public comment on whether RMP-covered municipal water and wastewater plants that are not eligible for Program 1 should also be subject to RMP Program 3, regardless of whether or not they are located in a state with a federally-delegated OSHA program.

Other than bulk agricultural chemical distributors and water and wastewater treatment facilities, there are fewer than 400 RMP facilities currently reporting Program 2 processes to EPA. Of these, EPA believes that approximately half are either non-agricultural bulk chemical distributors that would also become Program 3 in the event that OSHA were to restrict eligibility for its PSM retail exemption, or processes that incorrectly reported as Program 2 in their RMP (i.e., processes that are actually already subject to Program 3). In summary, if OSHA were to

restrict eligibility for its retail exemption to facilities selling small containers, packages, or allotments to the general public, and EPA were to require all RMP-covered water and wastewater treatment plants not eligible for Program 1 to comply with Program 3, EPA believes that there would be approximately 200 RMP-covered processes nationwide that would remain eligible for Program 2. In light of these facts, EPA invites comment on whether it should modify Program 2 eligibility criteria, or alternatively, eliminate Program 2 and require all formerly Program 2 processes to comply with Program 3 or Program 1 requirements<sup>37</sup>.

EPA requests information on the following questions:

- a. Do you currently operate a facility with Program 2 covered processes? Please indicate what type of Program 2 process your facility operates. Do you implement accident prevention measures that go beyond RMP Program 2 for this process? If so, why? What additional prevention elements do you use? Do you believe Program 2 requirements are necessary for the safe operation of this process? Do you have any Program 2 processes that may be adequately managed under Program 1? Please explain the basis for your views.
- b. Do you operate a water or wastewater treatment plant that is subject to the RMP regulation? If so, what level of accident prevention requirements do you believe are warranted for such facilities? If you operate a Program 2 process at a water or wastewater treatment plant, how much additional burden would be involved in implementing the additional RMP elements required for Program 3 processes?

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<sup>37</sup> This would mean that formerly Program 2 processes would henceforth be subject to the 5 Program 3 management system elements not required under Program 2 (i.e., Management of change, Pre-startup review, Employee participation, Hot work permits, and Contractors), as well as the more rigorous versions of the 7 Program 3 elements for which there are Program 2 analogs (e.g., Mechanical integrity under Program 3 vs Maintenance under Program 2).

- c. Should RMP-covered municipal water and wastewater plants that are not eligible for Program 1 always be subject to RMP Program 3, regardless of whether or not they are located in a state with a Federally-delegated OSHA program? Why or why not?
- d. If OSHA restricts its retail exemption to facilities selling regulated substances in small containers, should EPA eliminate RMP Program level 2 entirely or alternatively, modify Program 2 prevention elements or otherwise change the eligibility criteria for Program 2? If so, why?
- e. Would eliminating Program level 2 simplify rule compliance for the regulated universe and improve human and environmental health and safety, or does the current three-tiered prevention program framework under the RMP provide an appropriate level of protection?
- f. What would be the economic impacts of modifying or eliminating Program level 2? Are there any special circumstances involving small entities that EPA should consider with respect to modifying or eliminating Program 2?

D. Additional Items for which EPA Requests Information

This section discusses items that were not previously raised in the OSHA RFI. Each item discussion is followed by specific questions to collect data, information, and comments on each issue.

1. Safer Technology and Alternatives Analysis

EPA has recognized the importance of considering safer technology and alternatives techniques<sup>38</sup> that may result in improved process safety. EPA’s existing guidance<sup>39</sup> on the “general duty clause” in CAA section 112(r)(1) states that, “The owners and operators should try

<sup>38</sup> In this document, “safer technology and alternatives” refer to risk reduction strategies developed through an analysis using a hierarchy of controls.

<sup>39</sup> <http://www.epa.gov/emergencies/docs/chem/gdcregionalguidance.pdf>

to substitute less hazardous substances for extremely hazardous substances or minimize inventories when possible. This is usually the most effective way to prevent accidents and should be the priority of a prevention program.” EPA encourages sources to continue to examine and adopt viable alternative processing technologies, system safeguards, or process modifications to make new and existing processes and operations inherently safer.”<sup>40</sup>

Additionally, the structure of the applicability provisions of the RMP rule, with TQs, encourages minimizing the presence of regulated substances in processes. Thus, EPA’s historic approach to safer technology and alternatives under CAA section 112(r) has encouraged many chemical plant operators to introduce safer technology and alternatives to help reduce the overall risk of their facilities but has not mandated their use or analysis. As we noted in the preamble to the 1996 final RMP rule, “Application of good PHA techniques often reveals opportunities for continuous improvement of existing processes and operations without a separate analysis of alternatives” (61 FR 31674, June 20, 1996). In addition, in CAA Section 112(r) enforcement cases, facilities have occasionally entered into consent agreements involving implementation of safer alternatives. As a result of the Executive Order 13650 Report for the President<sup>41</sup>, EPA and other agencies will be considering various additional actions related to safer technologies and alternatives.

In July of 2012, a coalition representing 54 organizations and individuals petitioned EPA to use its rulemaking authority under CAA section 112(r)(7)(A), “to require the use of inherently safer technologies, where feasible, by facilities that use or store hazardous chemicals.” The petitioners also requested that “pending completion of a rulemaking under section CAA 112(r)(7)(A), EPA revise its guidance concerning the enforcement of the Clean Air Act’s general

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<sup>40</sup> See 61 FR 31700.

<sup>41</sup> Chemical Facility Safety and Security Working Group, Executive Order 13650 Report to the President – Actions to Improve Chemical Facility Safety and Security – A Shared Commitment, May 2014; [https://www.osha.gov/chemicalexecutiveorder/final\\_chemical\\_eo\\_status\\_report.pdf](https://www.osha.gov/chemicalexecutiveorder/final_chemical_eo_status_report.pdf)

duty clause, section 112(r)(1), 42 U.S.C. § 7412(r)(1), to make clear that the duty to prevent releases of extremely hazardous substances includes the use, where feasible, of safer technologies to minimize the presence and possible release of hazardous chemicals”<sup>42</sup>. While EPA shares the petitioner’s goal of preventing hazardous chemical releases and minimizing their risk to communities, the Agency requests additional information on possible approaches to promoting risk reduction through safer technology and alternatives.

A July 2010 Department of Homeland Security (DHS) report prepared by CCPS<sup>43</sup> described inherently safer technology (IST) as a philosophy and an iterative process, including eliminating a hazard, reducing a hazard, substituting a less hazardous material, using less hazardous process conditions, and designing a process to reduce the potential for, or consequences of, human error, equipment failure, or intentional harm. It stated that there is no clear boundary between IST and other strategies, that ISTs are relative and can only be described as inherently safer when compared to a different technology, including a description of the hazard or set of hazards being considered, their location, and the potentially affected population. Because an option may be inherently safer with regard to some hazards and inherently less safe with regard to others, the decision process must consider the entire life cycle, the full spectrum of hazards and risks, and the potential for transfer of risk from one impacted population to another. This report also noted that there is currently no consensus on either a quantification method for IST or a scientific assessment method for evaluation of IST options.

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<sup>42</sup> <https://www.documentcloud.org/documents/404584-petition-to-epa-to-prevent-chem-disasters-filed.html>, at 10.

<sup>43</sup> CCPS Final Report: Definition for Inherently Safer Technology in Production, Transportation, Storage, and Use, July 2010

The CCPS has also published a guideline book<sup>44</sup> intended to provide tools and guidance on approaches to implementing inherent safety. Among other information, the book contains an extensive checklist intended to assist industrial facilities with reviewing existing hazards and their safeguards, evaluating the feasibility of inherently safer alternatives, and documenting the results of this analysis.

A 2012 National Academy of Sciences report<sup>45</sup> found that while inherently safer process assessments can be valuable components of process safety management, inherently safer process assessments will not always result in a clear, well-defined, and feasible path forward. Although one process alternative may be inherently safer with respect to one hazard—toxicity of byproducts, for example—the process may present other hazards, such as an increased risk of fire or more severe environmental impacts. Choosing between options for process design involves considering a series of tradeoffs and developing appropriate combinations of inherent, passive, active, and procedural safety systems to manage all hazards.

There are some state and local governments that have included inherent safety requirements in their regulations. An IST Review Rule was adopted under the New Jersey TCPA program in May 2008. It requires IST reviews of all facilities covered by the TCPA by evaluating the four IST principles: minimization, substitution, moderation, and simplification. The rule includes a checklist developed under the direction of the New Jersey Domestic Security Preparedness Task Force. The New Jersey Department of Environmental Protection recommends three methods for IST analysis<sup>46</sup>: (1) reviewing and completing a checklist containing a number of practical inherent safety considerations, (2) avoiding a particular hazard at a part of the

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<sup>44</sup> American Institute of Chemical Engineers, Center for Chemical Process Safety, *Inherently Safer Chemical Processes: A Life Cycle Approach*, Second Edition, New York, Wiley, 2009

<sup>45</sup> <http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/MIC-Summary-Final.pdf>

<sup>46</sup> See: [http://www.nj.gov/dep/rpp/brp/tcpa/downloads/IST\\_guidance.pdf](http://www.nj.gov/dep/rpp/brp/tcpa/downloads/IST_guidance.pdf);  
[http://www.njwec.org/PDF/Factsheets/CS\\_IST\\_FactSheet.pdf](http://www.njwec.org/PDF/Factsheets/CS_IST_FactSheet.pdf)

process by employing a particular inherently safety strategy and (3) integrating IST into the facility's PHA study. A facility must determine an identified alternative's feasibility, and must provide written justification based on both qualitative and quantitative evaluations of environmental, human health and safety, legal, technological, and economic factors if it decides not to implement it. For IST alternatives implemented, an implementation schedule must be provided. A January, 2010 report prepared by the New Jersey Department of Environmental Protection to summarize the Department's review of 85 IST reports indicated that approximately 48% of facilities reported that they had implemented or scheduled to implement IST measures as a result of conducting the IST review.<sup>47</sup>

California's Contra Costa County's Industrial Safety Ordinance<sup>48</sup> requires stationary sources to consider IST in the development and analysis of mitigation systems resulting from a process hazard analysis for each covered process, and in the design and review of new processes and facilities. The stationary source must select and implement inherently safer systems to the greatest extent feasible, documenting in detail a determination that an inherently safer system is not feasible. A February, 2013 report prepared by Contra Costa County Health Services indicated that 4 of 7 facilities covered under the ordinance's IST provision implemented at least one inherently safer measure within the previous year.<sup>49</sup>

The CSB has released reports for two recent accidents that the Board indicated could have been avoided if safer technologies had been employed. CSB found that the use of a safer material, such as high-chromium steel, would have prevented the accelerated corrosion and failure of carbon steel involved in the equipment rupture at the Tesoro Refinery in Anacortes,

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<sup>47</sup> See: [http://www.nj.gov/dep/rpp/brp/tcpa/downloads/IST\\_SUMWEB.pdf](http://www.nj.gov/dep/rpp/brp/tcpa/downloads/IST_SUMWEB.pdf)

<sup>48</sup> See: [http://cchealth.org/hazmat/pdf/iso/2006\\_iso\\_official\\_code\\_complete.pdf](http://cchealth.org/hazmat/pdf/iso/2006_iso_official_code_complete.pdf)

<sup>49</sup> See: <http://cchealth.org/hazmat/pdf/iso/iso-report.pdf>

Washington in 2010, which resulted in an explosion and fire that killed seven employees<sup>50</sup>. CSB also cited the failure to use more corrosion resistant high-chromium steel as a factor in the 2012 Chevron Refinery accident in Richmond, CA which released hydrocarbons that ignited, endangering 19 employees<sup>51</sup>.

An additional complication to assessing safer technologies and alternatives is the varying amount and quality of information available regarding their implementation by industry. While some facilities have converted to processes considered to be inherently safer, other facilities may not have sufficient information available to effectively assess the impacts from changing existing processes to ones considered inherently safer. The differences that exist among chemical facilities, in terms of chemical process, facility layout, and ability to finance implementation, may challenge mandatory implementation of safer technologies and alternatives at regulated entities.

EPA is planning the following steps to advance safer technologies and alternatives:

- Publishing a joint alert with OSHA illustrating the concepts, principles and examples of safer technology and alternatives to make industry more aware of this information, while providing sources of information for further investigation and review,
- Publishing a voluntary guidance document with OSHA for operators on how to reduce risks by employing safer technology and alternatives, by offering a more thorough examination of alternative measures and safety techniques, including examples of safer technology and alternatives or practices,
- Based on the evaluation of feedback from the alert, guidance, and this RFI, EPA would consider proposing an amendment to the RMP regulations that requires:

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<sup>50</sup> See: [http://www.csb.gov/assets/1/7/Tesoro\\_Anacortes\\_2014-May-01.pdf](http://www.csb.gov/assets/1/7/Tesoro_Anacortes_2014-May-01.pdf)

<sup>51</sup> See: [http://www.csb.gov/assets/1/19/Chevron\\_Interim\\_Report\\_Final\\_2013-04-17.pdf](http://www.csb.gov/assets/1/19/Chevron_Interim_Report_Final_2013-04-17.pdf)

- An analysis and documentation of safer technologies and alternatives
- Integration of the safer technologies and alternatives analysis into the PHA
- Implementation of safer technologies and alternatives where feasible; EPA would not make any determination regarding the specific analysis, technology, design, or process selection by chemical facility owners or operators.

EPA requests information on the following questions:

- a. Should EPA require a safer alternatives options analysis either as a new prevention program element, as part of the existing PHA/Hazard Review element, or as a separate new requirement under CAA section 112(r)?
- b. How should safer alternatives be defined if it were to be a requirement under CAA section 112(r) regulations? What specifically should a safer alternatives analysis require and how would this differ from what is already required under other provisions of the RMP?
- c. How should industries determine if a safer alternative exists for their particular process? What safer alternative chemicals are available for the listed RMP chemicals and for ammonium nitrate?
- d. What should facilities consider when determining if such technologies, when identified, are effective, available, and economically justified for their particular process or facility? Can the RMP national database, Lessons Learned Information System<sup>52</sup> or other federal databases be structured to promote the exchange of

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<sup>52</sup> <https://www.llis.dhs.gov/topics/chemical-facility-safety-and-security>

- information both within industry and with other stakeholders on potentially safer technologies?
- e. If EPA were to require facilities to undertake an evaluation of the potential to incorporate safer alternatives, what minimum criteria should this evaluation be required to meet? How would the evaluation determine if a particular alternative is feasible, cost effective and results in less risk? What requirements or incentives, if any, should there be for implementation of identified safer alternatives? How should any such requirements be structured and enforced?
  - f. Should EPA require facilities to use a safer alternatives evaluation method such as the CCPS Inherently Safer Technology Checklist<sup>53</sup>?
  - g. How should EPA and facilities address the risk tradeoffs that could result when changing a process to incorporate safer alternatives?
  - h. Should EPA consider requirements similar to those used by the State of New Jersey or Contra Costa County, California, and if so, why? What have been the benefits of such programs in risk reduction or process safety for the facilities covered under these requirements? What have been the limitations or drawbacks of these programs?
  - i. If EPA were to develop regulatory requirements for safer alternatives, which facilities should be subject to those requirements? Should all RMP facilities be subject to such requirements, or only “high risk” facilities, such as refineries and large chemical plants? How would “high risk” be defined? Are there particular processes or chemicals that should be targeted or prioritized for implementation of such requirements?

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<sup>53</sup> CCPS, *Inherently Safer Chemical Processes: A Life Cycle Approach*, Second Edition (2009), Appendix A

- j. What barriers exist for industry to adopt safer alternatives? What incentives can be used by government to have facilities implement safer alternatives? Should the Agency provide special recognition to companies that implement safer alternatives?
  - k. What are other options (other than regulatory requirements) exist to encourage facilities to investigate, develop or implement safer alternatives and how can EPA further these efforts?
  - l. If RMP facilities are required to perform safer alternative options analyses and implementation plans, should EPA require that the analyses and/or implementation plans be submitted to the Agency? Should EPA have any role in approving such analyses or plans? In lieu of an approval, can EPA promote safer alternatives through reporting and the dissemination of information on potentially applicable practices?
  - m. If RMP facilities are required to consider safer alternative options, what role should local communities have in these analyses? Should facilities be required to disclose these analyses or recommendations resulting from such analyses to local authorities or the public prior to the selection of options? Are there any other disclosure options that will ensure that decisions on implementing safer technologies are made with transparency? Are there any means of oversight other than disclosure that would ensure that safer alternatives analyses are thorough and implementation decisions are appropriate?
  - n. What would be the economic impacts of requiring facilities to analyze safer alternative options? Are there any special circumstances involving small entities that EPA should consider?
2. Emergency Drills to Test a Source's Emergency Response Program or Plan

Under Subpart E of 40 CFR part 68, RMP-covered facilities are required to coordinate emergency response actions with local emergency planning and response agencies. RMP facilities with Program 2 and Program 3 processes must also develop and implement an emergency response program in accordance with § 68.95 if facility personnel will respond to accidental releases. As part of the emergency response program, an emergency response plan must be maintained at the stationary source; the program must include procedures for the use of emergency response equipment and for its inspection, testing, and maintenance; training for all employees in relevant procedures; and procedures to review and update, as appropriate, the emergency response plan to reflect changes at the stationary source and ensure that employees are informed of changes. For those Program 2 and Program 3 facilities at which facility employees will not respond to accidental releases, coordination with community emergency planners and responders is required and an appropriate mechanism must be in place to notify responders when there is a need for a response.

Exercising response plans is critical to ensure that response personnel understand their roles, local emergency responders are familiar with the hazards at the facility, and that the emergency response plan is appropriate and up to date. It ensures that personnel are properly trained and can be used to identify future training needs. Other EPA and Federal agency programs require exercises and drills as an element of their emergency response programs. For example, under the Oil Pollution Prevention regulation (40 CFR part 112), Facility Response Plan (FRP) holders are required to conduct drills and exercises, including evaluation procedures (§ 112.21). Exercises at FRP facilities may follow the National Preparedness for Response Exercise Program (PREP) Guidelines<sup>54</sup> which were developed to provide a mechanism for

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<sup>54</sup> A copy of the National Preparedness for Response Exercise Program (PREP) Guidelines, August 2002, can be accessed on the USCG Web site at <http://www.uscg.mil/vrp/faq/oil.shtml> under "Additional References."

compliance with EPA, U.S. Coast Guard (USCG), and U.S. Department of the Interior (DOI) exercise requirements for oil pollution response. The PREP guidelines include both internal and external exercise components. Internal exercises include notification exercises, emergency procedures exercises, spill management team tabletop exercises, and equipment deployment exercises. External exercises include area exercises, that include members of the response community, and government-initiated unannounced exercises.

Another example are exercises that the U.S. Nuclear Regulatory Commission (NRC), in conjunction with the Federal Emergency Management Agency (FEMA) and State and local government perform at nuclear power plants. The exercises evaluate both on-site and off-site emergency preparedness capabilities. The NRC also requires Research and Test Reactor (RTR) emergency plans to address the necessary provisions for coping with radiological emergencies at each facility in accordance with 10 CFR 50.54(q) and Appendix E to 10 CFR 50. Operators of RTRs are required to train personnel and perform emergency preparedness exercises in order to ensure the feasibility of the emergency preparedness plan.

Finally, industry guidelines recommend conducting exercises and drills. The CCPS Guidelines for Risk Based Process Safety<sup>55</sup> recommend periodically testing the adequacy of emergency response plans and level of preparedness of responders, including contractors and local response agencies.

In order to improve coordination with community responders and ensure that facility personnel have practice responding to accidental releases, EPA is considering requiring RMP-regulated facilities to perform exercises or drills as an element of the emergency response program identified under Subpart E of the RMP regulation.

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<sup>55</sup> Center for Chemical Process Safety, *Guidelines for Risk Based Process Safety*, American Institute of Chemical Engineers, New York, New York, 2007.

In considering this issue, EPA requests information on the following questions:

- a. Are RMP-regulated facilities currently exercising their emergency response plans? If so, are they doing these exercises to comply with other federal, state or local regulatory requirements? What references or guidelines were used to develop the exercise program?
- b. What should be the scope of an exercise/drill program? Should the exercise/drill program include internal (emergency response, notifications, and evacuation) and external elements (involving community and federal and state responders, as appropriate)? What elements should be exercised as part of the drill/exercise program? For example, should the program include communications, coordination, logistics, and evacuations/accounting for personnel, etc? What response scenarios should be considered for the exercise/drill program?
- c. How frequently should drills/exercises be performed?
- d. Who should be involved in the exercise program? How should the management team be engaged as part of the drills/exercises? How should contractors be included in the exercise/drill planning and when conducting exercises/drills? Who should be the designated official responsible for coordinating the exercises and drills conducted at the RMP facility? How should other federal, state and local agencies be included in the exercise/drill program?
- e. Should all RMP facilities be required to participate in some type of exercise/drill program or only those who are required to develop an emergency response program? Should Program 1 facilities (and Program 2/Program 3 facilities that do not respond to accidental releases with their own employees) be required to conduct external

- exercises with community responders and test notification procedures? Should Program 2 and Program 3 facilities whose employees respond to accidental releases conduct both internal and external exercises?
- f. How should lessons learned and recommendations be documented and addressed? What timeframe should be considered for completing such records? How long should records of exercises/drills be maintained?
  - g. Should stationary source operators be required to document and address lessons learned and recommendations when they respond to an actual accidental release?
  - h. Should information such as the date of the most recent exercise involving the emergency response plan be required to be reported to EPA in the facility's RMP?
  - i. What would be the economic impacts and paperwork burden of requiring an exercise/drill program for all or a subset of RMP facilities? Would such a requirement substantially improve preparedness for dealing with emergency situations? Are there any special circumstances involving small entities that EPA should consider with respect to an exercise/drill program?

3. Automated Detection and Monitoring for Releases of Regulated Substances

A process hazards analysis is intended not only to identify existing hazards, but also the likelihood that safety and mitigating systems, including detection and monitoring equipment, would function properly to eliminate or reduce the consequences that may occur as a result of those hazards. The RMP Program 3 Prevention Program requires regulated facilities to conduct a process hazard analysis (§ 68.67). The rule specifically requires a facility's hazard analysis to address engineering and administrative controls applicable to the hazards and their interrelationships, such as appropriate application of detection methodologies to provide early

warning of releases. Examples of acceptable detection methods identified in this requirement include process monitoring and control instrumentation with alarms, and detection hardware. Likewise, emergency response procedures can reduce the severity of a release and protect employees, emergency responders, and the public from harmful exposure to the regulated substances. RMP-regulated facilities must have procedures or mechanisms in place for informing the public and local emergency response agencies about accidental releases. These process hazards analysis and emergency program elements, while addressing detection methodologies, early warnings, and incident notifications, include no specific requirements for automated detection and monitoring systems to be installed. The active use of such systems may enhance both the prevention of and the response to accidental releases. However, the Agency understands that the need for and appropriate deployment of such systems is likely to be highly site-specific, and that facilities may already have appropriate incentives to deploy such systems where warranted and cost-effective.

The Agency recognizes that even equipment that is properly designed and maintained can sometimes fail. Automated detection and monitoring systems can be used not only to assess the effectiveness of existing control measures, but also to provide early warning of system upsets which could be acted upon to prevent a more serious or catastrophic incident. Linking these with alert systems and proper communications with the public and first responders may enhance emergency response efforts in the event of an incident, resulting in better protection of human health and the environment. For example, large increases in emissions due to a piping leak, a significant tear in a storage vessel seal, or other similar event can signal a process upset. Systems in place to detect leaks (or the conditions that might result in leaks) in a timely manner would allow for corrective measures to be taken more rapidly than if a facility relied solely on

traditional monitoring and inspection methods. RMP inspection and enforcement history has shown this to be of concern, particularly for facilities that are not staffed on a full-time basis and which may also be located in close proximity to population centers or environmentally sensitive areas.

While facilities may identify the benefits of installing automated detection and monitoring systems as they conduct their process hazards analysis, or as they develop their emergency response plan, the decision to invest in such equipment may be influenced by many factors. For example, automated detection and monitoring technologies may not be available for particular chemical hazards, or industry standards may not address their proper use. They may also be costly. Nevertheless, the Agency is requesting information on the need for new or expanded requirements for automated detection and monitoring systems that would supplement either the existing process hazard analysis and/or emergency response requirements. Specifically, EPA requests information on the following questions:

- a. Should facilities be required to install monitoring equipment or sensors to detect releases of RMP regulated substances, or the conditions that could lead to such a release? Should the systems provide for continuous detection and monitoring? How should any such requirements be crafted to provide appropriate site-specific flexibility?
- b. Are there specific issues that need to be considered for unmanned and/or remote facilities?
- c. Should an automated mechanism to notify, alert and warn the local responders and surrounding public of an incident be considered as part of any detection and

- monitoring system requirement? If so, how should the potential for false alarms be addressed within such a requirement?
- d. How can a requirement for automated detection and monitoring systems be best coordinated with the community emergency response plan? What are the advantages/disadvantages between continuous monitoring conducted by automated systems in contrast to third-party alarm agencies?
  - e. How would a requirement for appropriate detection thresholds be best established for activating alarms and/or alerts?
  - f. How would the significance and appropriate protective response action of the alarms/alerts be best communicated to responders and the public (including shelter-in-place and evacuations)?
  - g. What involvement should LEPCs and SERCs have in the development of the emergency response plan, particularly with respect to what actions are to be taken in the event of an incident where an alarm/alert is activated?
  - h. How frequently should monitoring equipment or sensors to detect releases of RMP-regulated substances be tested? How should these tests be documented? How long should records of such tests be maintained? Should automated monitoring records for periods of normal operations be maintained, so that past records may serve as an aid in determining what may have gone wrong prior to an accident (e.g., a gradual increase in emissions)? Should EPA specify requirements in this area, or are these aspects of program implementation best left to the facility?
  - i. Leak detection and repair programs are common under the CAA's routine emission programs. Can these programs be integrated with the accidental release prevention

program to reduce accidental releases and to simplify requirements for stationary sources subject to both the RMP and these other programs? Are there jurisdictional issues that prevent integration?

- j. What would be the economic impacts of specifying additional monitoring and detection requirements in the RMP? Are there any special circumstances involving small entities that EPA should consider with respect to such monitoring and detection requirements?

#### 4. Additional Stationary Source Location Requirements

EPA is considering whether to amend 40 CFR part 68 to provide more specific requirements to address stationary source siting. In 2005, a series of explosions occurred at the BP Texas City refinery during the restarting of a hydrocarbon isomerization unit. Fifteen workers were killed and 180 others were injured. Many of the victims were in or around work trailers located near an atmospheric vent stack. The CSB investigation identified the siting of the trailers as a key factor that led to the fatalities. The PSM standard and RMP rule both require that facility siting be addressed as one element of a PHA (see 29 CFR 1910.119(e)(2) and (3)(v)), and 40 CFR 68.67(c). While EPA has not provided any guidance on how to adequately address stationary source siting in the PHA, RMP facility owner/operators can refer to industry guidance on siting considerations. The following publications provide guidance on facility siting:

- American Petroleum Institute (API) Recommended Practice 752, Management of Hazards Associated With Location of Process Plant Buildings, 3<sup>rd</sup> Edition, December 2009;
- API Recommended Practice 753, Management of Hazards Associated with Location of Process Plant Portable Buildings, First Edition, June 2007

- CCPS, Guidelines for Facility Siting and Layout (2003); and
- CCPS, Guidelines for Evaluating Process Plant Buildings for External Explosions and Fires, and Toxic Releases, 2<sup>nd</sup> Edition (2012).

Both the siting of processes within a stationary source and the siting of the stationary source itself can affect the impact of an accidental release. Siting within a stationary source can impact the surrounding community not only by the proximity of the accidental release to off-site receptors adjacent to the facility boundary (e.g., people, infrastructure, environmental resources) but also by increasing the likelihood of a secondary “knock-on” release through compromising nearby processes.

Siting of a stationary source itself may allow the potential impact of an accidental release to dissipate depending on the distance from the source to receptors. The lack of sufficient distance between the source boundary and neighboring residential areas was a significant factor in the severity of several major chemical accidents, including, among others, the Bhopal disaster and the recent West Fertilizer accident. Facility designers have long recognized the potential benefits of adding buffer or safety zones - controlled areas separating the public and other facilities from the consequences of process incidents – when selecting the location for new chemical facilities (see, e.g., CCPS (2003)). For existing facilities, owners have sometimes compensated nearby residents to relocate away from the facility boundary in order to create a buffer zone where one did not previously exist, or where adjacent residential areas had been developed after the facility itself was constructed<sup>56</sup>.

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<sup>56</sup> See Matthews, Joe. “Paying neighbors to move Mossville: Residents of this Louisiana town, like those in Wagner’s Point here, faced a showdown with Condea Vista. Their experience is instructive.” *The Baltimore Sun* 6 Dec. 1998, and Gallagher, John. “Marathon offers to buy out Detroit homeowners near refinery amid \$2.2B expansion.” *The Detroit Free Press* 2 Nov 2011.

Should EPA amend the RMP rule to include more specific siting requirements as part of the PHA by, for example, establishing buffer or setback zone requirements for new covered stationary sources, or by establishing safety criteria for siting of occupancies inside the facility? Would such requirements provide significant incremental protection over current industry practice based on the references cited above? In considering this issue, EPA requests information on the following questions:

- a. Would additional specifics on stationary source siting and occupancy siting under the RMP minimize the impacts of chemical accidents to local communities? How should RMP stationary source siting requirements relate to OSHA PSM and other industry standards?
- b. What guidance should EPA consider in the development of stationary source siting requirements?
- c. What information should EPA consider in the development of stationary source buffer or setback zones for different risks? How should EPA address siting when limited space is available?
- d. What administrative processes and controls should be incorporated into stationary source siting requirements?
- e. What safety and process devices, instruments and controls should be incorporated into stationary source siting requirements?
- f. What criteria are appropriate for siting of occupancies (such as offices, control rooms, cafeterias, etc.) near an RMP-regulated process?
- g. How often should stationary source siting be evaluated for effectiveness? What criteria should be used?

- h. What documentation should be required for evaluating stationary source siting determinations?
  - i. Is it appropriate to reflect the environmental burden of the surrounding community in siting criteria for either new facilities or expansions within an existing site? Is it appropriate to consider chronic burdens or only burdens associated with accidental releases?
  - j. What challenges would the agency face in specifying uniform siting requirements for the wide variety of covered sites? What site specific factors would need to be addressed?
  - k. If EPA mandated siting criteria, how should EPA account for local zoning codes when establishing such criteria? Would setting federal requirements overstep into the normal state and local zoning process, or would it act as a supplemental measure ensuring minimal safety standards across the country?
  - l. What would be the economic impacts of specifying additional siting requirements? Are there any special circumstances involving small entities that EPA should consider with respect to siting requirements?
5. Compliance with Emergency Response Program Requirements in Coordination with Local Responders

Subpart E of the RMP regulation offers owners and operators of RMP-covered facilities with Program 2 or 3 processes two emergency response options. For facilities whose employees will respond to accidental releases of regulated substances, section 68.95 of the regulation requires owners or operators to implement an emergency response program that includes an emergency response plan, procedures for the use of emergency response equipment, training for

employees, procedures to review and update the response plan, and other elements. These “responding” facilities are also required to coordinate their emergency plan with local response authorities.

For facilities whose employees will not respond to releases, the RMP regulation states that owners and operators of these sources need not comply with the provisions of section 68.95 provided that the source is included in the community emergency response plan (for sources with regulated toxic substances) or has coordinated response actions with the local fire department (for sources with only regulated flammable substances), and that appropriate notification mechanisms are in place to notify emergency responders when there is a need for a response.

Subpart E can be read as offering owners or operators the choice of whether to be a responding or non-responding facility. RMP-regulated facilities indicate within their risk management plan whether or not they are a “responding” facility (i.e., by indicating compliance with mandatory elements of emergency response plans required in section 68.95(a)(1)), and EPA has found that the majority of RMP facilities claim to be “non-responding” facilities. However, during facility inspections, EPA has often found that facilities are either not included in the community emergency plan or have not properly coordinated response actions with local authorities. This problem occurs with both responding and non-responding facilities, but it is particularly troublesome for non-responding facilities, because if the facility itself does not maintain the capability to respond to emergencies, and local authorities are not able to respond, then a proper response to an accidental release at the facility may not occur or may be significantly delayed. EPA requests comment on whether this problem could be addressed through better enforcement of existing requirements, and if so, how best to do this.

In some cases, accidental releases have been made significantly worse due to poor emergency response planning and coordination. For example, following the August 2008 explosion and fire at the Bayer CropScience facility in Institute, West Virginia, poor coordination between the facility incident commander and local authorities prevented important information, including a shelter-in-place order, from being timely communicated to local authorities. Additionally, facility authorities initially prevented local responders from gaining access to the site of the incident.

EPA is considering whether the Emergency Response provisions in Subpart E of the RMP regulation should be revised to state more explicitly that owners and operators of RMP-regulated facilities must comply with the emergency response program requirements of section 68.95 unless local public responders both have the means and agree to respond to releases of regulated substances at the facility, and to describe what facility owners or operators must do to coordinate with local authorities on the development of community emergency response plans.

EPA requests information on the following questions:

- a. Do you own or operate an RMP-regulated facility that relies on public authorities to respond to accidental releases of regulated substances at the facility? What steps do you take to ensure that public responders are prepared to properly respond to accidental releases at your facility? Should EPA clarify what steps RMP facilities should take in order to properly coordinate their emergency response plan with the community emergency response plan?
- b. If your facility uses its own employees or response contractors provided by the facility to respond to emergencies, what factors led to your decision to use your own

- employees or contractors to conduct emergency response operations? What steps have you taken to coordinate with local responders on emergency response planning?
- c. Are you a member of an LEPC, municipal fire department or municipal hazardous materials response team? If so, do you believe that “non-responding” RMP facilities in your jurisdiction have generally provided the appropriate information and support to your organization to ensure an appropriate response to hazardous substance emergencies at those facilities? Is your organization capable of responding appropriately to such events at RMP facilities? How often do you visit RMP facilities in your jurisdiction? Do you conduct emergency drills at RMP facilities? Do you believe that RMP facilities should generally respond to emergencies using their own employees, or rely on public responders? Should EPA clarify what is necessary for RMP facilities to adequately coordinate their emergency response plan with the community emergency response plan? Would new regulations in this area significantly improve emergency response planning in your area?
- d. Are there certain substances or types of facilities that present particular response challenges for local authorities? If so, which substances or types of facilities? Should such facilities be required to prepare and implement comprehensive emergency response programs instead of relying primarily on public responders? Do public responders in your area have adequate existing authority to require this now?
- e. If public responders are not capable of responding to a particular type of chemical or release event at an RMP-regulated facility, should the owner or operator of the facility be required to provide for an effective response, either with the facility’s own

employees, response contractors, a mutual aid agreement with nearby facilities, or some other means?

- f. What would be the economic impacts of expanding the emergency response requirements as discussed above? Are there any special circumstances involving small entities that EPA should consider with respect to modifying emergency response requirements?

#### 6. Incident Investigation and Accident History Requirements

Incident investigations and accident history reporting can provide valuable information about potential hazards and the steps needed to prevent future events. Many times, the cause of an incident is the result of a series of other problems that need to be addressed to prevent recurrences. For example, an operator's mistake may be the result of poor training, inappropriate procedures, or poor design of control systems; equipment failure may result from improper maintenance, misuse of equipment (e.g., operating at too high a temperature), or use of incompatible materials. Through incident investigation a facility owner or operator would determine not only the initiating event that led to the release, but more importantly its root cause(s). Accident history reporting provides an avenue to disseminate that information. Thorough investigations and reporting may help facilities identify and address root causes.

The RMP's incident investigation requirements closely track those established in OSHA's PSM accident investigation requirements. Likewise, EPA's hazard assessment requirements include a five-year accidental release history, which has some overlap with similar OSHA process hazard analysis requirements. While most catastrophic releases affect workers first, there are incidents where workers are protected but the public and the environment may be threatened, e.g. emergency relief devices working as designed to vent hazardous atmospheres

away from the workplace and into the air where they may be carried downwind. Although the PHA process may have recognized and addressed the potential off-site impact associated with safety measures that protect workers (e.g. an emergency vent scrubber system), the RMP requires that facilities consider such possibilities and integrate the protection of workers, the public, and the environment into one program. Thus, RMP facilities must investigate each significant incident which resulted in, or could reasonably have resulted in a catastrophic release. A catastrophic release is defined for purposes of the RMP as one where a major uncontrolled emission, fire, or explosion, involving one or more regulated substances presents an imminent and substantial endangerment to public health and the environment. Imminent and substantial endangerment includes off-site consequences such as death, injury, or adverse effects to human health or the environment, or the need for the public to shelter-in-place or be evacuated to avoid such consequences. In contrast, the accident history requirement includes a five-year record of only those accidents from covered processes that resulted in deaths, injuries, or significant property damage on-site, or known off-site deaths, injuries, evacuations, sheltering in place, property damage, or environmental damage. Near-miss accidents or accidents with only the potential for consequences are not required to be included, and the accident history requirement applies only to covered processes.

EPA has encouraged facilities to investigate all accidental releases. However, the focus of the current incident investigation and accident history reporting requirements is limited. EPA's experiences with RMP facility inspections and incident investigations show there have been incidents that were not investigated, even though under slightly different circumstances, the incident could have resulted in a catastrophic release. While these unplanned "near miss" events did not result in deaths, injuries, adverse health or environmental effects, or sheltering-in-place,

only a fortunate break in the chain of events prevented a catastrophic release of a regulated substance from happening. For example, a runaway reaction that is brought under control by operators is a near miss that may need to be investigated to determine why the problem occurred, even if it does not directly involve a covered process. Similarly, fires and explosions near or within a covered process, any unanticipated release of a regulated substance, and process upsets that could have led to a release of a regulated substance may also be one step away from initiating a chain of events leading to a catastrophic release. Additionally, there have been some cases where the facility chose not to conduct an investigation because the owner/operator elected to decommission the process involved, or because the process was destroyed in the incident. While an investigation would have no impact on a decommissioned or destroyed process, other similar processes or operations at the facility, or at similar facilities, could potentially benefit from its findings. In other instances, facilities have failed to investigate serious releases because they determined there were no actual or potential off-site consequences. Investigating these types of incidents and including them as part of the RMP accident history report could provide facilities with important information on what problems could lead to an incident, and allow for the facility to address them before a catastrophic release occurs. Further, including some of these incidents as part of the accident history could also improve process safety at facilities with similar processes, where operators could learn from the shared information.

Incident investigations may result in improved process safety through the dissemination of lessons learned and the implementation of recommended corrective actions. Conducting these investigations as soon as possible after an incident may yield better quality data and information, though time may also be required to collect, validate, and integrate data from a range of sources. EPA has discovered situations where incident investigations by regulated facilities have been

indefinitely delayed. Delays could result in an increased risk of incident recurrence as root causes and the appropriate corrective actions are not necessarily promptly identified or implemented. The value of conducting incident investigations and communicating lessons learned in a timely manner was also recognized by the CSB. In recommendations to the Agency, the CSB called for RMP accident histories to be updated on a more timely basis in view of the valuable information they provide for chemical accident prevention and preparedness efforts by government, industry and the public<sup>57</sup>. EPA agreed with the CSB recommendation and amended the RMP accident history requirements to require that facilities who have had an accident meeting the criteria for the five-year accident history to update their RMP accident history to include the new accident history information within six months of the date of the accident.

The Agency is considering whether broadening the incident investigation and accident history requirements to include clear requirements to investigate near misses and determine root causes of accidents, near misses, and process upsets would promote increased safety. The Agency is requesting information on the appropriateness of requiring root cause investigations of incidents, process upsets and near-misses, and of establishing specific time frames for incident investigations to be completed. Specifically, the Agency requests detailed information on the following questions:

- a. Are the RMP incident investigation requirements too narrowly focused? Would identifying a broader range of incidents requiring investigation (e.g., near misses) help prevent additional accidental releases? Please provide specific examples where possible. EPA requests information on alternative definitions or incident

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<sup>57</sup> Joint Chemical Safety Board, Occupational Safety and Health Administration, National Institute for Occupational Safety and Health, and EPA Roundtable on Developing Improved Metrics on Accidental Chemical Process Releases, November 14, 2002

- classifications that could be included within the rule's incident investigation requirements.
- b. Are there any data or information on process upsets, near misses or other incidents that were not required to be investigated, but where an investigation and resulting changes in management systems might prevent accidental releases?
  - c. Does your facility routinely investigate incidents not required to be investigated under part 68? If so, please describe the types of incidents investigated, and the effects these investigations have had on facility operations.
  - d. Would a specific time frame for incident investigations to be completed benefit overall safety? What should be the basis for establishing an appropriate timeframe requirement for an incident investigation to be completed? What are the challenges and limitations to completing an incident investigation within a specified timeframe?
  - e. Are there benefits from requiring that investigations must be performed even in cases where the owner/operator elects to decommission the process involved, where the process is destroyed in the incident, or where a facility determines there were no actual or potential off-site consequences? Would such a requirement provide a disincentive to decommission potentially risky processes?
  - f. Would a modification of the definition of "catastrophic release" assist in addressing the concerns regarding the appropriate scope of incidents that require investigation?
  - g. Would a modification of the accident history reporting requirements to reflect a broader range of incidents being investigated assist in disseminating lessons learned across industry?

- h. Should EPA require facilities that have incidents or near misses to conduct a full compliance audit under § 68.58 and § 68.79?
  - i. Is it appropriate for facilities to share the results of accident investigations with the local community or alternatively a summary of the accident, and its root cause? Is there an appropriate role for the local community in conducting investigations?
  - j. What would be the economic impact of broadening the RMP incident investigation requirements to require root cause investigations of near misses? Are there any special circumstances involving small entities that EPA should consider? Would small businesses have the capacity to investigate near miss incidents?
7. Worst Case Release Scenario Quantity Requirements for Processes Involving Numerous Small Vessels Stored Together

Section 68.25(b) of the RMP rule requires the owner or operator to determine a worst-case release quantity. The regulation states that “the worst case release quantity shall be the greater of the following: (1) For substances in a vessel, the greatest amount held in a single vessel, taking into account administrative controls that limit the maximum quantity; or (2) For substances in pipes, the greatest amount in a pipe, taking into account administrative controls that limit the maximum quantity.” Based on a review of past RMP submissions and facility inspections, EPA believes that in most cases the current requirements result in a reasonable estimate of worst case releases. However, for certain categories of facilities, like chemical warehouses, where large numbers of regulated chemical containers are stored closely together, the Agency has questions about whether a different approach would better characterize the potential process hazards and associated risks. This is of particular concern for those cases where

each storage container may only contain a few pounds of a regulated substance, but there are numerous such containers stored in close proximity to one another.

This type of situation occurred on June 24, 2005, where a fire involving propylene cylinders occurred at the St. Louis Praxair Distribution site. A small fire that began in one propylene cylinder spread to other nearby propylene cylinders and then to acetylene and propane cylinders. The exploding cylinders flew up to 800 feet in the air, started fires, and damaged property in the community. The fire consumed 8,000 cylinders, or almost the entire inventory of flammable gases at the facility. Similar accidents have occurred at Air Liquide in Phoenix, Arizona in June 1997, Airgas in Tulsa, Oklahoma in August 2003, and Praxair in Fresno, California in July 2005. An October 2006 accident in Apex, North Carolina, involving numerous small containers of flammable and toxic materials stored at a hazardous waste disposal facility caused a fire, multiple explosions, and the release of a toxic vapor cloud that resulted in the evacuation of 16,000 nearby residents.

EPA seeks information on whether to revise section 68.25(b) of the RMP regulation to better account for processes involving numerous small vessels stored together, such as on pallets, cylinder racks, and in groups. EPA is looking for information on whether including the entire quantity in one location or one process, instead of just the single largest vessel or pipe, would better represent the true worst case scenario quantity, and thereby increase protection to human health and the environment and help prevent future accidents from occurring. EPA also requests comment on whether there are ways of grouping vessels or pipes short of including all the vessels or pipes at a facility that would be appropriate for worst case scenario analysis. EPA is also interested in receiving information on whether worst-case scenario requirements should account for the potential cascading effects of separate facilities that are interconnected (e.g., a

manufacturer that provides product to an adjacent source through an interconnecting pipeline).

Specifically, EPA requests information on the following questions:

- a. Should EPA revise § 68.25(b) to require the owner or operator of any regulated process involving numerous small containers stored together to consider as the worst case release quantity the sum of the quantity of all containers in the process, or a subset of such containers, or the containers within one storage area of the process?
- b. Would revising the worst case scenario quantity determination requirement in this manner better represent the true worst case scenario for such processes?
- c. Would this change promote stronger process safety controls and help prevent accidents?
- d. In situations where numerous small containers are stored together, are there any kinds of protective barriers or other methods of storage that would reduce the likelihood of a release from one container causing additional releases from adjacent or nearby containers? Should such barriers or storage methods be incorporated into the rule's worst case scenario requirements, and if so, how? Would revising § 68.25(b) cause any type of additional burden on facilities where large amounts of chemicals are stored together?
- e. If EPA were to revise § 68.25(b) to take into account numerous small vessels being stored together, what types/kinds of vessels should be covered? Should there be any limits on the size of containers subject to the aggregation requirement? What would such limits be based on? Similarly, should there be a specific distance between vessels established in order to consider them as grouped together for purposes of worst case scenario calculations? What would that distance be based on?

- f. Should EPA revise § 68.25 to require the owner or operator of a regulated process to consider the potential for worst case release scenarios to involve adjacent facilities or other nearby facilities that are interconnected through pipelines? Would this change raise any confidentiality or security issues? How would EPA adjust its worst case scenario modeling requirements to account for such a change?
  - g. What would be the economic impacts of modifying the worst case scenario analysis requirements as discussed above? Are there any special circumstances involving small entities that EPA should consider with respect to worst case scenario analysis?
8. Public Disclosure of Information to Promote Regulatory Compliance and Improve Community Understanding of Chemical Risks

EPA is seeking public comment on whether there are additional steps the Agency could take to improve compliance through increased information disclosure to the public and local authorities. For example, would requiring RMP-covered facilities to post on a company website unrestricted (i.e., non-off-site consequence analysis) RMP information, such as the facility's RMP executive summary, emergency contact information, identity of the LEPC, or links to the local emergency response plan and/or the facility's most recent EPCRA Tier II report, lead to improvements in facility safety and better regulatory compliance? Would disclosing a summary of the facility's compliance audit, PHA, or incident investigation reports to the LEPC result in improvements in emergency planning and response? Would such disclosures raise any concerns regarding facility security or proprietary business information?

We note that the RMP rule was published in 1996 before many of the current information-sharing technologies were conceived. While the Agency has modernized mechanisms for reporting and handling risk management plans, we have made only minor

adjustments to the RMP rule for new information technologies. We have not systematically reviewed the rule to see if enhanced facility and community interaction through the use of these technologies can promote safer operations, perhaps at a reduced cost of compliance and oversight.

Ensuring that communities, local planners and local first responders have appropriate facility chemical hazard information is critical to the health and safety of the responders and the local community. In response to Executive Order 13650, EPA seeks to find ways to enhance information sharing and collaborative planning between chemical facility owners and operators, tribal and local emergency planning committees and first responders. EPA is interested in identifying ways to make RMP-regulated facility information more readily available to local responders and local communities without creating additional security concerns. EPA requests information on the following questions:

- a. Should EPA amend the RMP regulation to require RMP-regulated facilities to post chemical hazard-related information on their websites (if they have one) such as RMP chemical names, chemical quantities, executive summaries, links to LEPCs, community emergency plans, Safety Data Sheets (SDS) for hazardous chemicals present on site, EPCRA Tier 2 reports, release notification reports, accident history and cause and other similar information? What requirements should be considered for facilities that do not have a website?
- b. Would requiring facilities to make this information available on the company website promote improved regulatory compliance? What additional economic burden would be associated with such a requirement?

- c. Do RMP-regulated facility owners/operators have any safety or security concerns with posting the executive summary from the RMP, or linking to EPCRA reports and community response plans on the company websites? Please explain any concerns regarding specific elements of this information.
- d. Would posting the RMP executive summary on a website cause facility owner/operators to remove important information from the executive summary? Does EPA need to better define the contents of an executive summary in order to allay security concerns?
- e. Is there other information (web-based or otherwise) that would assist local communities, emergency planners, and responders in understanding facility risks that should be made publicly available? For example, would disclosure of the facility's PHA or compliance audit to local authorities such as the LEPC result in improved safety?
- f. Does your facility interact with community groups (e.g., a citizen advisory panel)? If so, what information do you provide to such groups?
- g. Are there other activities or measures that RMP-facility owner/operators can use to ensure that communities, planners, and responders have access to appropriate information?
- h. Can the use of social media or other forms of community outreach be incorporated into hazard assessment, prevention, and response to leverage community involvement in oversight? For example, would increased public disclosure of RMP-related information, such as accidental releases, near misses, and subsequent safety enhancements, or increased community involvement in facility emergency response

planning, lead to improvements in facility safety? Please identify aspects of the RMP rule where there are opportunities for community involvement.

9. Threshold Quantities and Off-site Consequence Analysis Endpoints for Regulated Substances Based on Acute Exposure Guideline Level Toxicity Values

EPA is considering the use of Acute Exposure Guideline Levels (AEGLs)<sup>58</sup> developed by the National Advisory Committee (NAC) for AEGLs for Hazardous Substances (NAC/AEGL Committee) to recalculate RMP reporting thresholds and toxic endpoints for off-site consequence analyses in order to better reflect the potential for adverse effects of an accidental release upon a community.

EPA originally set the TQs for the RMP toxic substances using a ranking method similar to that used in developing the threshold planning quantities (TPQs) for the EPCRA EHSs. A factor for each toxic chemical based on its toxicity level of concern “LOC” and its potential to become airborne and disperse “V”, was derived and used to develop a ranking factor equal to LOC divided by V. Chemicals with lower ranking factors were assigned lower thresholds. A low numerical LOC value represents a high toxicity and a high value of V represents a high potential for air dispersion. Therefore, the ranking factor was designed such that lower LOC values or higher V values (or both) resulted in lower ranking factors. For example, the V for all gases is assigned a value of 1, which is higher than the calculated values of V for all liquids. For the RMP substances, thresholds were assigned based on order of magnitude ranges in the ranking factor, using TQ categories of 500 pounds, 1,000 pounds, 2,500 pounds, 5,000 pounds, 10,000 pounds, 15,000 pounds and 20,000 pounds (59 FR 4478, January 31, 1994).

The toxicity LOC was the maximum short term exposure concentration level in air for each chemical that would not lead to serious irreversible health effects in the general population

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<sup>58</sup> <http://www.epa.gov/oppt/aegl/>

when exposed for a relatively short duration. The Immediately Dangerous to Life and Health (IDLH) value developed by the National Institute of Occupational Safety and Health (NIOSH) or an approximation of the IDLH based on animal toxicity data was used as the basis for the LOC.

The IDLH is defined as the maximum concentration from which one could escape within 30 minutes without any escape-impairing symptoms or any irreversible health effects. The IDLH was presented in the 1990 edition of the NIOSH Pocket Guide to Chemical Hazards and was used where available to develop the LOC toxicity levels for RMP toxic substances. For substances without a published IDLH value, a value equivalent to the IDLH was derived from mammalian toxicity data using a methodology described in Appendix D of the Technical Guidance for Hazard Analysis, Emergency Planning for Hazardous Substances<sup>59</sup>.

In some cases, revised or updated toxicity data were used, based on the December 1990 Registry of Toxic Effects of Chemical Substances (RTECS) rather than the toxicity data used to derive TPQs for EHSs.

EPA is considering recalculating the current IDLH-based TQs for the following reasons:

- The IDLH is based upon response of healthy male worker-population and does not take into account the exposure of more sensitive individuals, such as the elderly, pregnant women, children or people with various health problems.
- The IDLH is based upon a maximum 30-minute exposure period which may not reflect (may underestimate) actual exposures to accidental airborne releases.
- The IDLH may not reflect the concentration that could result in serious but reversible injury because IDLHs were designed only to protect workers against concentrations that

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<sup>59</sup> USEPA/FEMA/DOT, Technical Guidance for Hazard Analysis, Emergency Planning for Hazardous Substances, December 1987, [http://www2.epa.gov/sites/production/files/2013-08/documents/technical\\_guidance\\_for\\_hazard\\_analysis.pdf](http://www2.epa.gov/sites/production/files/2013-08/documents/technical_guidance_for_hazard_analysis.pdf)

would prevent death or irreversible health effects or would prevent other deleterious effects (e.g. disorientation or incoordination) that would prevent escape.

EPA recognized the limitation of using the IDLH values when it developed the TPQs for the EHSs in 1986 and 1987, but the agency was only just beginning the development of more appropriate chemical emergency exposure levels for the general public. Therefore, EPA chose to continue using the IDLH because there were many more published IDLH values available than other potential exposure limits and because there was already a method available for deriving an IDLH equivalent from toxicity data.<sup>60</sup>

Due to the limitations outlined above, EPA is now considering the use of AEGLs to recalculate RMP TQs. AEGLs represent threshold exposure limits (exposure levels below which adverse health effects are not likely to occur) for the general public and are applicable to emergency exposures ranging from 10 minutes to 8 hours. AEGLs are developed by the National Advisory Committee (NAC) for AEGLs for Hazardous Substances (NAC/AEGL Committee), which was established to identify, review, and interpret relevant toxicologic and other scientific data and develop AEGLs for high-priority acutely toxic chemicals<sup>61</sup>. AEGLs are developed for five exposure periods (10 and 30 minutes, 1 hour, 4 hours, and 8 hours) and distinguished by varying degrees of severity of toxic effects. AEGLs are designed to protect the general population, including susceptible subpopulations, such as infants, children, the elderly, persons with asthma, and those with other illnesses, which are groups not generally considered in the development of workplace exposure levels. AEGLs have been developed or are now under development for 471 priority chemicals.

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<sup>60</sup> USEPA. June 21, 1992. Technical Background Document: Development of Threshold Quantities for List of Regulated Substances for Accidental Release Prevention, Document No. II-B-2, Docket No. A-91-74, page 7.

<sup>61</sup> see: <http://www.epa.gov/oppt/aegl/>

A chemical may have up to three AEGLs values, each of which corresponds to a specific tier of health effects. The three AEGL tiers are defined as follows:

- AEGL-1 is the airborne concentration, expressed as parts per million or milligrams per cubic meter (ppm or mg/m<sup>3</sup>) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
- AEGL-2 is the airborne concentration (expressed as ppm or mg/m<sup>3</sup>) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
- AEGL-3 is the airborne concentration (expressed as ppm or mg/m<sup>3</sup>) of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

The use of AEGLs to recalculate RMP reporting thresholds would better reflect the potential for adverse effects of an accidental release upon individuals in a community compared to IDLHs because AEGLs take into account the potential exposure of more sensitive individuals, the potential for longer periods of exposure, and the potential for serious but reversible injuries.

In situations where no AEGL exists for a chemical, EPA would use Emergency Response Planning Guidelines (ERPGs), if available, to recalculate reporting thresholds. ERPGs estimate the concentrations at which most people will begin to experience health effects if they are exposed to a hazardous airborne chemical for 1 hour. (Similar to IDLH values, however, sensitive members of the public—such as old, sick, or very young people—aren't covered by

these guidelines and may experience adverse effects at concentrations below the ERPG values.) ERPGs are developed by the Emergency Response Planning committee of the American Industrial Hygiene Association (AIHA). ERPGs could be used to help protect the public when AEGLs aren't available and there has been a chemical release that is short-term in duration. There are about 145 chemicals with ERPGs.<sup>62</sup> A chemical may have up to three ERPG values, each of which corresponds to a specific tier of health effects.

The three ERPG tiers are defined as follows:

- ERPG-3 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects.
- ERPG-2 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action.
- ERPG-1 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient health effects or perceiving a clearly defined, objectionable odor.

EPA previously used ERPG values in 1996 (61 FR 31668, June 20, 1996) to establish toxic endpoints (i.e., air concentrations) for each RMP toxic chemical to be used when conducting the off-site consequence analysis (OCA). The endpoints chosen were the ERPG-2 values developed by AIHA; the toxic endpoint was the level of concern (LOC) from EPA's 1987 Technical Guidance for Hazards Analysis for those substances that did not have an established

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<sup>62</sup> <http://response.restoration.noaa.gov/erpgs>

ERPG-2, updated where necessary to reflect new toxicity data. EPA chose ERPG-2 values first because they were specifically developed by a scientific committee for emergency planning to protect the general public in emergency situations and are subject to peer review. EPA had rejected use of the ERPG-3, which is a lethal exposure level, because it is not protective enough of the public in emergency situations.

One consequence however, of the agency using separate toxicity values for TQs (based upon IDLH) and toxic endpoints (based upon ERPG-2) for the RMP regulations as a whole is some inconsistency in the representation of the relative toxicities of certain substances compared to others. For example, chlorine and sulfur dioxide have relatively similar ERPG-2 toxic endpoints, 0.0087 mg/L and 0.0078 mg/L, respectively, but chlorine is listed with a reporting threshold of 2,500 pounds while sulfur dioxide has a reporting threshold of 5,000 pounds. As gases, both chlorine and sulfur dioxide have the same air dispersion factor (V) of 1. The difference in thresholds is due to the use of 1990 IDLH values, with chlorine having an IDLH (0.087 mg/L or 30 ppm), that suggests it is three times more toxic than sulfur dioxide (IDLH of 0.261 mg/L or 100 ppm). To remedy such issues, EPA is considering the use of AEGLs as the basis for determining both the RMP reporting thresholds and the toxic endpoints. Furthermore, in those cases where an AEGL is not available, using ERPG-2 values to calculate both the reporting threshold and toxic endpoint will also remove such inconsistencies. Finally, using AEGLs when available to recalculate current toxic endpoints will also take into account the potential exposure of more sensitive individuals, which is not addressed when using ERPG-2 values.

With few exceptions, AEGL-2 values are significantly lower than LOC values for a given substance, and generally somewhat lower than the corresponding ERPG-2 value. However, this

does not necessarily mean that TQs would always decrease. As indicated above, when originally developing TQs, EPA used the LOC value divided by the V factor for each chemical to develop a ranking index. Substituting AEGL-2 values for LOC values and recalculating the ranking index values would generally result in much lower index values. However, index values do not correlate directly to a TQ. Instead, a range of index values was assigned a TQ. For example, all substances with index values less than 0.01 were assigned a TQ of 500 pounds, substances with index values greater than or equal to 0.01 and less than 0.05 were assigned a TQ of 1000 pounds, substances with index values greater than or equal to 0.05 and less than 0.1 were assigned a TQ of 2500 pounds, and so on, up to the maximum TQ value of 20,000 pounds. If EPA used the new index values to assign TQs based on these current ranges, then TQs for substances that currently have higher TQs would tend to drop, while TQs for substances with lower TQs would generally remain unchanged. Therefore, under this scenario, most substances would be grouped into the lower TQs.

Alternatively, if EPA established TQs by redefining the index value ranges for each TQ according to the new range of index values alone (i.e., disregarding the old index ranges), then the change would have the effect of reshuffling substances into new TQs. In this scenario, incorporating AEGL values would likely result in reducing the TQ for some substances (those with the lowest AEGL-to-LOC ratio), while raising it (or causing no change) for others. As the purpose of assigning TQs according to a distribution of index values was to assign lower TQs to the more toxic and easily dispersed substances and higher TQs to less toxic and less easily dispersed substances, this approach may be more appropriate.

Adopting AEGL-2 values in place of ERPG-2 values to establish new toxic endpoints would have a more direct effect. AEGL-2 values are often, but not always, lower than the

existing toxic endpoints. Where the AEGL value is lower than the current toxic endpoint for a particular substance, the new toxic endpoint would likewise be lower, and vice versa. The practical effect of changing toxic endpoints would be to change the off-site consequence analysis distance to endpoint for a given substance and release quantity. For all processes containing substances with new lower toxic endpoints, larger worst case and alternative release scenario zones would result, whereas processes containing substances with new higher toxic endpoints would have smaller off-site consequence zones. If most toxic endpoints were to either decrease or remain the same, another result would likely be that fewer regulated processes would be eligible for Program 1.

EPA requests information on the following questions regarding recalculating reporting thresholds and/or toxic endpoints using AEGLs (or ERPG values when AEGLs are not available):

- a. Would revising the RMP rule to incorporate AEGL-2 and ERPG-2 values (when an AEGL is not available), as the basis for TQs and toxic endpoints make the RMP rule more protective of human health and the environment? Would it result in significant changes to the universe of RMP-regulated facilities due to potential changes in TQs? If so, what number and types of facilities would be most affected and what changes would occur?
- b. The IDLH values used for setting the existing TQs are based on an exposure period of 30 minutes. If the IDLH was not available, the acute toxicity data used to determine the equivalent IDLH varied depending on the chemical and actual study, and these numbers typically ranged from 1 to 8 hours. The ERPG-2 values used for the toxic endpoints represent an exposure period of 1 hour. Given that AEGLs are established

- with five different exposure periods (10 minutes, 30 minutes, 1 hour, 4 hours, and 8 hours), which exposure time should be used if the AEGL is used to determine the TQs and/or toxic endpoints?
- c. What should be the hierarchy for developing an alternative or equivalent LOC when an AEGL value has not been established for a toxic substance? Should ERPG values be used instead if they exist? If no ERPG value exists, should an LOC based on the IDLH value be used instead if it exists? If there is no IDLH value, how should the LOC be calculated for either the TQ or toxic endpoint? Is there an alternate method for establishing an equivalent LOC for those chemicals not having an AEGL or ERPG that will result in an appropriate TQ?
  - d. Currently, RMP worst-case scenarios can be based on 10-minute or 60-minute release times. Because many AEGL-2 values are established for 1-hour, 4-hour and 8-hour exposure periods, should requirements for determining the worst-case and alternative release scenarios also incorporate four and eight hour release times using the 4-hour and 8-hour AEGL-2 values for a particular toxic chemical?
  - e. Should EPA consider using AEGL-1 rather than AEGL-2 values for calculating reporting thresholds and toxic endpoints in order to address acute effects that are transient and reversible (such as discomfort and irritation)?
  - f. What would be the economic impacts of recalculating TQs as discussed above? Are there any special circumstances involving small entities that EPA should consider with respect to recalculating TQs?

10. Program 3 NAICS Codes Based on RMP Accident History Data

When developing the RMP, the Agency scaled the regulatory requirements based on the potential risk posed by a source and the steps needed to address the risk, rather than imposing identical requirements on all sources. To this end, processes subject to RMP requirements were divided into three tiers: Programs 1, 2, and 3 (see section I.C). Eligibility for any given Program is based on process criteria so that classification of one process in a Program does not influence the classification of other processes at the source. The Agency established the most stringent RMP requirements under Program 3 for those industry sectors that represented a potentially higher risk of accidental releases.

Industry accident records represent a reasonable criterion for identifying high risk sources. If an entire industry has a long history of accidental releases, it may indicate that the materials handled and handling conditions generate a higher potential for serious releases, or that the government or industry standards applicable to that industry area are not effectively minimizing risks. Additionally, accident history associated with industry sectors was identified by EPA as a better surrogate for underlying risk than individual source accident histories because accidents are rare events; a source with no accidental releases over the previous five years is not necessarily safe. Further, serious chemical accidents occur infrequently even at sources with poor process safety practices.

Program 3 eligibility is based in part on the NAICS associated with the covered process<sup>63</sup>. The specific codes identified for Program 3 were based on an analysis of reported

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<sup>63</sup> The 1996 final RMP rule based Program 3 eligibility on the old Standard Industrial Classification (SIC) code system, which assigned four-digit codes to different industry sectors. However, in 1997, the U.S. Government, in cooperation with the governments of Canada and Mexico, adopted a new industry classification system, the North American Industry Classification System (NAICS), to replace the SIC codes. NAICS codes are either five or six digits, depending on the degree to which the sector is subdivided. As a result, in 1999 EPA revised RMP requirements whose applicability was originally based on SIC codes (64 FR 964, January 6, 1999). All "SIC code" references were replaced with "NAICS code" and the nine SIC codes subject to Program 3 prevention program requirements were replaced with ten NAICS codes.

accident histories within industry areas, selecting those that evidenced a higher risk potential<sup>64</sup>. EPA selected the industry sectors that showed a high frequency of the most serious accidents across a significant percentage of all sources within the sector to avoid mischaracterizing an industry based on isolated, problematic sources. Accounting for the number of reports from individual sources was intended to avoid selecting a sector because of a small number of sources with serious safety problems. The analysis included not only off-site impacts, but also accidental releases that caused death, hospitalizations, or injuries on site, as these may serve as an indicator of significant safety problems that could lead to releases with off-site impacts. Program 3 applies to processes not eligible for Program 1 and in NAICS 32211 (pulp mills), 32411 (petroleum refineries), 32511 (petrochemical manufacturing), 325181 (alkalies and chlorine), 325188 (all other inorganic chemical manufacturing), 325192 (other cyclic crude and intermediate manufacturing), 325199 (all other basic organic chemical manufacturing), 325211 (plastics and resins), 325311 (nitrogen fertilizer), and 32532 (pesticide and other agricultural chemicals). Program 3 also applies to all processes subject to the OSHA PSM standard, unless the process is eligible for Program 1.

The RMP national database now contains nearly two decades of accident history reports from covered sources, and the Agency believes that these reports represent a more comprehensive picture of the relative accident risks associated with different industry sectors regulated under the rule than was available to the Agency prior to the rule's publication. Based on these accident reports, the ten NAICS codes most frequently associated with accidents in RMP-regulated processes are 32411 (petroleum refineries), 325199 (all other basic organic chemical manufacturing), 325188 (all other basic inorganic chemical manufacturing), 22131

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<sup>64</sup> EPA Report: Development of Decision Criteria For Accident History by SIC Code Approach and 100 or More Employee Approach, EPA Docket Number HQ-OAR-2004-0365, February 28, 1995.

(water supply and irrigation systems), 42491 (farm supplies merchant wholesalers), 22132 (sewage treatment facilities), 325181 (alkalies and chlorine manufacturing), 311615 (poultry processing), 49312 (refrigerated warehousing and storage), and 32211 (pulp mills).<sup>65</sup> The Agency is requesting information on the appropriateness of reevaluating the NAICS industry sectors originally identified to determine Program 3 applicability based on the collected RMP data. Specifically, EPA requests information on the following questions:

- a. Should industry sectors represented in RMP data as those with the most accidental releases be used to update and replace the existing set of Program 3 NAICS codes with a new set?
- b. How can the RMP accident history data best be used to update the current list of NAICS codes that trigger Program 3 requirements? Should the agency take into account the number of sources in each sector, or the severity of reported accidents, or other factors, in selecting updated Program 3 NAICS codes? Is the methodology used to develop the SIC/ NAICS code list applicable to the RMP accident history database?
- c. Would limiting the data analysis or the selection of NAICS codes to only those industry sectors represented in the RMP data provide a complete and accurate picture of high risk industry sectors?
- d. Should an analysis of the RMP data be combined with an analysis of other current accident history databases to inform any revisions/updates? If so, what other

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<sup>65</sup> We note that for purposes of categorizing RMP processes based on accident frequency, some different NAICS codes represent essentially the same type of chemical process. For example, facilities in NAICS 311615 (poultry processing) and 49312 (refrigerated warehousing and storage) generally become RMP-regulated as a result of using large anhydrous ammonia refrigeration systems. Similarly, there are several NAICS codes for RMP-regulated processes that represent bulk storage of anhydrous ammonia by agricultural chemical distribution facilities. EPA could account for this by aggregating accidents from similar process types when updating Program 3 NAICS codes.

databases should be used? How much weight should be given to the RMP data set in comparison to other sources?

- e. Should the original NAICS codes continue to be included? Would not including the NAICS codes historically identified under Program 3 cause increase risks to those industry sectors by having them no longer subject to the more stringent measures?
- f. Should an analysis of accident history data be limited to a specific time frame?
- g. Would it cause confusion within the regulated community to change the list of NAICS codes for which Program 3 is required?
- h. What would be the economic impacts of modifying the list of NAICS codes for which Program 3 is required? Are there any special circumstances involving small entities that EPA should consider with respect to modifying the list of covered NAICS codes?

#### 11. The “Safety Case” Regulatory Model

The “safety case” regulatory model<sup>66</sup> is a framework for regulating high-risk industries where owners or operators of industrial facilities are required to demonstrate to the regulator that they have reduced risks to a level that is “as low as reasonably practicable”, or ALARP. In the safety case model, operators must present to regulators a structured argument, supported by a body of evidence that provides a compelling, comprehensible and valid case that a system is safe for a given application in a given operating environment. This regulatory approach is used in the chemical and refining industries by some countries outside the U.S., including the United Kingdom, Australia, Norway, and others, and is similar in practice to the U.S. regulatory regime for nuclear reactor facilities regulated by the NRC.

In its December 2013 Draft Regulatory Report on the Chevron Richmond Refinery Pipe Rupture and Fire, the CSB advocates the safety case approach as a safety management

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<sup>66</sup> <http://www.csb.gov/working-papers-on-the-safety-case-regulatory-model-and-its-attributes/>

framework for U.S. refineries<sup>67</sup>. The CSB specifically recommends that the California legislature adopt the safety case approach for refineries in California, and that OSHA, as part of that Agency's response to Executive Order 13650, "develop questions and evaluate issues raised from the findings and conclusions in this report concerning the safety case regime." As the CSB report was published after OSHA published its RFI under Executive Order 13650, OSHA was not able to include questions concerning the CSB's safety case recommendation within its RFI. However, because the OSHA PSM standard and EPA RMP regulation are closely linked, and together constitute the federal regulatory framework for chemical process safety management regulation in the U.S., EPA believes it is appropriate for the Agency to raise this issue within this RFI.

Completely replacing the current RMP regulation (and PSM standard) with a safety case approach would require significant changes to the existing regulatory regime for chemical process safety in the United States. Nevertheless, EPA is requesting public comment on whether EPA and OSHA should consider these actions. As an alternative to a wholesale adoption of the safety case approach, EPA and/or OSHA could potentially implement selected aspects of the approach within the current regulatory framework. For example, EPA and OSHA could require owners and operators to submit a PHA or a similar document to EPA and OSHA, and require Agency approval of the PHA. Also, EPA and OSHA could limit the applicability of the safety case approach to selected categories of high-risk facilities, such as petroleum refineries.

EPA requests information on the advantages and disadvantages of adopting a safety case approach to replace the RMP regulation and PSM standard, or alternatively, of incorporating

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<sup>67</sup> At its January 15, 2014, meeting, the Board refused to endorse this aspect of the draft report. The majority directed the CSB staff to revise the report within 120 days. [http://www.contracostatimes.com/rss/ci\\_24922079](http://www.contracostatimes.com/rss/ci_24922079).

aspects of the approach into current regulations or for selected categories of facilities. In particular, EPA requests information on the following questions:

- a. If you own or operate any RMP or PSM-covered facilities and also own or operate facilities in countries that use a safety case regulatory regime, please describe the process of developing and obtaining approval for your safety case. How long does development and approval of a safety case take for a large petroleum refinery or chemical processing facility? What are the advantages and disadvantages of the safety case approach in comparison to the existing U.S. regulatory regime for chemical process safety? Is there any evidence that the safety case approach reduces the frequency and severity of accidental releases and near misses? If so, please provide any information, data, or studies to EPA that demonstrate these effects. How expensive is it for facility owners to implement the safety case approach in comparison to implementing RMP or PSM? Do you already incorporate aspects of the safety case approach in your risk management program?
- b. The CSB Draft Regulatory Report on the Chevron Richmond Refinery Pipe Rupture and Fire<sup>68</sup> highlights the NRC as a U.S. regulator that has established a safety case approach for licensing and oversight of commercial nuclear power plants in the United States. The NRC oversees approximately 100 nuclear reactor and 3000 nuclear materials facilities in the U.S.<sup>69</sup>; the NRC has nearly 4000 employees and an annual budget of over \$1 billion<sup>70</sup>. What additional resources would be required by EPA and OSHA in order to establish and oversee a safety case regulatory regime for RMP and PSM-covered facilities?

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<sup>68</sup> [http://www.csb.gov/assets/1/19/CSB\\_Chevron\\_Richmond\\_Refinery\\_Regulatory\\_Report.pdf](http://www.csb.gov/assets/1/19/CSB_Chevron_Richmond_Refinery_Regulatory_Report.pdf)

<sup>69</sup> <http://www.nrc.gov/info-finder.html>

<sup>70</sup> <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1100/v29/fy2014-cbj.pdf>

- c. Is the safety case approach suitable for all RMP and PSM covered facilities, or, if adopted, should it be limited to only the most high-risk facilities, such as petroleum refineries and other high-risk chemical processing facilities?
- d. What would be the economic impacts of moving to a safety case based regulatory regime for chemical facility safety? Are there any special circumstances involving small entities that EPA should consider with respect to safety case based approach?

## 12. Streamlining RMP Requirements

In addition to the items listed above, EPA is interested in gathering information on any other areas within part 68 that should be modernized, strengthened, or clarified. In particular, EPA invites comment on any potential revisions to the RMP rule that would make it easier for regulated sources to comply with its requirements. EPA also requests information on the following questions:

- a. Are there steps that EPA could take to simplify the process of determining whether the RMP rule applies to particular facilities? Are there other potential revisions to the rule that would make it easier for regulated entities to comply with its provisions?
- b. Are there steps that EPA could take to simplify the RMP submission process? For example, are there advances in electronic reporting or information technology that EPA could use in order to make RMP submissions easier?
- c. Should EPA require that RMP submissions be certified by a senior corporate official, such as the Chief Executive Officer, Chief Financial Officer, Chief Operations Officer, or the equivalent to ensure corporate-wide awareness and accountability in the RMP submission?

- d. Is the three-tiered program level structure of the RMP regulation appropriate, or should EPA consider simplifying the rule to make only two program tiers, or only a single prevention program applicable to all facilities?
- e. Are the accident prevention program elements clearly defined? Should EPA further clarify any of the existing elements?
- f. Are the regulatory terms and definitions contained in section 68.3 sufficiently clear? Are there additional terms that EPA should define in this section?

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