



# Regulation of Fertilizers: Ammonium Nitrate and Anhydrous Ammonia

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## Summary

The explosion on April 17, 2013, at the West Fertilizer Company fertilizer distribution facility in West, TX, has led to questions about the oversight and regulation of agricultural fertilizer. Facilities holding chemicals must comply with regulations attempting to ensure occupational safety, environmental protection, and homeland security. In addition to federal regulation requiring reporting and planning for ammonium nitrate and anhydrous ammonia, most state and some local governments have laws and regulations regarding the handling of either or both of these chemicals.

The West Fertilizer Company possessed a variety of agricultural chemicals at its retail facility, but policy interest has focused on two chemicals: ammonium nitrate and anhydrous ammonia. Ammonium nitrate is a solid that is primarily used as a fertilizer whose use generally occurs without incident. In combination with a fuel source and certain conditions, such as added heat or shock, confinement, or contamination, ammonium nitrate can pose an explosion hazard. Such accidents have rarely occurred, but have historically had high impacts. For example, the ammonium nitrate explosion in 1947 in Texas City, TX, where two ships carrying ammonium nitrate caught fire and exploded, destroyed the entire dock area, including numerous oil tanks, dwellings, and business buildings. The bomb used in 1995 to attack the Murrah Federal Building contained ammonium nitrate as a component of its explosives.

Anhydrous ammonia has a variety of uses, including as an agricultural fertilizer. Many agricultural retailers store and use anhydrous ammonia. In contrast with ammonium nitrate, anhydrous ammonia is a gas more generally viewed as a threat from its inhalation toxicity. It is regulated to prevent release of the chemical into the atmosphere where it might travel as a cloud and impact workers and the surrounding environment.

Various federal, state, and local agencies collect mission-relevant information about chemical holdings. The West facility had reportedly not complied with all relevant and applicable regulatory requirements. For example, the facility reportedly had not contacted the Department of Homeland Security (DHS), which should have received information about any ammonium nitrate or anhydrous ammonia stored at the facility. The extent to which agencies shared relevant information about chemical holdings in order to enable effective regulatory oversight is still unresolved.

As congressional policymakers consider the ramifications of the explosion in West, TX, they may face several policy issues. These policy issues include the:

- challenges arising from relying on reporting of chemical inventories by regulated facilities;
- potential for omission and duplication in existing regulatory reporting;
- long intervals between inspection at many such facilities;
- ability of federal, state, and local government agencies to share information effectively among themselves; and
- public and first-responder access to regulatory information.

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## Introduction

The explosion on April 17, 2013, at the West Fertilizer Company fertilizer distribution facility in West, TX, has led to questions about the oversight and regulation of agricultural fertilizer.<sup>1</sup> Different federal agencies apply a variety of regulatory structures to these chemicals. This regulation meets different policy rationales, goals, and purposes. Some attempt to ensure occupational safety, others environmental protection, and still others security. As a consequence, various federal, state, and local agencies collect mission-relevant information about chemical holdings, with some entities gaining a narrower, or broader, understanding of a facility's chemical inventories.

The West Fertilizer Company possessed a variety of agricultural chemicals at its retail facility,<sup>2</sup> but policy interest has focused on two chemicals: ammonium nitrate and anhydrous ammonia. In 2012, the West Fertilizer Company had reported to the U.S. Environmental Protection Agency (EPA) and the state of Texas the presence of 110,000 pounds of anhydrous ammonia and 270 tons of ammonium nitrate<sup>3</sup> and had complied with certain provisions of the Clean Air Act,<sup>4</sup> but the West facility had not complied with all reporting requirements. For example, the facility reportedly had not contacted the Department of Homeland Security (DHS), which should have received information about any ammonium nitrate or anhydrous ammonia stored at the facility.<sup>5</sup>

In addition to federal regulation requiring reporting and planning for ammonium nitrate and anhydrous ammonia, most state and some local governments have laws and regulations regarding the handling of either or both of these chemicals.<sup>6</sup> States regulate worker and environmental protection, product efficacy and safety, chemical sales and storage, and security. In addition, states may enforce standards such building, plumbing, mechanical, electrical, and fire codes. Local zoning laws may dictate placement of a facility within a community. Many states require registration to track the sellers and sales of fertilizer.<sup>7</sup>

This report will focus on some of the federal regulatory programs overseeing storage of ammonium nitrate and anhydrous ammonia by retailers. The report will not address federal regulation of material in transport.<sup>8</sup> It will discuss federal occupational safety, environmental, and

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<sup>1</sup> For example, see Manny Fernandez and Steven Greenhouse, "Texas Fertilizer Plant Fell through Regulatory Cracks," *New York Times*, April 24, 2013.

<sup>2</sup> Adair Grain, Inc. DBA West Fertilizer Co., Tier II, Emergency and Hazardous Chemical Inventory, 2012, [http://op.bna.com/env.nsf/id/jsun-96vvcm/\\$File/Adair%20Grain%20Inc%202012%20Tier%202%20Report.pdf](http://op.bna.com/env.nsf/id/jsun-96vvcm/$File/Adair%20Grain%20Inc%202012%20Tier%202%20Report.pdf).

<sup>3</sup> It is unclear from the Tier II report whether this reflects maximum amounts stored on site or some other value. Adair Grain, Inc. DBA West Fertilizer Co., Tier II, Emergency and Hazardous Chemical Inventory, 2012, [http://op.bna.com/env.nsf/id/jsun-96vvcm/\\$File/Adair%20Grain%20Inc%202012%20Tier%202%20Report.pdf](http://op.bna.com/env.nsf/id/jsun-96vvcm/$File/Adair%20Grain%20Inc%202012%20Tier%202%20Report.pdf).

<sup>4</sup> Right-to-Know Net, West Fertilizer Co. Risk Management Plan, June 30, 2011, [http://data.rtknet.org/rmp/rmp.php?facility\\_id=100000135597&database=rmp&detail=3&datatype=T](http://data.rtknet.org/rmp/rmp.php?facility_id=100000135597&database=rmp&detail=3&datatype=T).

<sup>5</sup> Personal communication between DHS and CRS staff, April 23, 2013.

<sup>6</sup> The authors thank Jerry Yen, Intern, Congressional Research Service, for research assistance on state fertilizer regulation.

<sup>7</sup> The Association of American Plant Food Control Officials and the Fertilizer Institute have compiled a list of state fertilizer laws and regulations. Association of American Plant Food Control Officials, "State Fertilizer Laws and Regulations," at [http://www.aapfco.org/state\\_laws\\_regs.html](http://www.aapfco.org/state_laws_regs.html) and The Fertilizer Institute, "2012 Summary of State Fertilizer Laws," at <http://www.tfi.org/node/507>.

<sup>8</sup> The Department of Transportation and the U.S. Coast Guard regulate the transportation of chemicals by land and sea.

security statutes and regulations applicable to each chemical. Select policy issues regarding these federal regulatory programs will be highlighted. It does not address various law enforcement activities related to tracking of anhydrous ammonia used for illegal drug synthesis (e.g., methamphetamine).

## **Ammonium Nitrate**

Domestic production capacity of ammonium nitrate is approximately 7 million tons,<sup>9</sup> and it is produced worldwide. Ammonium nitrate is a solid that is primarily used as a fertilizer. The vast majority of ammonium nitrate use occurs without incident. Most experts consider ammonium nitrate itself as a stable chemical with few handling restrictions, but, in combination with a fuel source, it can pose an explosion hazard.<sup>10</sup> Ammonium nitrate requires certain conditions, such as added heat or shock, confinement, or contamination to explode. Ammonium nitrate in combination with certain additives is widely used as a type of explosive known as a blasting agent.

Ammonium nitrate is suspected as the cause of the explosion at the West Fertilizer Company.<sup>11</sup> Accidental explosions of ammonium nitrate have resulted in loss of lives and destruction of property. These accidents have rarely occurred, but have had high impacts. For example, the ammonium nitrate explosion in 1947 in Texas City, TX, where two ships carrying ammonium nitrate caught fire and exploded, destroyed the entire dock area, including numerous oil tanks, dwellings, and business buildings.<sup>12</sup> Because of this history, and its inherent characteristics, a variety of federal agencies have authority to regulate ammonium nitrate, some of which has been delegated to state agencies.

## **Regulation by Bureau of Alcohol, Tobacco, Firearms and Explosives**

The Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) of the Department of Justice (DOJ) regulates ammonium-nitrate-based blasting agents, but it does not regulate ammonium nitrate as fertilizer. The ATF has issued regulations regarding the necessary distance to be maintained between ammonium nitrate and other explosive materials.<sup>13</sup> The ATF and the fertilizer industry have undertaken joint voluntary efforts to secure ammonium nitrate fertilizer, predominantly through “know your customer” programs.<sup>14</sup>

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<sup>9</sup> IFDC, *North America Fertilizer Capacity*, March 2013.

<sup>10</sup> Environmental Protection Agency, Office of Solid Waste and Emergency Response, Chemical Emergency Preparedness and Prevention Office, “Chemical Safety Alert: Explosion Hazard from Ammonium Nitrate,” EPA 550-F-97-002d, December 1997.

<sup>11</sup> No final determination of the root cause of the explosion of the West Fertilizer Company has been made. The Chemical Safety Board has begun an investigation into the explosion. Chemical Safety Board, “Chemical Safety Board Deploying to West Fertilizer Plant Accident,” *Press Release*, undated.

<sup>12</sup> S. Olafson, “Texas City Just Blew Up,” *Houston Chronicle*, April 16, 1997.

<sup>13</sup> 27 C.F.R. §550.220.

<sup>14</sup> See, for example, <http://www.atf.gov/explosives/programs/ammonium-nitrate-security/index.html>.

## **Regulation by Department of Homeland Security**

While often used for legitimate purposes, malicious actors might also use ammonium nitrate fertilizer as part of an improvised explosive device. For example, the bombing of the Murrah Federal Building in Oklahoma City, OK, used ammonium nitrate, along with other chemicals, as the primary explosive material. The ease with which ammonium nitrate fertilizer can be transformed into ammonium-nitrate-based blasting agent has led to increased scrutiny of the storage and transfer in order to prevent its misappropriation and misuse.

For this reason, the Department of Homeland Security (DHS) has multiple statutory authorities under which it regulates ammonium nitrate for security purposes. In general, DHS authorities fall into two categories: securing facilities containing ammonium nitrate and tracking the transfer of ammonium nitrate.<sup>15</sup>

Since 2002, the U.S. Coast Guard (USCG) has regulated security at certain stationary facilities adjacent to waterways under the authority of the Maritime Transportation Security Act (MTSA, P.L. 107-295). In 2006, when Congress authorized DHS to regulate high-risk chemical facilities for security purposes in P.L. 109-295 (Department of Homeland Security Appropriations Act, 2007), it exempted those facilities already regulated under MTSA.<sup>16</sup> Congress also authorized DHS to oversee the sale and transfer of ammonium nitrate in P.L. 110-161 (Consolidated Appropriations Act, 2008).<sup>17</sup>

### **Maritime Transportation Security Act**

The DHS, through the USCG, regulates security at facilities located adjacent to any waters subject to U.S. jurisdiction of the United States. Note that this regulatory requirement is irrespective of the presence of chemicals at the facility, but would capture any facility storing ammonium nitrate adjacent to waterways. The USCG implemented MTSA through a series of regulations issued in October 2003.<sup>18</sup> The MTSA requires the creation of an area security plan, assessment of security vulnerabilities at the facility, and the creation of a facility security plan. The USCG creates the area security plan. Either the USCG or the regulated facility performs a vulnerability assessment of the regulated facility. Based on this vulnerability assessment, the facility must develop and implement a security plan consistent with the broader USCG area maritime transportation security plan. The facility must update this plan every five years, and the USCG inspects the facility's implementation of the plan.<sup>19</sup>

### **Chemical Facility Anti-Terrorism Standards**

In 2007, DHS issued an interim final rule establishing the Chemical Facility Anti-Terrorism Standards (CFATS), the regulatory program by which it implements its chemical facility security authority. Under the CFATS interim final rule, the Secretary of Homeland Security determines which chemical facilities must meet regulatory security requirements, based on the degree of risk

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<sup>15</sup> The U.S. Coast Guard also regulates transport of ammonium nitrate on waterways as a "certain dangerous cargo."

<sup>16</sup> Section 550, P.L. 109-295, Department of Homeland Security Appropriations Act, 2007.

<sup>17</sup> Section 563, P.L. 110-161, Consolidated Appropriations Act, 2008.

<sup>18</sup> 33 C.F.R. §105.

<sup>19</sup> Vessels have similar requirements to facilities under the MTSA.

posed by each facility. The DHS lists 322 “chemicals of interest” and screening threshold quantities for each chemical to determine the need to comply with CFATS.<sup>20</sup> The DHS considers each chemical in the context of three threats: release; theft or diversion; and sabotage and contamination. The regulation lists two formulations of ammonium nitrate (one used as a blasting agent, the other as fertilizer) as a chemical of interest and identifies them as release and theft or diversion threats.

The screening threshold quantity differs depending on whether the ammonium nitrate is blasting agent or fertilizer. Facilities possessing at least 5,000 pounds (400 pounds if packaged for transportation) of ammonium nitrate as a blasting agent (ammonium nitrate with more than 0.2% combustible substances) are potentially high-risk facilities and must participate in the CFATS regulations. Facilities possessing at least 2,000 pounds of transportable fertilizer mixture containing at least 33% ammonium nitrate are potentially high-risk facilities and must participate in the CFATS regulations. According to DHS, “This [screening threshold quantity] is geared toward ensuring that DHS secures [ammonium nitrate] inventories at major manufacturing and distribution facilities, as opposed to individual farmers involved mainly in the application of [ammonium nitrate].”<sup>21</sup>

Chemical facilities with greater than specified quantities of chemicals of interest must submit information to DHS. This information-gathering process is called the “Top-Screen.” It enables DHS to determine the facility’s risk status based on the information received. If a facility comes into possession of any of the chemicals of interest at the corresponding quantities, it must complete and submit a Top-Screen within 60 calendar days.<sup>22</sup> Also, the CFATS rule states that DHS may contact and instruct specific facilities to complete and submit Top-Screen information. Facilities that DHS deems high risk must meet CFATS requirements, which include performing a security vulnerability assessment, developing a site security plan, implementing the security plan, and then being inspected by DHS for compliance. See **Figure 1**.

Several types of facilities are exempt from the CFATS regulation. The statute exempts any facility defined as a water system or wastewater treatment works; owned or operated by the Department of Defense or Department of Energy; regulated by the Nuclear Regulatory Commission (NRC); or regulated under MTA. Many of these types of facilities comply with other security requirements. The DHS has implemented a regulatory extension for agricultural chemical users, though not distributors or retailers.<sup>23</sup> Indeed, DHS stated in the CFATS interim final rule that “if a retail establishment does exceed any of these [screening threshold quantities], the retail establishment will have to complete the Top-Screen.”<sup>24</sup> The CFATS rule does not, however, impose any limitations on the sale or transfer of ammonium nitrate.

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<sup>20</sup> 72 *Federal Register* 65396-65435 (November 20, 2007).

<sup>21</sup> 72 *Federal Register* 65396-65435 (November 20, 2007) at 65407.

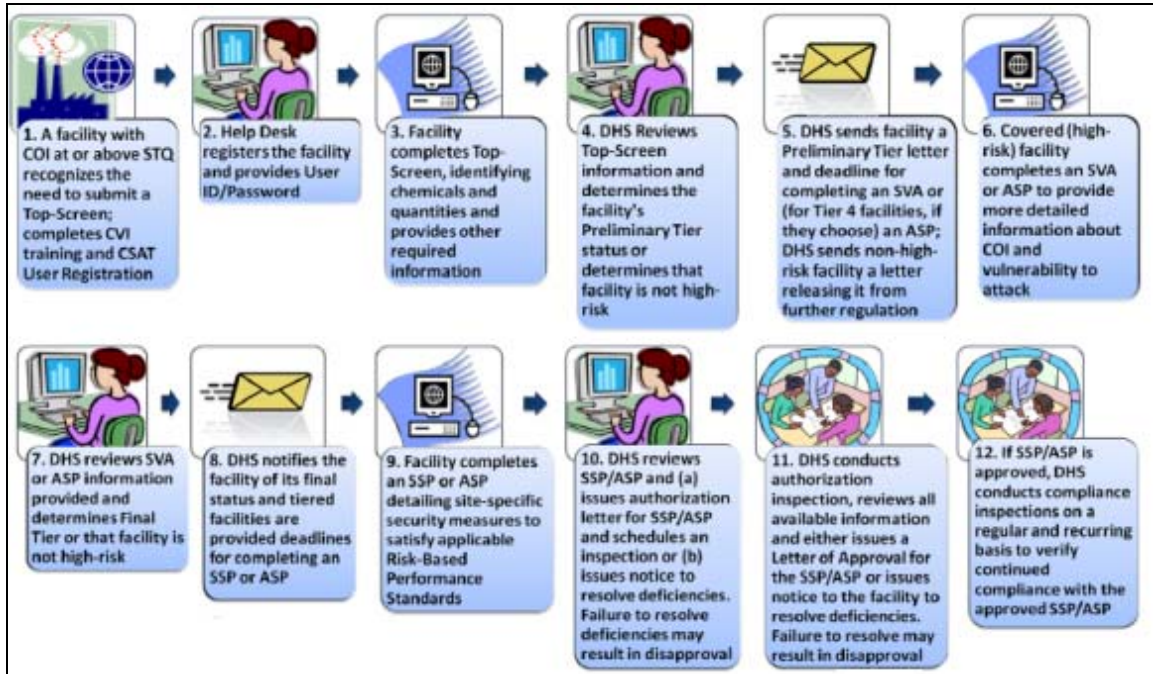
<sup>22</sup> 72 *Federal Register* 17688-17745 (April 9, 2007) at 17731.

<sup>23</sup> See Section 550(a), P.L. 109-295, Department of Homeland Security Appropriations Act, 2007 and 73 *Federal Register* 1640 (January 9, 2008).

<sup>24</sup> 72 *Federal Register* 17688-17745 (April 9, 2007) at 17697.

Figure I. Overview of CFATS Regulatory Process

(July 2012)



**Source:** Office of Infrastructure Protection, National Protection and Programs Directorate, Department of Homeland Security, *Chemical Facility Anti-Terrorism Standards (CFATS) and Ammonium Nitrate Security Regulation Update*, July 31, 2012.

**Notes:** COI = Chemical of Interest; STQ = Screening Threshold Quantity; CVI = Chemical-terrorism Vulnerability Information; CSAT = Chemical Security Assessment Tool; SVA = Security Vulnerability Assessment; ASP = Alternative Security Program; SSP = Site Security Plan.

## Ammonium Nitrate Proposed Rule

In 2007, Congress enacted Section 563 of P.L. 110-161 (Secure Handling of Ammonium Nitrate), authorizing DHS to “regulate the sale and transfer of ammonium nitrate by an ammonium nitrate facility ... to prevent the misappropriation or use of ammonium nitrate in an act of terrorism.”<sup>25</sup>

The statute further required that DHS develop regulations wherein, among other responsibilities:

- sellers and purchasers of ammonium nitrate register with DHS and are screened by DHS against the Terrorist Screening Database;
- sellers of ammonium nitrate verify purchaser’s identify and registration, keep records of sales or transfers, and report theft or loss; and
- DHS audits, inspects, and monitors compliance; develops guidance materials; establishes an appeals process; and defines the threshold percentage of ammonium nitrate in a mixture for that mixture to be regulated.

<sup>25</sup> Section 563, P.L. 110-161, Consolidated Appropriations Act, 2008.



The DHS began its ammonium nitrate rulemaking process with an advanced notice of proposed rulemaking in October 2008<sup>26</sup> and, in August 2011, issued a proposed rule regulating ammonium nitrate possession, sale, and transfer.<sup>27</sup>

The proposed rule would impose certain conditions on the sale or transfer of ammonium nitrate, for example, requiring that ammonium nitrate may only be transferred between registered ammonium nitrate sellers and registered ammonium nitrate purchasers. Each purchaser and seller would be required to apply to be registered with DHS, which would screen each applicant against the Terrorist Screening Database (TSDB).<sup>28</sup> Following the screening process, approved individuals would be allowed to engage in the sale, purchase, or transfer of ammonium nitrate.

Transactions involving the sale or transfer of ammonium nitrate would be regulated at the point of sale and procedures for reporting a theft or loss of ammonium nitrate would be established. Ammonium nitrate sellers would be required to sell or transfer ammonium nitrate only to individuals who had successfully registered with DHS or those individuals' agent. The proposed rule would also require those selling ammonium nitrate to retain records for two years and report theft or loss of ammonium nitrate to federal authorities within 24 hours of discovery. The DHS would be responsible for ensuring compliance with these proposed standards to ensure public safety and support legitimate commerce.

This proposed rule received 132 comments, and DHS has not yet issued a final rule. Consequently, no regulation implements DHS's statutory authority to regulate ammonium nitrate sale and transfer.

## **Regulation by Occupational Safety and Health Administration**

The Occupational Safety and Health Administration (OSHA) regulates employers within the agency's jurisdiction that use or possess certain quantities of ammonium nitrate at their worksites.<sup>29</sup> Under the "General Duty Clause" of the Occupational Safety and Health Act (P.L. 91-596, as amended), each employer must provide its employees with a workplace that is free from "recognized hazards that are causing or are likely to cause death or serious physical harm" to its employees.<sup>30</sup> Thus, employers who use or possess ammonium nitrate must, regardless of any other regulations, ensure that the hazards known to be associated with ammonium nitrate do not put their employees in danger.

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<sup>26</sup> 73 *Federal Register* 64280-64282 (October 29, 2008).

<sup>27</sup> 76 *Federal Register* 46907-46957 (August 3, 2011).

<sup>28</sup> The Terrorist Screening Database (TSDB) is a centralized federal database of information about known or suspected terrorists. For more information, see [http://www.fbi.gov/about-us/nsb/tsc/tsc\\_faqs](http://www.fbi.gov/about-us/nsb/tsc/tsc_faqs).

<sup>29</sup> OSHA does not have jurisdiction over public sector employers; employers who are regulated by other federal safety agencies, such as the Mine Safety and Health Administration (MSHA); and employers in states with approved occupational safety and health plans. Currently, 20 states and Puerto Rico have their own occupational safety and health plans that cover the private sector. Under Section 18(c) of the Occupational Safety and Health Act [29 U.S.C. §667(c)], a state plan must contain regulations "at least as effective" as those enforced by OSHA.

<sup>30</sup> 29 U.S.C. §654(a).

Nearly every workplace covered by OSHA is required to have an emergency action plan (EAP) that complies with OSHA Standard 1910.38.<sup>31</sup> An EAP must have, at minimum, the following elements:

- procedures for reporting a fire or other emergency;
- procedures for evacuation;
- procedures to be followed by employees who remain to operate parts of the facilities before evacuating;
- procedures to account for all employees after evacuation;
- procedures for employees performing rescue or medical duties; and
- names and job titles of persons who may be contacted by employees to provide information to employees about the EAP.<sup>32</sup>

According to information provided on its EPA Risk Management Plan (RMP), West Fertilizer Company reportedly had an EAP in place.<sup>33</sup>

In addition to their general duty and EAP requirements, employers regulated by OSHA must meet the following occupational safety and health standards that specifically apply to the use and possession of ammonium nitrate.<sup>34</sup>

### **Standard 1910.109: “Explosives and Blasting Agents”<sup>35</sup>**

This standard regulates the storage, use, and transportation of explosives and blasting agents, including those that may contain ammonium nitrate. The general hazard provision of this standard states:

No person shall store, handle, or transport explosives or blasting agents when such storage, handling, and transportation of explosives or blasting agents constitutes an undue hazard to life.<sup>36</sup>

In addition, this standard contains specific rules regarding the storage of ammonium nitrate.<sup>37</sup> These specific rules include height and spacing requirements for stored ammonium nitrate, required separation from other materials, and identification of certain building parameters.

Finally, the standard also specifies the minimum distances by which blasting agents and ammonium nitrate must be separated during storage.<sup>38</sup>

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<sup>31</sup> 29 C.F.R. §1910.38.

<sup>32</sup> 29 C.F.R. §1910.38(c).

<sup>33</sup> Right-to-Know Net, Risk Management Plan, [http://data.rtknet.org/rmp/rmp.php?facility\\_id=100000135597&database=rmp&detail=3&datatype=T](http://data.rtknet.org/rmp/rmp.php?facility_id=100000135597&database=rmp&detail=3&datatype=T).

<sup>34</sup> Pursuant to Section 6 of the Occupational Safety and Health Act (29 U.S.C. §655) OSHA may promulgate occupational safety and health standards through regulation.

<sup>35</sup> 29 C.F.R. §1910.109.

<sup>36</sup> 29 C.F.R. §1910.109(b)(1).

<sup>37</sup> 29 C.F.R. §1910.109(i).

### **Standard 1910.1200: “Hazard Communication”<sup>39</sup>**

This standard requires that chemicals used in the workplace be properly classified, labeled, and identified so that their potential safety and health hazards may be communicated to employees. For example, employers who use substances with recognized safety or health hazards are generally required to keep material safety data sheets on site and accessible to employees. In 2012, OSHA changed this standard to bring it more in line with the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).<sup>40</sup> This standard generally applies to “any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.”<sup>41</sup>

### **Standard 1910.119: “Process Safety Management of Highly Hazardous Chemicals”**

Section 304 of the Clean Air Act Amendments of 1990 (CAAA) mandated promulgation of the Process Safety Management (PSM) standard.<sup>42</sup> The PSM standard “contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals.”<sup>43</sup> Processes involving ammonium nitrate are not subject to regulation under OSHA’s process safety management of highly hazardous chemicals (PSM) standard, as ammonium nitrate is not listed as a highly hazardous chemical in Appendix A of the standard.<sup>44</sup>

## **Regulation by U.S. Environmental Protection Agency**

The U.S. Environmental Protection Agency (EPA) is authorized to regulate production, distribution, storage, and release of most chemicals in commerce. Among the many environmental authorities the EPA relies upon, the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act directly address the potential risks from facilities holding chemical hazards.

### **Emergency Planning and Community Right-to-Know Act**

The accidental and sudden release of methyl isocyanate in an industrial accident at the Union Carbide Plant in December 1984 in Bhopal, India, and the attendant loss of life and injuries spurred legislative proposals to reduce the risk of chemical accidents in the United States. Enacted in 1986 as Title III of the Superfund Amendments and Reauthorization Act (SARA; P.L. 99-499), the Emergency Planning and Community Right-to-Know Act (EPCRA) established

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(...continued)

<sup>38</sup> 29 C.F.R. §1910.109(g)(4)(vi).

<sup>39</sup> 29 C.F.R. §1910.1200.

<sup>40</sup> Department of Labor, Occupational Safety and Health Administration, “Hazard Communication: Final Rule,” 77 *Federal Register* 17574, (March 26, 2012).

<sup>41</sup> 29 C.F.R. §1910.1200(b)(2).

<sup>42</sup> P.L. 101-549.

<sup>43</sup> 29 C.F.R. §1910.119.

<sup>44</sup> 29 C.F.R. §1910.119. A similar PSM standard for the construction industry is at 29 C.F.R. §1926.64.

requirements and a framework to ensure that the EPA, state and local governments, and the private sector would work together to control and, if necessary, respond to releases of hazardous chemicals to the environment. Section 301 of EPCRA established state emergency response commissions (SERCs) and local emergency planning committees (LEPCs) to develop and implement local plans for coping with potential releases of hazardous chemicals.

Ammonium nitrate is regulated under two sections of EPCRA, Sections 311 and 312. EPCRA, Section 311, requires owners or operators of local facilities covered by the Occupational Safety and Health Act (P.L. 91-596, as amended) to submit a material safety data sheet (MSDS) for each “hazardous chemical,” or a list of such chemicals, to the SERC, the LEPC, and the local fire department. An MSDS need only be submitted once, unless there is a significant change in the information it contains. An MSDS must be provided in response to a request by an LEPC or a member of the public. The definition of “hazardous chemicals” includes hundreds of chemicals.<sup>45</sup> EPCRA Section 311(e)(5) excludes certain substances from this definition, including “fertilizer held for sale by a retailer to the ultimate customer.”<sup>46</sup>

EPCRA, Section 312, requires the same employers to submit annually an emergency and hazardous chemical inventory form to the SERC, LEPC, and local fire department. These forms must provide estimates of the maximum amount of the chemicals present at the facility at any time during the preceding year; estimates of the average daily amount of chemicals present; and the general location of the chemicals in the facility.<sup>47</sup> Information must be provided to the public in response to a written request. EPA is authorized to establish threshold quantities for chemicals below which facilities are not required to report.

### **Clean Air Act, Section 112(r)**

In 1990, accumulated data on chemical accidents in the United States prompted Congress to amend Section 112 of the Clean Air Act (CAA) to further address the threat of catastrophic releases into the ambient air of chemicals that might cause immediate deaths or injuries in communities. Section 112(r)(7) requires owners and operators of covered facilities that produce, process, handle, or store certain extremely hazardous substances to submit to the EPA a risk management plan (RMP) for each process that might have an accidental chemical release. RMPs summarize the potential threat of unanticipated emissions into the ambient air of certain dangerous chemicals and facilities’ plans to prevent such releases and mitigate any damage.

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<sup>45</sup> 29 C.F.R. 1910.1200(c) defines hazardous chemical to mean “any substance, or mixture of substances” that “is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.” “Health hazard means a chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard.” “Physical hazard means a chemical that is classified as posing one of the following hazardous effects: explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid or gas); self-reactive; pyrophoric (liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; or in contact with water emits flammable gas.”

<sup>46</sup> EPCRA Section 311(e) excepts foods, food additives, or other substances regulated by the Food and Drug Administration; solids in a manufactured item to the extent exposure to people or the environment does not occur; substances used for personal or household purposes; substances used in research or hospitals; and substances used in routine agricultural operations.

<sup>47</sup> EPCRA allows facilities to report aggregate amounts of chemicals with similar health and environmental effects. This is called “Tier I” information. However, chemical-specific information (“Tier II”) must be provided on request (under certain conditions) to an SERC, LEPC, fire department, or the public.

Ammonium nitrate is not a chemical regulated under Section 112(r) of the Clean Air Act. The implementing regulation applies to facilities that possess more than threshold levels of any of 77 acutely toxic substances or 63 flammable gases which the Administrator determined “pose the greatest risk of causing death, injury, or serious adverse effects to human health or the environment from accidental releases.” In listing substances, the statute directed the EPA Administrator to consider “the severity of any acute adverse health effects associated with accidental releases of the substance,” “the likelihood of accidental releases of the substance,” and “the potential magnitude of human exposure to accidental releases of the substance.” The law explicitly excludes fuels held for retail sale from regulation, as it does substances regulated under other sections of the Clean Air Act. In addition, the EPA Administrator was “authorized to establish a greater threshold quantity for, or to exempt entirely, any substance that is a nutrient used in agriculture when held by a farmer.” The EPA Administrator did not include ammonium nitrate on the RMP chemical list.

## **Anhydrous Ammonia**

Ammonia has a variety of uses, for example, as an agricultural fertilizer and an industrial refrigerant. It also is used in industrial chemistry to manufacture other nitrogen-containing chemicals, such as ammonium nitrate which is made from the reaction of ammonia with nitric acid. The term “anhydrous ammonia” refers to essentially pure ammonia that exists as a gas. This contrasts with “aqueous ammonia,” where the ammonia is dissolved in water as a liquid solution. Many agricultural retailers and facilities with ammonia refrigeration systems store and use anhydrous ammonia. Domestic production of ammonia is approximately 12 million tons,<sup>48</sup> and it is produced worldwide.

In contrast to ammonium nitrate, where the concern is one of potential explosion or theft to illegally manufacture explosives, anhydrous ammonia is a toxic inhalational hazard. Generally, anhydrous ammonia is stored as a liquid under pressure; it becomes a toxic gas when released to the environment. Anhydrous ammonia can harm individuals who inhale or contact it. Thus, it is regulated to prevent release of the chemical into the atmosphere where it might travel as a cloud and impact workers and the surrounding environment. It is also encountered routinely in relatively small quantities by local law enforcement officials and hazardous material response teams when it is encountered as part of illegal drug synthesis operations (e.g., methamphetamine).

## **Regulation by Department of Homeland Security**

The DHS uses the same authorities to regulate security of facilities possessing anhydrous ammonia that it uses to regulate those possessing ammonium nitrate: MTSA and CFATS. As mentioned above, in 2002, Congress enacted MTSA, which authorized the USCG to regulate security at facilities adjacent to waterways.<sup>49</sup> In 2006, Congress authorized DHS to regulate high-risk chemical facilities for security purposes, exempting those facilities already regulated under MTSA.<sup>50</sup> The MTSA and CFATS provide the two mechanisms by which DHS regulates facilities possessing anhydrous ammonia.

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<sup>48</sup> IFDC, *North America Fertilizer Capacity*, March 2013.

<sup>49</sup> The MTSA also provided additional authorities, including regulating security on vessels.

<sup>50</sup> Section 550, P.L. 109-295, Department of Homeland Security Appropriations Act, 2007.

## **Maritime Transportation Security Act**

The MTSA required DHS, through the USCG, to regulate security at facilities located adjacent to any waters subject to U.S. jurisdiction. Note that this regulatory requirement is irrespective of the presence of chemicals at the facility, but would capture any facility storing anhydrous ammonia adjacent to waterways. The USCG implemented MTSA through a series of regulations issued in October 2003.<sup>51</sup> The MTSA requires the creation of an area security plan, assessment of security vulnerabilities at the facility, and the creation of a facility security plan. The USCG creates the area security plan. Either the USCG or the regulated facility performs a vulnerability assessment of the regulated facility. Based on this vulnerability assessment, the facility must develop and implement a security plan consistent with the broader USCG area maritime transportation security plan. The facility must update this plan every five years, and the USCG inspects the facility's implementation of the plan.<sup>52</sup>

## **Chemical Facility Anti-Terrorism Standards**

In 2007, DHS issued an interim final rule establishing the Chemical Facility Anti-Terrorism Standards (CFATS), the regulatory program by which it implements its chemical facility security authority. The DHS regulates ammonia through the CFATS program. Under the CFATS interim final rule, the Secretary of Homeland Security determines which chemical facilities must meet regulatory security requirements, based on the degree of risk posed by each facility. The DHS lists 322 "chemicals of interest" and screening threshold quantities for each chemical to determine the need to comply with CFATS.<sup>53</sup> The regulation lists two formulations of ammonia (anhydrous ammonia and aqueous ammonia with a concentration of at least 20%) as chemicals of interest and identifies release threats for them.

Facilities holding 10,000 pounds or more of anhydrous ammonia or 20,000 pounds or more of aqueous ammonia with a concentration of at least 20% must submit information to DHS as part of the "Top-Screen" process. Facilities that DHS deems high risk based on the "Top-Screen" submission must meet CFATS requirements, which include performing a security vulnerability assessment, developing a site security plan, implementing the security plan, and then being inspected by DHS for compliance.

As noted above, the statute exempts several types of facilities from CFATS regulation. The DHS has implemented a regulatory extension for agricultural chemical users, though not distributors or retailers.<sup>54</sup> As DHS stated in the CFATS interim final rule, "if a retail establishment does exceed any of these [screening threshold quantities], the retail establishment will have to complete the Top-Screen."<sup>55</sup>

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<sup>51</sup> 33 C.F.R. §105.

<sup>52</sup> Vessels have similar requirements to facilities under the MTSA.

<sup>53</sup> 72 *Federal Register* 65396-65435 (November 20, 2007).

<sup>54</sup> See Section 550(a), P.L. 109-295, Department of Homeland Security Appropriations Act, 2007; and 73 *Federal Register* 1640 (January 9, 2008).

<sup>55</sup> 72 *Federal Register* 17688-17745 (April 9, 2007) at 17697.

## **Regulation by Occupational Safety and Health Administration**

OSHA regulates employers within its jurisdiction that use or possess certain quantities of anhydrous ammonia at their worksites. In addition to being subject to the General Duty Clause, employers regulated by OSHA must meet the following occupational safety and health standards that specifically apply to the use and possession of anhydrous ammonia.

### **Standard 1910.111: “Storage and Handling of Anhydrous Ammonia”<sup>56</sup>**

This standard provides comprehensive requirements for the “design, construction, location, installation, and operation of anhydrous ammonia systems including refrigerated ammonia storage systems.”<sup>57</sup> In addition to basic rules for the storage and handling of anhydrous ammonia and the operation of anhydrous ammonia systems, this standard provides additional requirements for different types of refrigerated and non-refrigerated storage systems and containers, transportation and transfer of anhydrous ammonia, and use of anhydrous ammonia in connection with farm vehicles such as spraying systems.

### **Standard 1910.119: “Process Safety Management of Highly Hazardous Chemicals”<sup>58</sup>**

Section 304 of the Clean Air Act Amendments of 1990 (CAAA) mandated promulgation of the PSM standard.<sup>59</sup> The PSM standard “contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals.”<sup>60</sup> The PSM standard covers processes involving anhydrous ammonia. As provided in Appendix A of the standard, OSHA considers anhydrous ammonia a highly hazardous chemical subject to standard when it is present in quantities exceeding 10,000 pounds.<sup>61</sup> Facilities with sufficient quantities of anhydrous ammonia must comply with the 14 elements of the process safety management regulation.

For the purposes of this standard, a process is defined as:

any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities. For purposes of this definition, any group of vessels which are interconnected and separate vessels which are located such that a highly hazardous chemical could be involved in a potential release shall be considered a single process.<sup>62</sup>

Any employer engaging in a process subject to the PSM standard must adhere to requirements designed to prevent an accidental release of a highly hazardous chemical or mitigate the consequences of such a release to prevent a catastrophic outcome. The CAAA requires 14

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<sup>56</sup> 29 C.F.R. §1910.111.

<sup>57</sup> 29 C.F.R. §1910.111(a)(1)(i).

<sup>58</sup> 29 C.F.R. §1910.119.

<sup>59</sup> P.L. 101-549.

<sup>60</sup> 29 C.F.R. §1910.119.

<sup>61</sup> 29 C.F.R. §1910.119 Appendix A.

<sup>62</sup> 29 C.F.R. §1910.119(b).

elements to be components of the PSM standard, and these elements have been generally grouped into the following requirements for employers:

1. develop and maintain written safety information identifying workplace chemical and process hazards, equipment used in the processes, and technology used in the processes;
2. perform a workplace hazard assessment, including, as appropriate, identification of potential sources of accidental releases, an identification of any previous release within the facility which had a likely potential for catastrophic consequences in the workplace, estimation of workplace effects of a range of releases, estimation of the health and safety effects of such range on employees;
3. consult with employees and their representatives on the development and conduct of hazard assessments and the development of chemical accident prevention plans and provide access to these and other records required under the standard;
4. establish a system to respond to the workplace hazard assessment findings, which shall address prevention, mitigation, and emergency responses;
5. periodically review the workplace hazard assessment and response system;
6. develop and implement written operating procedures for the chemical process including procedures for each operating phase, operating limitations, and safety and health considerations;
7. provide written safety and operating information to employees and train employees in operating procedures, emphasizing hazards and safe practices;
8. ensure contractors and contract employees are provided appropriate information and training;
9. train and educate employees and contractors in emergency response in a manner as comprehensive and effective as that required by the regulation promulgated pursuant to Section 126(d) of the Superfund Amendments and Reauthorization Act;
10. establish a quality assurance program to ensure that initial process related equipment, maintenance materials, and spare parts are fabricated and installed consistent with design specifications;
11. establish maintenance systems for critical process related equipment including written procedures, employee training, appropriate inspections, and testing of such equipment to ensure ongoing mechanical integrity;
12. conduct pre-start-up safety reviews of all newly installed or modified equipment;
13. establish and implement written procedures to manage change to process chemicals, technology, equipment and facilities; and



14. investigate every incident which results in or could have resulted in a major accident in the workplace, with any findings to be reviewed by operating personnel and modifications made if appropriate.<sup>63</sup>

The PSM standard does not apply to retail facilities. While the standard does not provide a definition of “retail facility,” OSHA’s interpretation is that the retail facility exemption applies to any establishment in which more than half of the income it obtains from the sale of highly hazardous chemicals covered by the PSM standard comes from direct sales to end users.<sup>64</sup> According to information provided on its EPA RMP, West Fertilizer Company reportedly was not covered by this standard.<sup>65</sup>

### **Standard 1910.1000: “Air Contaminants”<sup>66</sup>**

This standard provides limits to employee exposure to certain substances. As provided in Table Z-1 of this standard, the permissible exposure limit (PEL) of an employee to anhydrous ammonia is:

- 50 parts of vapor or gas per million parts of contaminated air by volume at 25 degrees C and 760 Torr (50 ppm) as measured as an eight-hour time weighted average (TWA); or
- 35 milligrams of substance per cubic meter of air (35 mg/m<sup>3</sup>, approximate) as measured as an eight-hour time TWA.<sup>67</sup>

## **Regulation by Environmental Protection Agency**

The EPA is authorized to regulate production, distribution, storage, and release of most chemicals in commerce. Among the many environmental authorities the EPA relies upon, the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act directly address the potential risks from facilities holding chemical hazards.

### **Emergency Planning and Community Right-to-Know Act**

EPCRA Section 302 directs EPA to list “extremely hazardous substances” (EHS) that are to be the subject of emergency planning and to establish threshold planning quantities for each substance. Generally, EPA has included chemicals in this list if they can harm people exposed to them for only a short period of time. The implementing regulation requires owners or operators of facilities where an EHS is present at an amount above its threshold planning quantity to notify their SERC, which then is required to notify the EPA Administrator. Anhydrous ammonia is an EHS with a threshold planning quantity of 500 pounds.

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<sup>63</sup> 29 U.S.C. §655 note.

<sup>64</sup> See for example OSHA’s standard interpretation “Clarification of the retail facilities exemption under the PSM standard,” December 12, 2005, [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=INTERPRETATIONS&p\\_id=25171](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=25171).

<sup>65</sup> Right-to-Know Net, Risk Management Plan, [http://data.rtknet.org/rmp/rmp.php?facility\\_id=100000135597&database=rmp&detail=3&datatype=T](http://data.rtknet.org/rmp/rmp.php?facility_id=100000135597&database=rmp&detail=3&datatype=T).

<sup>66</sup> 29 C.F.R. §1910.1000.

<sup>67</sup> 29 C.F.R. §1910.1000 Table Z-1.

EPCRA Section 303 requires LEPCs to work with facilities handling EHS to develop response procedures, evacuation plans, and training programs for people who will be the first to respond in the event of an accident. Upon request, facility owners and operators are required to provide an LEPC with any additional information that it finds necessary to develop or implement an emergency plan.

EPCRA Section 304 requires that facilities immediately report a release of any EHS or any “hazardous substance” (a much broader category of chemicals defined under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 102(a)) that exceeds the reportable quantity to appropriate state, local, and federal officials.<sup>68</sup> Releases of a reportable quantity of a “hazardous substance” also must be reported to the National Response Center under CERCLA Section 103(a).<sup>69</sup> (For more on CERCLA, see CRS Report RL30798, *Environmental Laws: Summaries of Major Statutes Administered by the Environmental Protection Agency*, which includes a summary of CERCLA.) EPCRA Section 304 also would require reporting of any release above the reporting threshold for anhydrous ammonia.

As noted in the section above for ammonium nitrate, EPCRA Section 311 requires owners or operators of local facilities regulated by OSHA to submit an MSDS for each “hazardous chemical,” or a list of such chemicals, to the LEPC, the SERC, and the local fire department. The OSHA defines “hazardous chemicals,” but EPCRA Section 311(e)(5) excludes “fertilizer held for sale by a retailer to the ultimate customer” from this definition.

Also as described previously, EPCRA Section 312 requires the same employers to submit annually an emergency and hazardous chemical inventory form to the LEPC, SERC, and local fire department.

### **Clean Air Act, Section 112(r)**

As described above, the CAA Section 112(r)(7) requires owners and operators of covered facilities that produce, process, handle, or store certain extremely hazardous substances, including, but not necessarily limited to extremely hazardous substances under EPCRA, to submit Risk Management Plans (RMPs) to the EPA. RMPs summarize the potential threat of unanticipated emissions into the ambient air of certain dangerous chemicals and facilities’ plans to prevent such releases and mitigate any damage. Congress explicitly required planning for possible releases of anhydrous ammonia.

## **Policy Issues**

As congressional policymakers consider the ramifications of the explosion in West, TX, they may face several policy issues. These policy issues include the challenges arising from relying on reporting of chemical inventories by regulated facilities; the potential for omission and

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<sup>68</sup> Under CERCLA Section 102(a), a “hazardous substance” includes any “elements, compounds, mixtures, solutions, and substances which, when released into the environment may present a substantial danger to the public health or welfare or the environment.” Included in this definition are substances listed under the authority of any of the major environmental statutes (see CERCLA Section 101(14)).

<sup>69</sup> The term “release” is defined in CERCLA Section 101(22) to exclude a release which results in exposure to persons solely within a workplace and normal application of fertilizer.

duplication in existing regulatory reporting; the long intervals between inspection at many such facilities; the ability of federal, state, and local government agencies to share information effectively among themselves; and public and first-responder access to regulatory information.

## **Challenges from Reporting by Facilities**

Congressional policymakers might consider mechanisms to address the data quality issues arising from reporting by facilities. Regulatory programs often require facilities to report their chemical holdings, but such reporting creates the potential for the regulatory agency to be unaware if the facility does not report. This may be especially true for federal agencies that rely on state or local implementation of federal requirements. In addition, the quality of such information may be questioned due to its self-reported nature.<sup>70</sup> For example, the Government Accountability Office has found that DHS does not use self-report vulnerability assessment information in determining the security risk at chemical facilities.<sup>71</sup>

## **Lack of Harmonized Reporting**

Because different chemicals often have different reporting requirements, regulated entities often report different information to different regulating agencies. For example, as noted above, DHS, EPA, and state regulatory agencies receive different information; each chemical may fall under some, all, or no regulatory requirements due to particular exclusions or exemptions. Consequently, no central overview of facility chemical holdings exists, and may create the potential for inefficient regulation.

## **Inspection Rate**

Interested Members of Congress might focus upon the rate of inspection under the various regulatory programs. Under some federal programs, inspection has not occurred at a pace expected by policymakers. For example, the DHS Office of Inspector General reported that DHS had inspected 47 of approximately 4,400 facilities regulated under CFATS as of March 2013.<sup>72</sup> In 2009, the EPA Office of Inspector General reported that EPA had inspected less than half of the EPA-identified high-risk facilities and less than 35% of all facilities reporting under Section 112(r) of the Clean Air Act.<sup>73</sup> Inspection of facilities reporting their chemical holdings may increase the trustworthiness of supplied information. Also, regular inspection may yield benefits in enhanced compliance with best practices and regulatory adherence. Of course, increased inspection relies upon a substantial inspector cadre, which would require additional

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<sup>70</sup> The Tier II reporting document filed by West Fertilizer Company, for example, has several internal inconsistencies regarding its chemical inventory.

<sup>71</sup> Government Accountability Office, *Critical Infrastructure Protection: DHS Efforts to Assess Chemical Security Risk and Gather Feedback on Facility Outreach Can Be Strengthened*, GAO-13-353, April 2013.

<sup>72</sup> Office of Inspector General, Department of Homeland Security, *Effectiveness of the Infrastructure Security Compliance Division's Management Practices to Implement the Chemical Facility Anti-Terrorism Standards Program*, OIG-13-55, March 2013, p. 93.

<sup>73</sup> Office of Inspector General, Environmental Protection Agency, *EPA Can Improve Implementation of the Risk Management Program for Airborne Chemical Releases*, Report No. 09-P-0092, February 10, 2009, p. 15. See also Office of Inspector General, Environmental Protection Agency, *Improvements Needed in EPA Training and Oversight for Risk Management Program Inspections*, Report No. 13-P-0178, March 21, 2013.

appropriations for support. Similarly, delegation of inspection responsibilities for federal programs to state agencies might reduce the number of discrete inspections but increase the costs borne by those states. Conversely, additional efficiency might be achieved with a cross-trained inspectorate that might inspect a facility under all, or most, applicable regulatory regimes.

## **Ability of Government Agencies to Share Information Effectively**

Congressional policymakers have identified information sharing in the homeland security and intelligence context as a high priority following the events of September 11, 2001. The reported gap in information between EPA, which knew of the West Fertilizer Company's existence and its anhydrous ammonia holdings, and DHS, which did not, indicates a potential gap in information sharing among federal regulators. Similarly, information possessed by the state of Texas, which knew of the West Fertilizer Company's ammonium nitrate holdings, apparently did not reach DHS. Increased information sharing may also raise concern among industry stakeholders regarding the potential for inadvertent release of proprietary information due to the effects of aggregation and the increased need to transmit such information between different entities.

## **Public Access to Information**

Congressional policymakers have long been interested in the balance between providing public access to information regarding chemical hazards and limiting the potential for malicious use of such information.<sup>74</sup> Reporting under EPA regulation is intended to improve accident planning through increasing community and first-responder awareness of the potential for release of hazardous materials. First responders receive some of this information directly and residents of the surrounding community may obtain access to it. In contrast, DHS restricts information dissemination regarding security efforts at chemical facilities, partly in order to limit the ability of malicious actors to use such information for targeting purposes. The extent to which the residents and first responders of West, TX, knew of the potential hazards may provide insights into this balance and the effectiveness of community outreach efforts.

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<sup>74</sup> For example, Congress addressed this issue in the context of EPA plans to electronically publish potential consequence data from RMP submissions by barring such publication (Section 3 of P.L. 106-40, Chemical Safety Information, Site Security and Fuels Regulatory Relief Act). See also House Committee on Commerce, Subcommittee on Health and Environment and Subcommittee on Oversight and Investigations, "Internet Posting of Chemical 'Worst Case' Scenarios: A Roadmap for Terrorists," *Serial No. 106-3*, February 10, 1999.