

U.S. Chemical Safety and Hazard Investigation Board



Public Meeting
January 28, 2016

**West Fertilizer / Adair Grain Company
Ammonium Nitrate Fire and Explosion**

**West, Texas
April 17, 2013**





Investigation Team

- **Johnnie Banks, Supervisory Investigator**
- **Mike Corona, Attorney/Investigator**
- **Jerad Denton, Attorney/Investigator**
- **Beeta Lashkari, Attorney/Investigator**
- **Samuel Oyewole, Ph.D, Investigator**
- **Reepa Shroff, Investigator**
- **Lucy Sciallo-Tyler, Investigator**
- **Veronica Tinney, Recommendations Specialist**



Meeting Agenda

- **Video Overview of Incident**
- **Incident Description**
- **FGAN Hazards and Contributing Factors**
- **Inherently Safer Technology**
- **Insurance**
- **Land Use Planning**
- **Emergency Response**



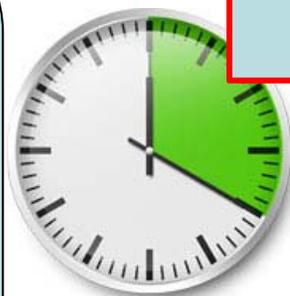
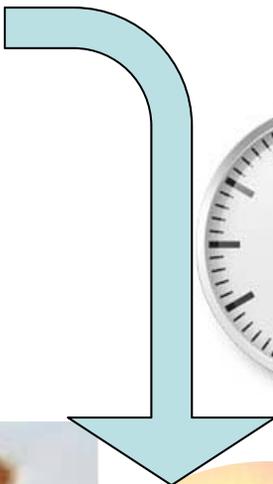
Meeting Agenda (Continued)

- **Regulatory Analysis**
- **Key Findings**
- **Recommendations**
- **Board Q&A**
- **Intermission (10 minutes)**
- **Public Comment**
- **Board Deliberations**
- **Board Vote**





Consequences



**Less than 20
Minutes**

**15
Fatalities**

- 12 Firefighters and EMTs
- 3 Community Members

Injuries

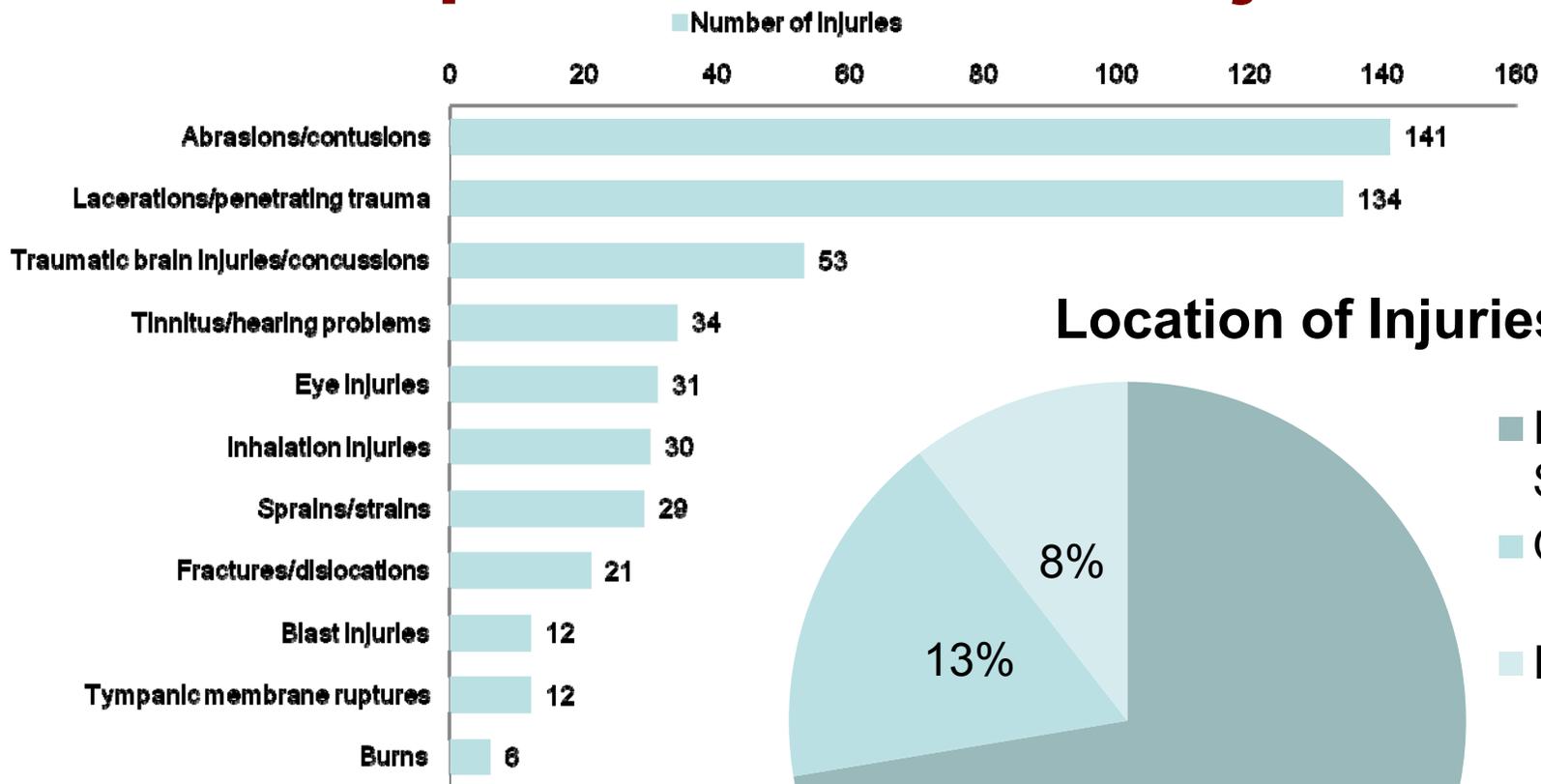
- Over 260 Community Members and Emergency Responders

**Community
Damage**

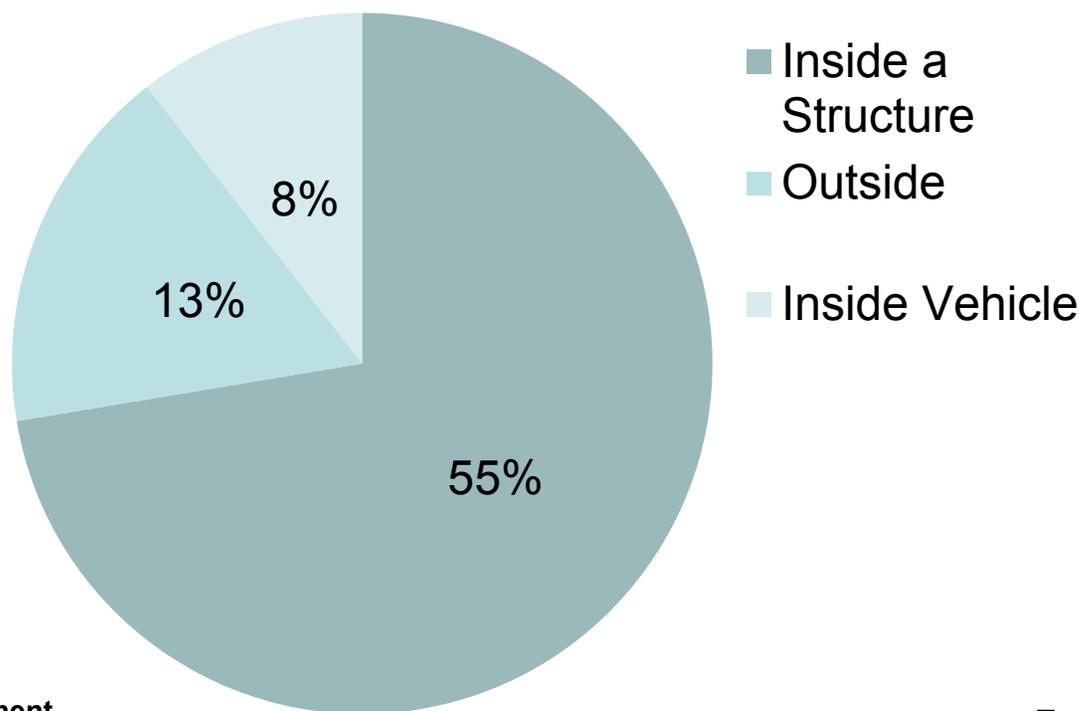
- Apartment Complex
- Schools
- Nursing Home
- Private Residences 6



252 Explosion-Related Injuries



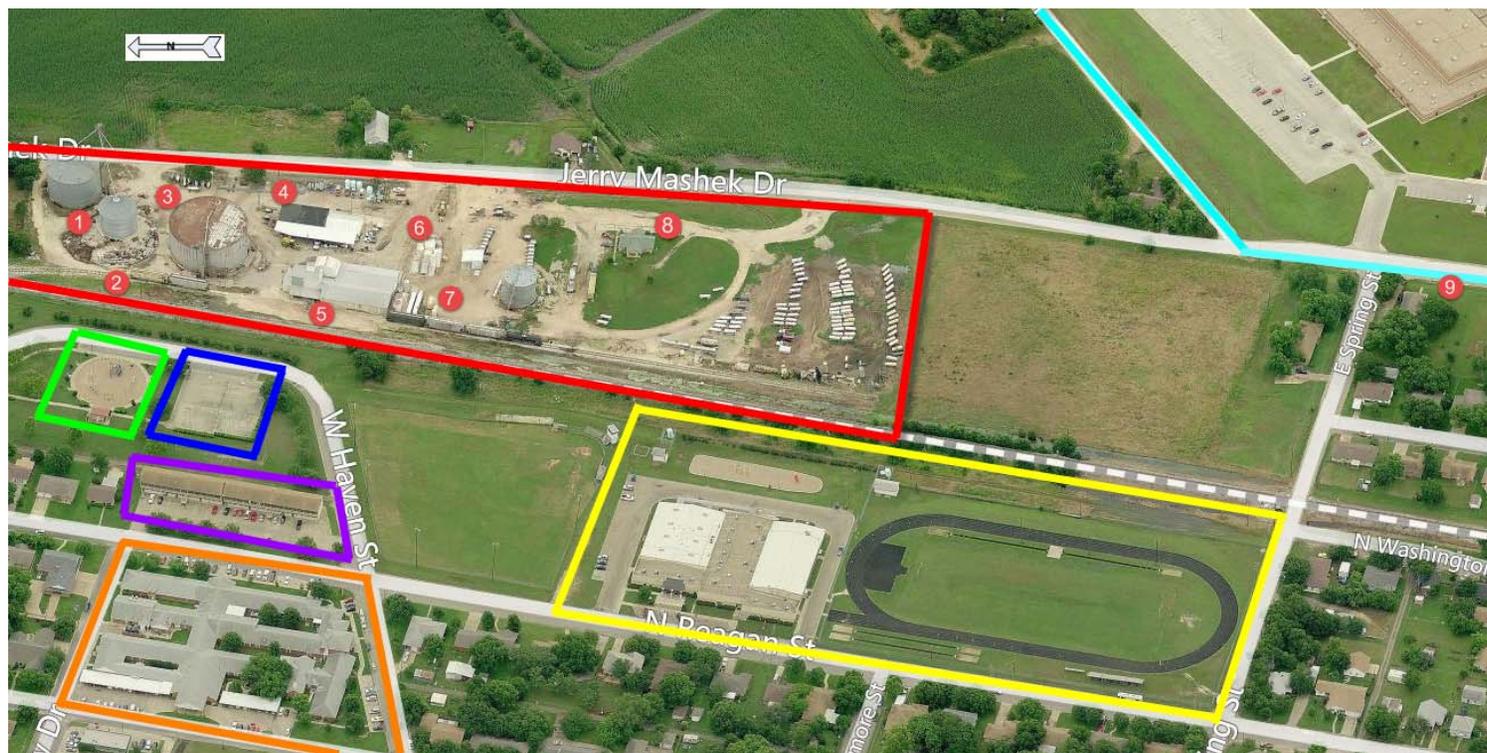
Location of Injuries



Source: Waco-McLennan County Public Health Department



WFC Overview



City of West Legend	Approximate Distance from Seat of Blast to Fenceline (Feet)
 West Fertilizer Company	0
 West High School	1,157
 West Intermediate School	552
 Basketball Court	249
 Playground	366
 West Terrace Apartment Complex	454
 West Rest Haven Nursing Home	629

WFC Facility Legend	
1	Grain Silos
2	Location of Overturned FGAN Railcar (post-explosion)
3	Corn Silo
4	Office/Chemical Storage
5	Fertilizer Building
6	Liquid Fertilizer Tanks
7	Anhydrous Ammonia Pressure Vessels
8	Scale House
9	Nearest Fire Hydrant



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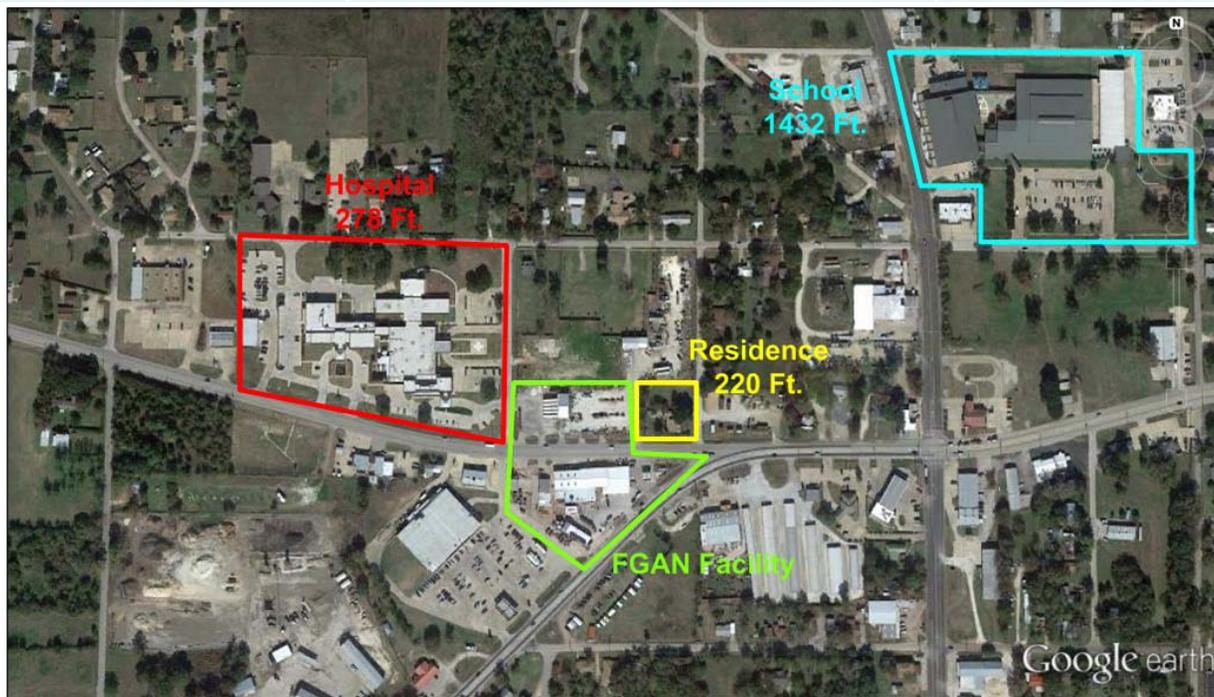
Blast Wave - Intermediate School





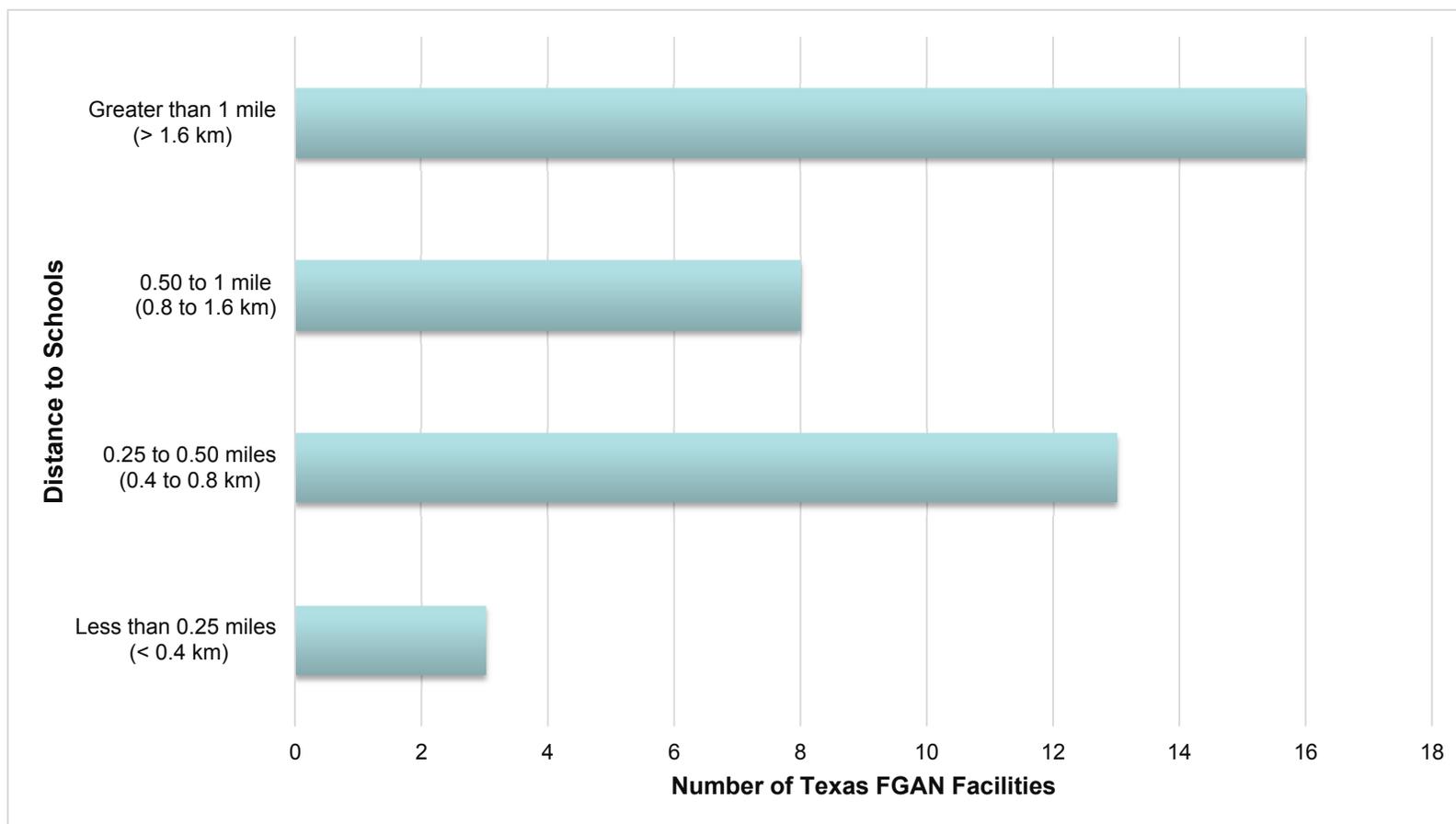
FGAN Facilities in Texas and the Potential for Offsite Consequences

Community Structure	West Fertilizer Company	Example of an FGAN Facility in Texas
School	552 Feet	1,432 Feet
Healthcare Facility	629 Feet	278 Feet
Residence	287 Feet	220 Feet



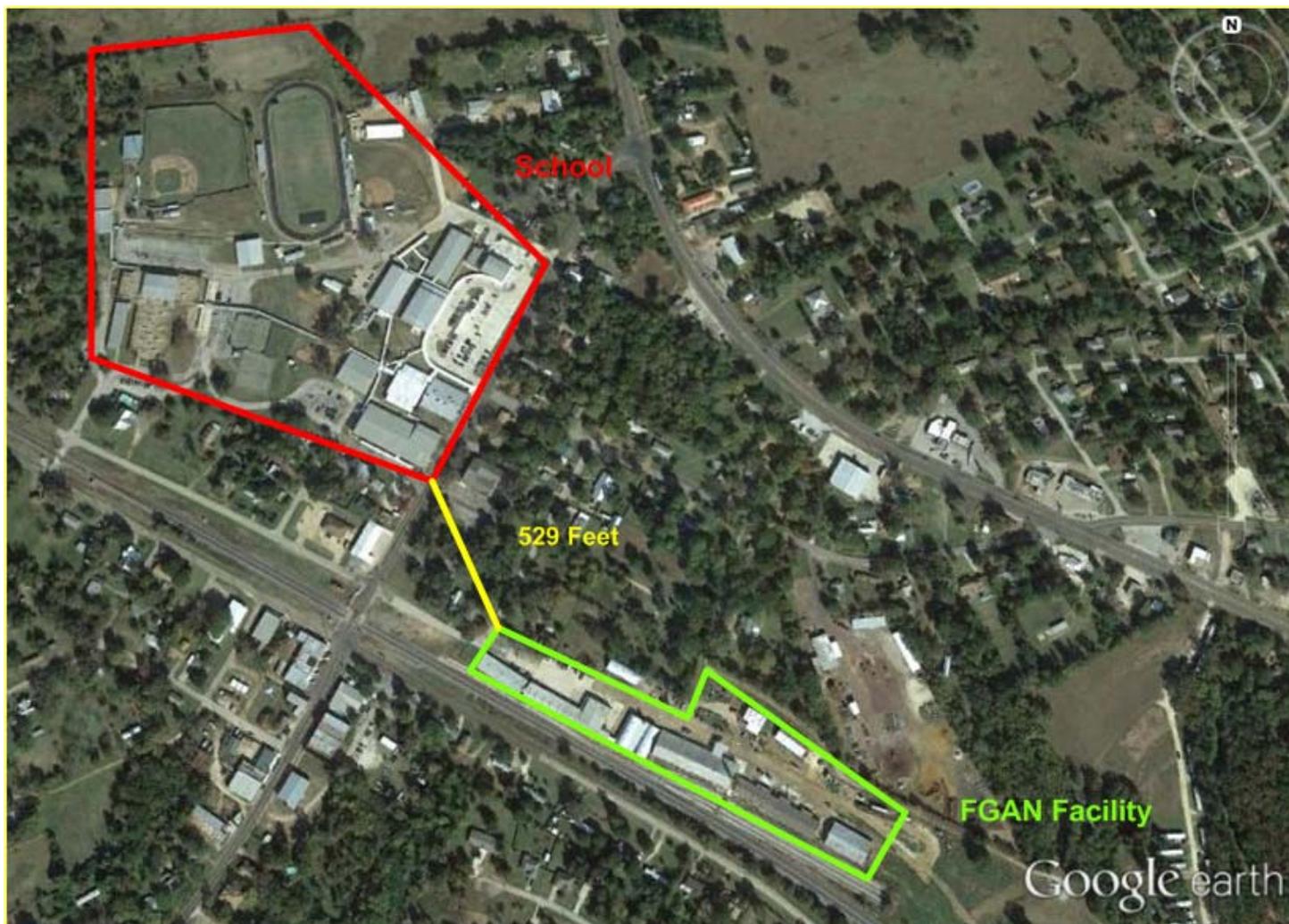


Proximity of FGAN Facilities to Schools Throughout Texas





Proximity of FGAN Facility to School in Texas





Blast Wave - West Terrace Apartments





Blast Wave - Rest Haven Nursing Home





Video Footage of Community Property Damage





Virtual Tour of WFC and Fertilizer Building



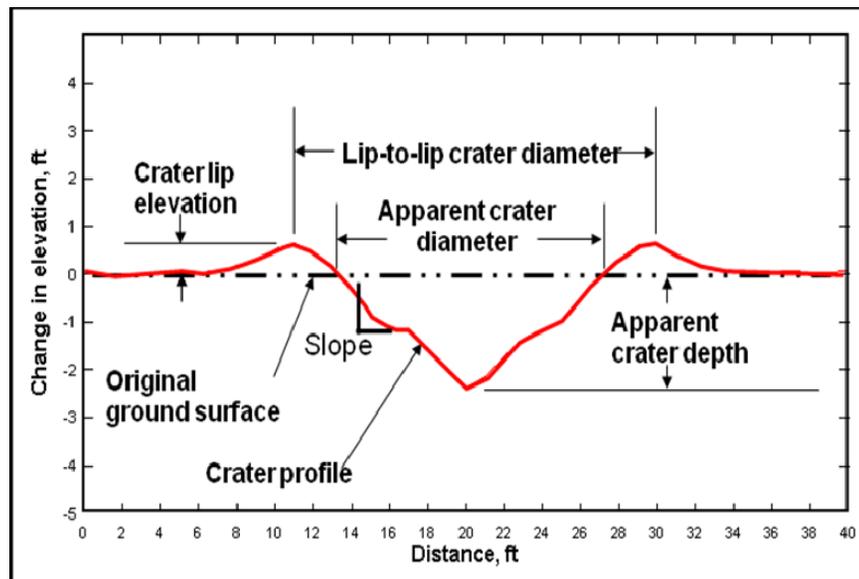


Overview of Fertilizer Building - Crater Under AN Bin





Crater Dimensions



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FGAN Hazards and Contributing Factors





Fertilizer Grade Ammonium Nitrate (FGAN)



Prills (pellets) of FGAN piled in
wooden storage bin





Hazards of Ammonium Nitrate

Fertilizer Grade
Ammonium Nitrate (FGAN)



- High-density Prill
- Division 5.1 Oxidizer

Technical (Explosive) Grade
Ammonium Nitrate (TGAN)



- Low-density Prill
- Division 5.1 Oxidizer





Hazards of Ammonium Nitrate

3

MAIN HAZARDS

in fire situations:



AN is **unpredictable** when exposed to fire.
Always assume an AN fire can detonate.

1. Uncontrollable Fire

- Oxidizing properties support combustion
- Can increase the flammability or explosibility (or both) of other combustible substances when it decomposes after exposure to heat

2. Decomposition

- Can produce toxic and flammable by-products during thermal decomposition
- The reactions release gases such as nitric acid (HNO_3), ammonia (NH_3), nitrogen oxides (NO , NO_2), nitrous oxide (N_2O), nitrogen, oxygen, and water vapor

3. Explosion

- May undergo detonation when heated under confinement
- Contaminants such as combustible materials, metal fines, flammable liquids, and sulfurs can decrease AN stability and increase its sensitivity to detonation



West Fertilizer Fire and Explosion: Contributing Factors

- 1. Contamination of the FGAN pile**
- 2. Heating and ventilation inside the fertilizer building**



Contamination of the FGAN pile

- **Combustible construction materials**
- **Storage of combustible materials near the FGAN pile**
- **PVC and roofing materials**



Combustible Construction





Combustible Construction

- **In fires, FGAN-saturated wood burns with greater intensity**
- **The wood constructed bins at WFC likely led to the intensity and spread of the fire throughout the fertilizer building**



Heating and Ventilation

- Oxygen depleted as the fire progressed from the seed room



Cupola with
ventilation
louvers on top

Limited
ventilation at
ground level



Heating and Ventilation



**7:42 pm:
Darker smoke observed**



Heating and Ventilation



**7:45 pm:
Lighter smoke observed**

Larger fire



Historical FGAN Explosions

- **Most explosions resulted from a massive fire**
- **Occurred within 20 min. to 1 hour from the initial report of the fire**
- **Slight variations in storage conditions, such as ventilation, construction materials, or nearby combustible storage can impact AN detonability during fires**

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Inherently Safer Technology

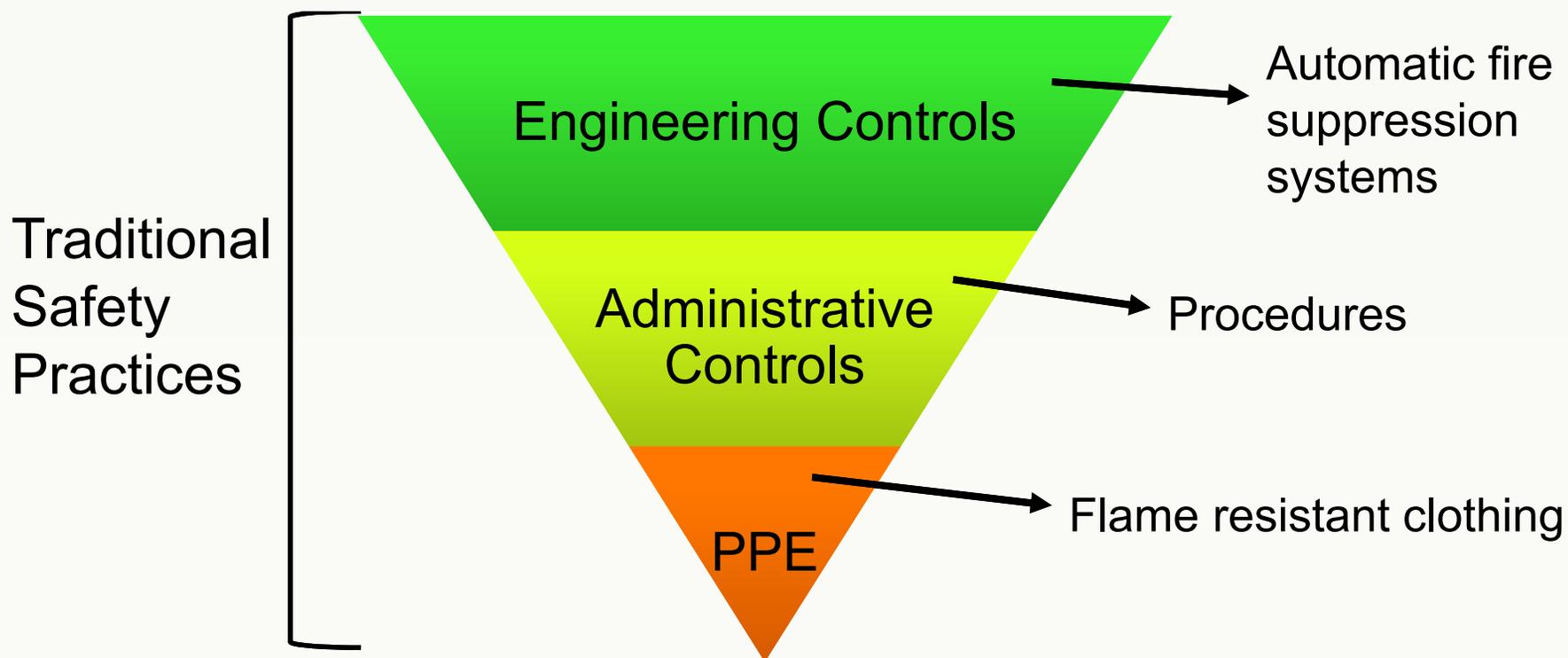


Inherently Safer Technology (IST)

- **Under certain conditions FGAN is inherently dangerous:**
 - **Oxidizer**
 - **Used to manufacture explosives**
- **Traditional safety practices can be used to control FGAN fire and explosion hazards, however the concept of IST can further reduce or eliminate the risk of consequences.**

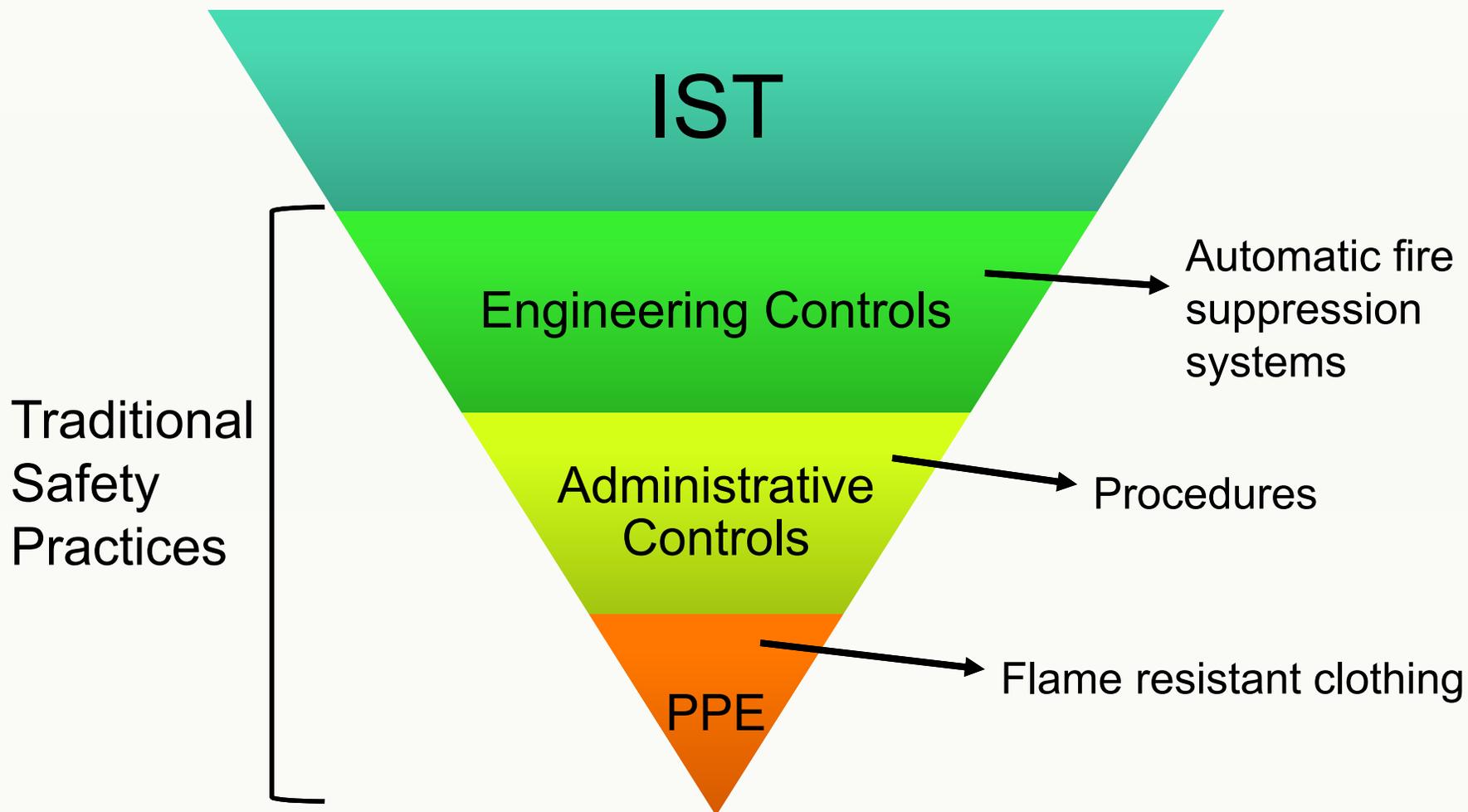


Inherently Safer Technology



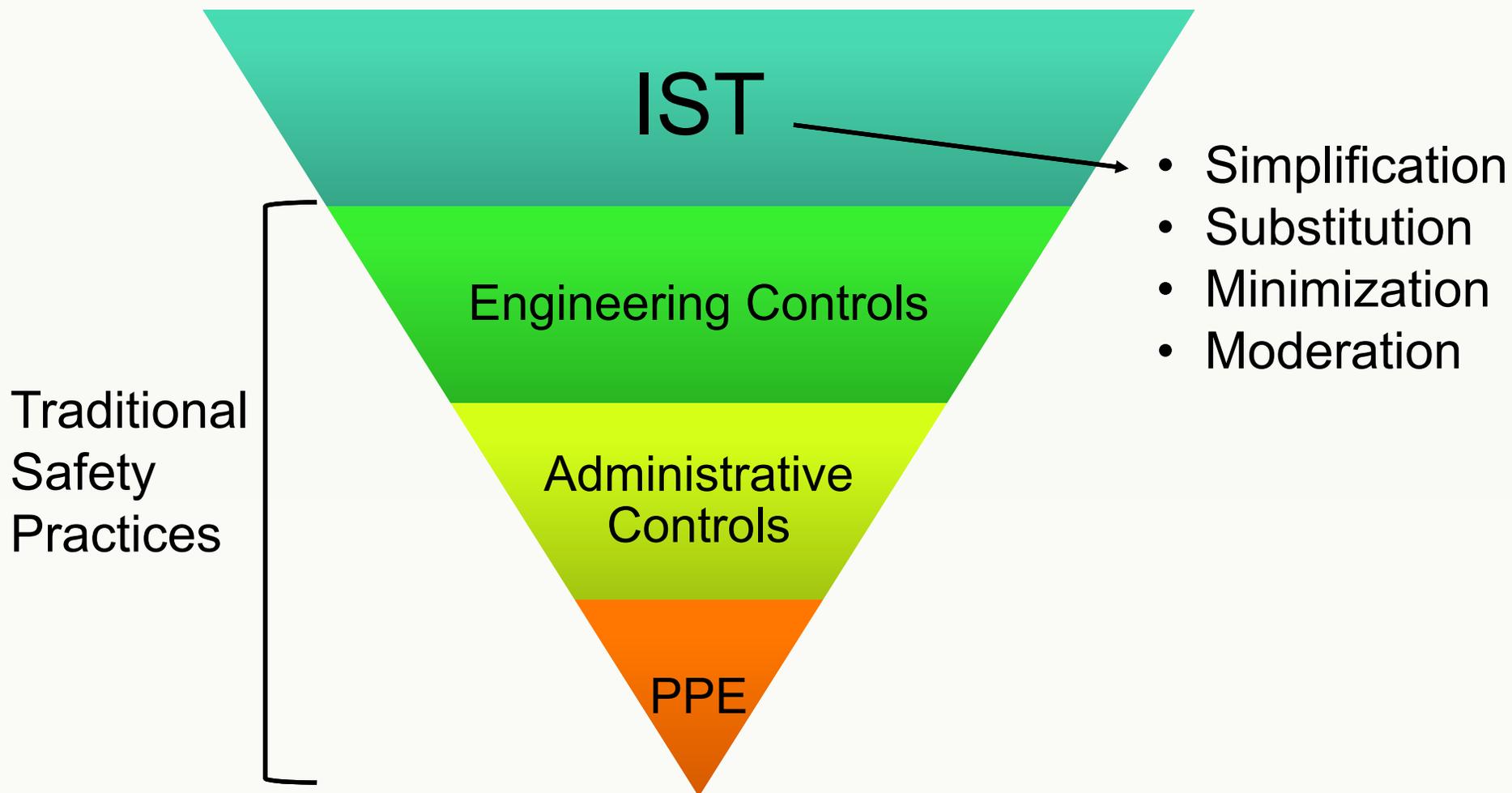


Inherently Safer Technology





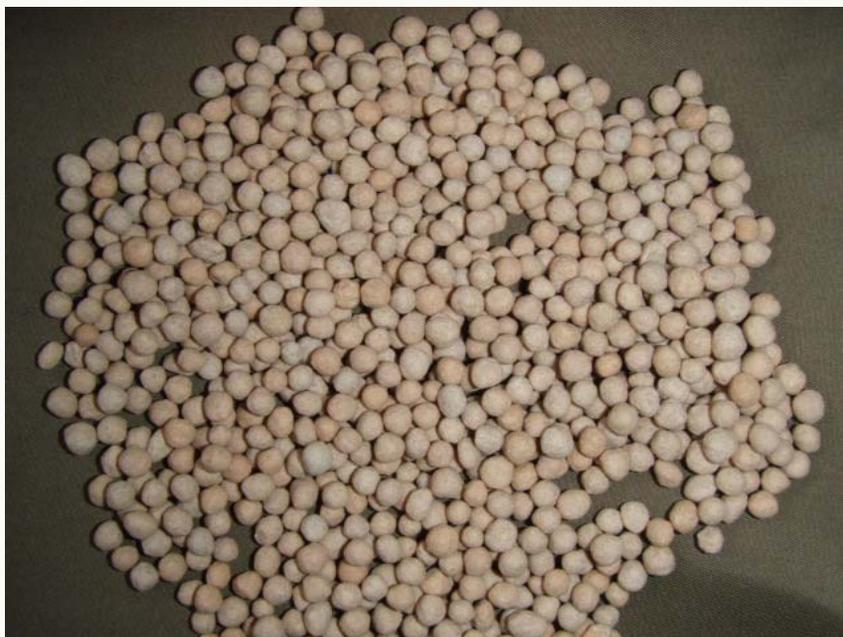
Inherently Safer Technology





Applying IST to FGAN

Alternate Formulations



Source: Nutricarefertilisers.com

Inherently Safer Building Design





Alternate Formulations of FGAN

- **Modify or substitute the formulation of FGAN, making it less susceptible to a fire or explosion**
 - Adding inert chemicals during prill manufacture
 - Applying inert coatings
 - Diluting FGAN in mixtures of fire retardant chemicals



Alternate Formulations of FGAN

- **Hundreds of formulations have been introduced**

Calcium Ammonium Nitrate	AN and calcium carbonate
ASN-26	AN fused with ammonium sulfate
Ferti-Safe	Fly-ash and gypsum coated AN

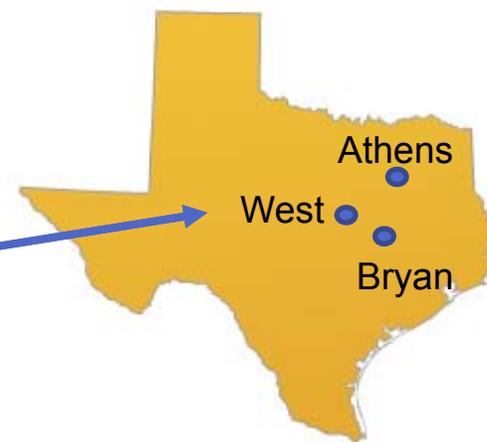
- **Limited large scale testing in sustained fires**
- **Further testing to determine agricultural compatibility**



Inherently Safe Building Design

- **Modify the conditions in which FGAN is stored to eliminate the possibility of a massive fire and explosion**

Prior to the fires in Athens, Bryan and West, the FGAN facilities were constructed with combustible materials and had limited fire safety features.

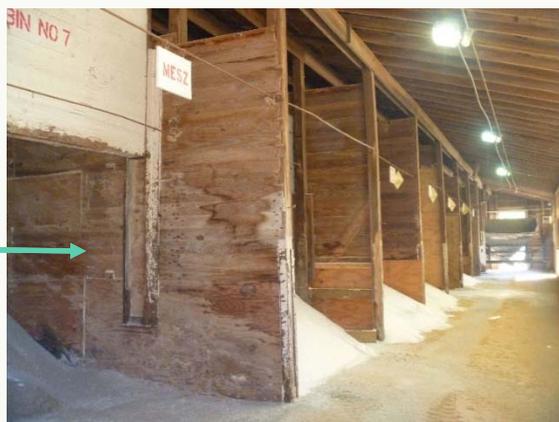




Inherently Safer Building Design

Traditional Storage Practices

Wooden
FGAN
storage
bins



Wooden
construction
materials



Safer Storage Options

Concrete
bins



Concrete
storage
dome



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Insurance Inspections





WFC's Insurance Coverage

- **Policies held by WFC in 2013:**
 - Commercial Property
 - General Liability
 - Commercial Automobile
 - Inland Marine (property in transit)
- **Coverage by Triangle Insurance**
 - 2007-2009
- **Coverage by U.S. Fire Insurance**
 - 2010-2013



Triangle Insurance 2007-2009

- **Triangle conducted annual loss control inspections in 2006 through 2009**
 - **Made several recommendations for safety improvements**
 - **Some remained outstanding**
- **2006 initial inspection**
 - **RMP for anhydrous ammonia was out of date**



Triangle Insurance Inspections

- 2007 and 2008 inspections revealed electrical wiring hazards



Corroded 440 volt wire



Corroded aluminum ground wire



Triangle Insurance Inspections

- **2009 annual loss control inspection**
 - Noted “written programs are outdated and there is no structured safety program”
- **Due to lack of compliance, Triangle decided not to renew WFC insurance policy for 2010**



U.S. Fire Insurance

- **WFC obtained an insurance policy from U.S. Fire**
- **No documentation of onsite inspections from 2010-2013**



Texas Insurance Requirements

- **WFC was not required to obtain property or liability insurance**
- **Texas only requires certain businesses to obtain liability insurance**

Business/Operation	Minimum Amount
Amusement ride operators	\$1.5 million
Elevator/escalator contractors	\$1.5 million
Mold assessors and remediators	\$1 million
Electricians	\$600,000
Residential appliance installers	\$600,000
Plumbers	\$300,000
Tow truck operators	\$300,000
Structural pest control providers	\$300,000
Used automotive parts recyclers	\$250,000
Air conditioning service providers	\$200,000



Insurance Inspections

- **Compliment government oversight by identifying hazards and reducing losses through the insurance process**
- **Reinforces government regulations and industry practices**
- **Insurance audits can be more frequent than state or federal enforcement activities**



Insurance Inspections at WFC

- **Triangle's loss control surveys did not focus on FGAN**
- **U.S. Fire provided no documentation of onsite inspections**



Insurance Inspections

- Previous incidents demonstrate the risk imposed by FGAN facilities on Texas communities



- CSB recommends TDI issue guidance for insurers to focus on FGAN hazards

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Land Use Planning





West, Texas – Before and After





Land Use Planning

- **Why was the City of West located so close to the WFC facility?**
 - **The City expanded in the direction of the WFC facility over time**
 - The WFC facility was constructed and began operations in 1962
 - **A lack of zoning regulations**
 - At the local, state, and federal levels



West Through the Years



Fertilizer
Facility
2013



Land Use Planning

- Zoning codes are typically adopted as ordinances at the county or local level
- However, at all levels of government there has been a failure to adopt codes concerning the siting of many types of hazardous facilities near communities
 - This includes FGAN facilities



Land Use Planning

- Land use planning and zoning codes typically do not apply to existing AN storage facilities
- Facilities that are covered:
 - Facilities constructed after zoning codes haven't been enacted
 - Existing facilities which undergo significant modifications after code enactment

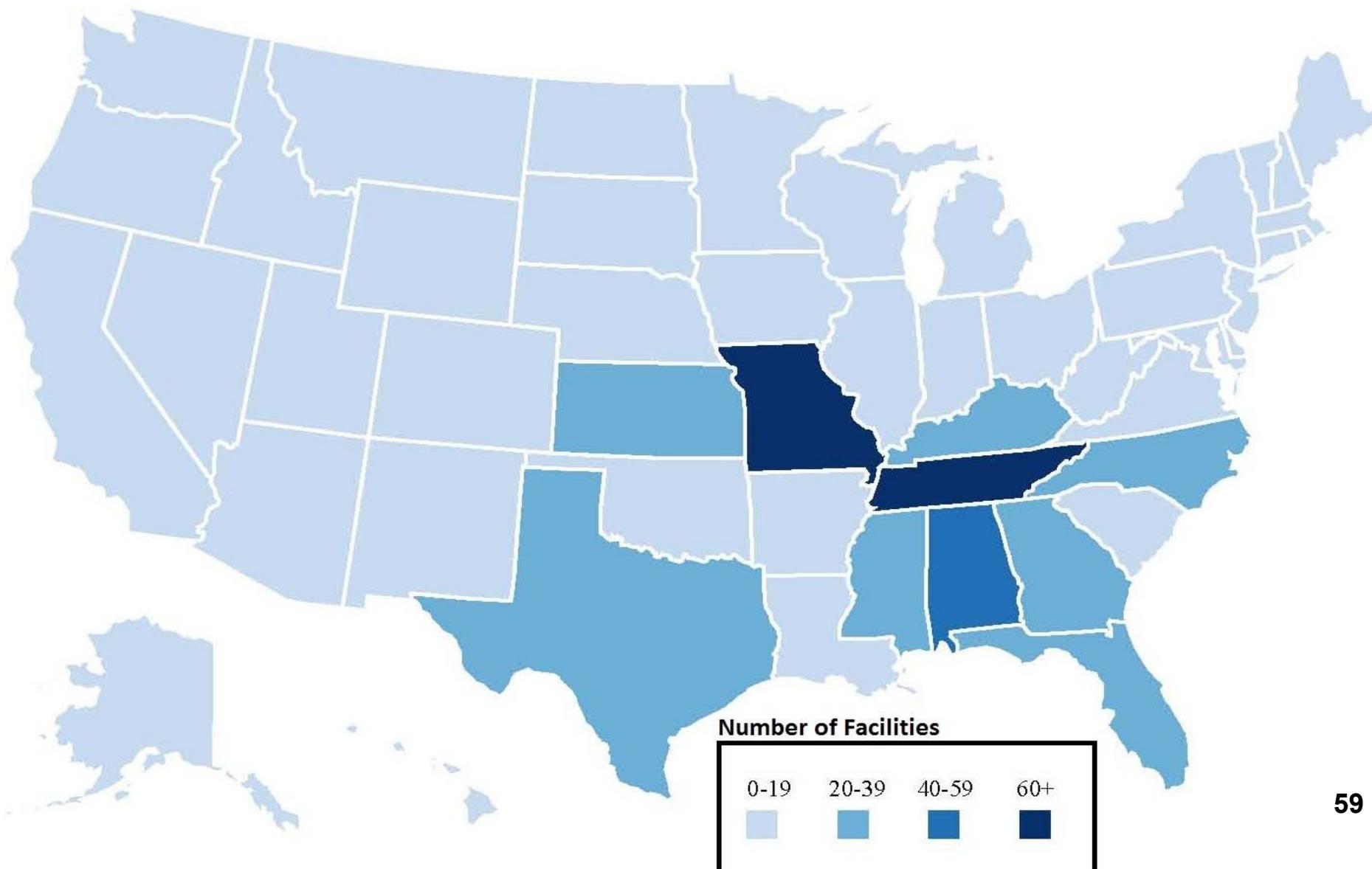


Land Use Planning

- **The issue of locating AN facilities near the community is not limited to the WFC incident**
 - **There are over 1,350 bulk AN retail facilities nationwide**
- **In Texas alone, the CSB identified 19 FGAN facilities in the State being located within a half-mile of a school**



AN Fertilizer Storage





CSB Investigations with Land Use Issues

- Land use issues have been identified in prior CSB investigations involving other hazardous chemicals and various public receptors

- **13 CSB investigations:**
 - 6 offsite fatalities
 - 15,670 injured or sought medical treatment





Addressing Land Use after West

- Land use and zoning remain at a county or local level in Texas
- The City of West plans to site any new fertilizer facilities away from the community
- The McLennan County LEPC agreed to focus on “upfront planning” when siting community buildings near chemical facilities



Addressing Land Use after West

- **The SFMOs is providing software demonstrations to all counties that estimate blast impacts from FGAN storage facilities**
- **The Fire Protection Research Foundation, sponsored by the NFPA, has engaged in an effort to further develop separation distances for NFPA codes that can be adopted at a state level**



Addressing Land Use after West

- **The International Building Code has established separation distances for the storage of oxidizers**
- **Land use planning and zoning remains an important issue for the CSB**
 - **CSB plans to study the issue of locating communities within proximity of chemical facilities**

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Emergency Response





Emergency Response





Emergency Response





Emergency Response

- **The explosion fatally injured emergency responders and nearby residents**

Organization	Casualties
West Volunteer Fire Department	5
Abbott Volunteer Fire Department	2
Navarro Mills Volunteer Fire Department	1
Dallas Fire Department	1
EMT (West Volunteer Fire Department)	1
Members of the public	5



Key Contributing Factors

- **Incident command system**
- **Incident management system**
- **HAZMAT Training**
- **Pre-incident planning**
- **Limited and conflicting technical guidance on FGAN**
 - **Inconsistent firefighting measures**



Lack of Incident Command System

- **Incident command system was not established**
 - **No evidence of routine NIMS process**
 - **No evidence of discussion on who should be Incident Commander**
 - **No prior IC experience with industrial fires**



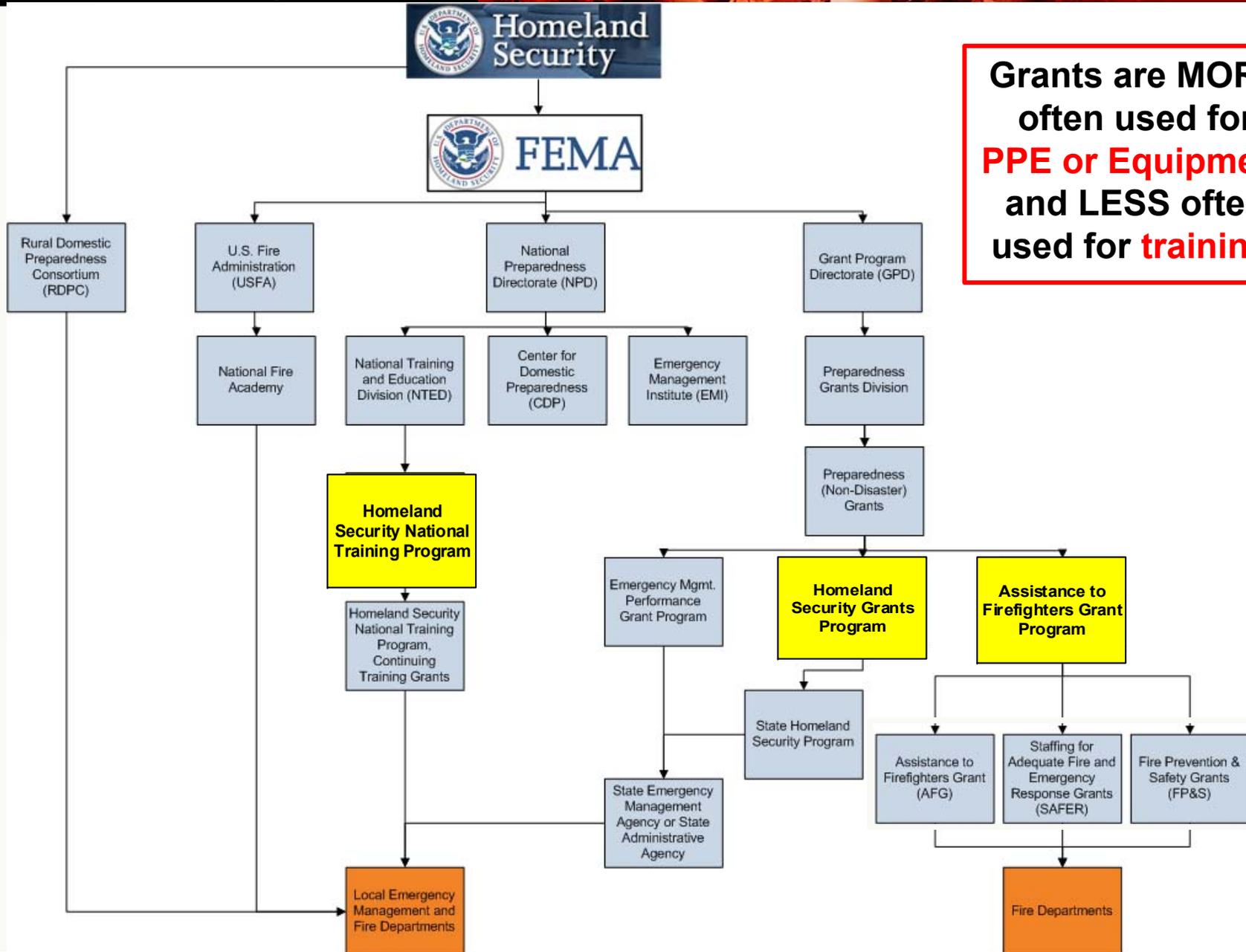
Lack of Established Incident Management System (IMS)

- **IMS not effectively set up, implemented, or coordinated**
 - **Public emergency alert systems not activated before explosion**
- **Residents left unaware of risk**
 - **Watched fire from inside their homes and vehicles or from the street**
 - **Placed within range of high-pressure blast wave and debris**



HAZMAT Training & Knowledge

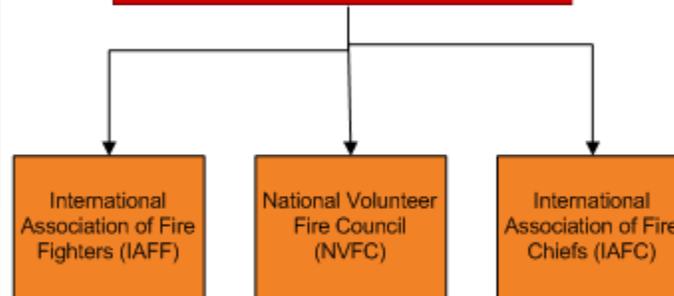
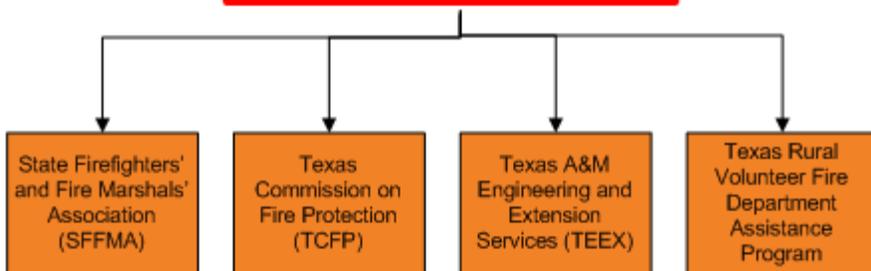
- **Lack of knowledge and understanding of FGAN detonation hazards**
 - Few responding firefighters had HAZMAT training
 - Hazards and severity of FGAN incidents not addressed in HAZMAT training



Grants are MORE often used for PPE or Equipment and LESS often used for training.



Firefighting Training Organizations and Programs in Texas & Nationwide





Lack of Pre-Incident Planning

- **Pre-incident planning for FGAN not conducted**
 - No anticipation of possible FGAN explosion
 - Efforts concentrated on anhydrous ammonia tanks
- **Anhydrous ammonia drills conducted**
 - None focused on FGAN-related fire



Lack of Pre-Incident Planning

- **Pre-incident planning provides the foundation for decision-making during an emergency**
 - **NFPA 1620 Standard for Pre-Incident Planning (2010 Edition)**
- **Pre-incident plan development depends on volunteer fire departments**
- **Currently, no federal agency regulates municipal fire departments in the U.S.**



Situational Awareness & Risk Assessment Knowledge

- **Firefighters must rapidly 'size-up' any fire situation and make quick, informed decisions**
 - **NFPA 472, Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents (2013 Edition)**
- **Firefighters' training courses provided limited information**



Conflicting Firefighting Guidance

El Dorado SDS for FGAN (2000)	CF Industries SDS for FGAN (2012)	NFPA 400 (2013) Annex E (Section E.2.1)	DOT ERG (2012)
If confined when an ignition occurs, an explosion may occur.	FGAN may undergo detonation if heated under confinement.	Should a fire break out in an area where FGAN is stored, keep mass cool and promptly extinguish the burning.	FGAN may explode from heat or contamination.
Flood with water.	Flood fire area from a distance .	Apply large volumes of water as quickly as possible.	Flood large fire with water from a distance .
Fire fighters should wear property protective equipment and self contained breathing apparatus.	For massive fires, use unmanned fire nozzles if this is impossible, withdraw from area and let burn.	If fires reach massive and uncontrollable proportions, fire-fighting personnel should evacuate the area and withdraw to a safe location .	For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

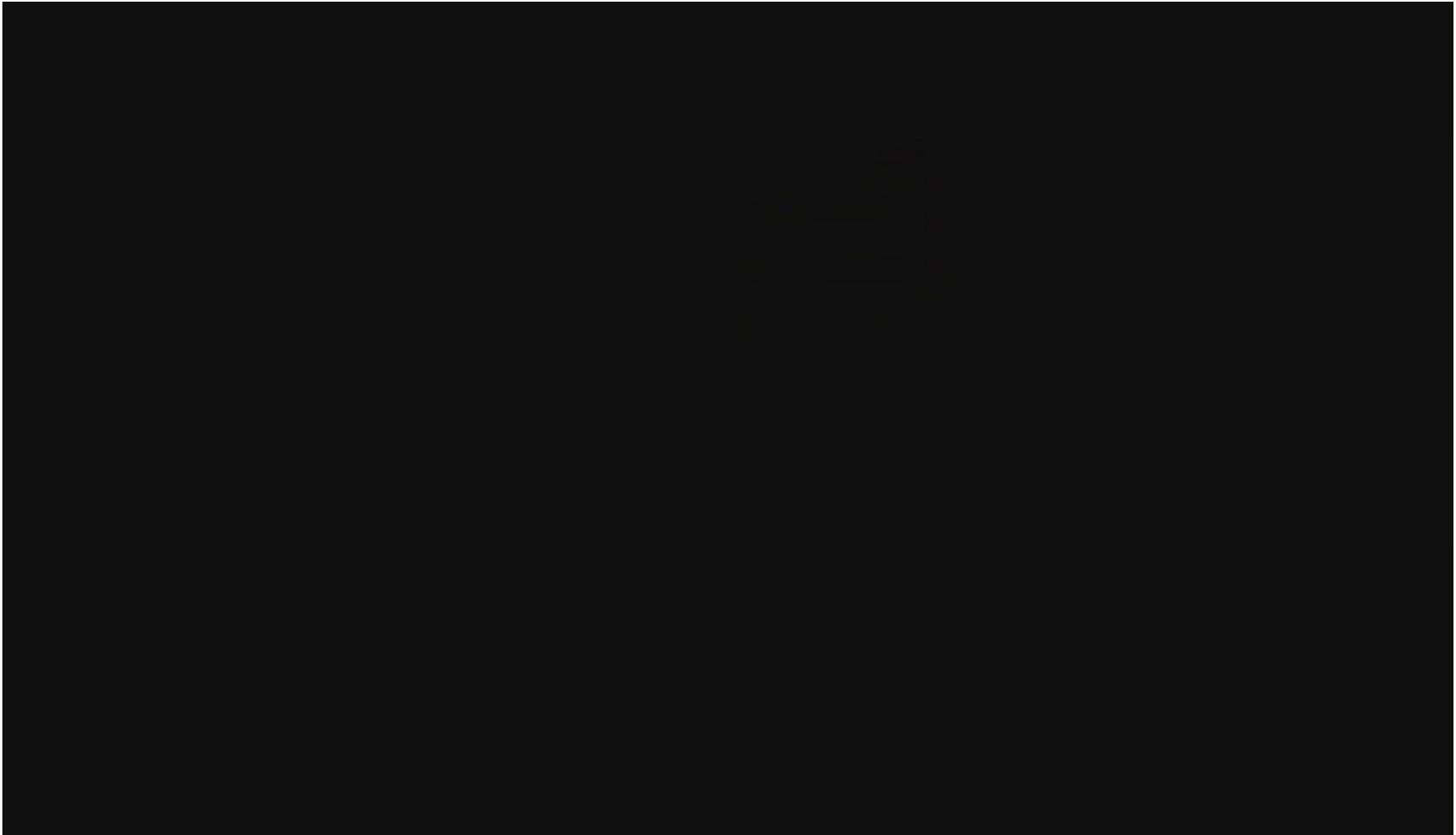


Lessons Not Learned

- **Previous lessons learned from firefighter fatalities and emergency response to FGAN incidents were not effectively disseminated to firefighters and emergency responders in other communities where FGAN is stored or utilized**



Lessons Not Learned



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Regulatory Analysis





Agency	OSHA		EPA	
Rule	Explosives and Blasting Agents Standard	Process Safety Management Standard	Risk Management Program Rule	Emergency Planning and Community Right-to-Know Act
Requirements	Based on prior versions of NFPA Codes (has not been revised since 1971)	Covered processes must follow 14 minimum performance-based elements	Based on Program Level classification for covered processes	Emergency planning and reporting sections based on chemicals covered at specified thresholds
Applicability	Storage, use, and transportation of explosives and blasting agents	Chemicals at or above specified threshold quantities on the PSM list of covered chemicals	Substances at or above specified threshold quantities on the RMP list of covered flammables and toxics	Substances and chemicals covered at specified thresholds
Covers FGAN	✓	✗	✗	✓
WFC Compliance	✗	✓	✓	✓



Executive Order (EO) 13650: Improving Chemical Facility Safety and Security

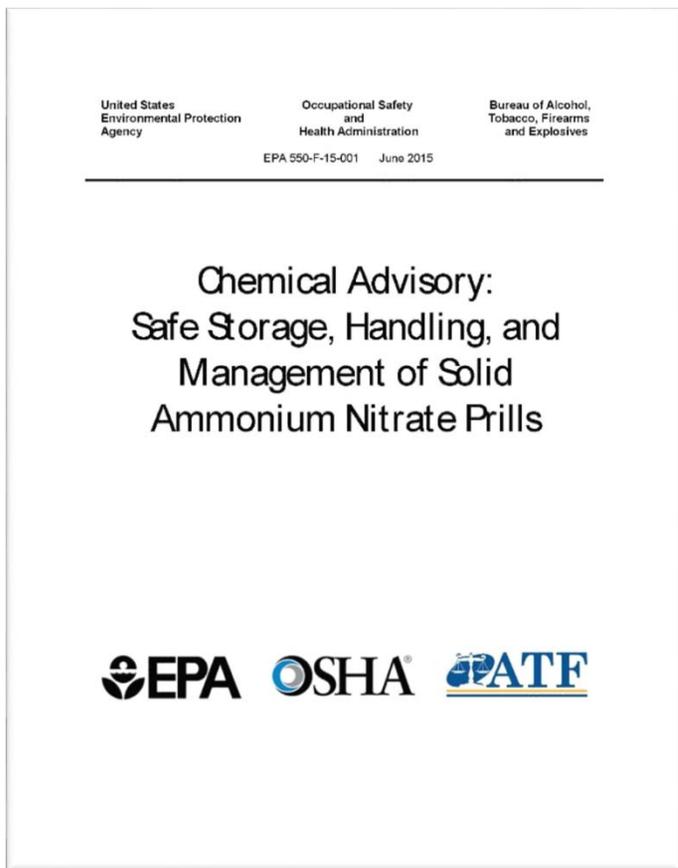


- **Issued on August 1, 2013**
- **Created EO Working Group, co-chaired by OSHA, EPA, and DHS**
 - **Tasked to improve operational coordination with state, local, and tribal partners, enhance Federal coordination, improve information collection and sharing, modernize key policies, regulations, and standards, and identify best practices**

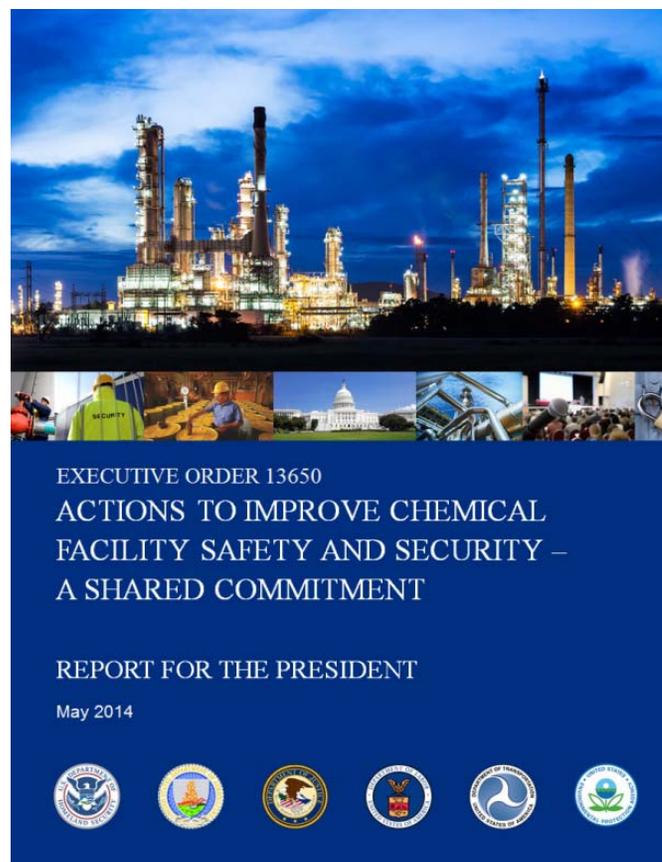


Executive Order (EO) 13650: Improving Chemical Facility Safety and Security

Chemical Advisory: Safe Storage, Handling, and Management of FGAN (August 2013, revised June 2015)



Actions to Improve Chemical Facility Safety and Security – A Shared Commitment (June 2014)





OSHA Explosives and Blasting Agents Standard (29 CFR 1910.109)

- Regulates the storage, use, and transportation of explosives and blasting agents
- Specifies safety requirements for various grades of AN, including FGAN

1910.109(i)(1)(i)(a)

Except as provided in paragraph (i)(1)(i)(d) of this paragraph applies to the storage of ammonium nitrate in the form of crystals, flakes, grains, or prills including fertilizer grade, dynamite grade, nitrous oxide grade, technical grade, and other mixtures containing 60 percent or more ammonium nitrate by weight but does not apply to blasting agents.



OSHA Explosives and Blasting Agents Standard (29 CFR 1910.109)

- Fertilizer industry unfamiliar with standard applicability at the time of the incident
 - OSHA has since worked to increase awareness

Title does not suggest applicability to fertilizer

FGAN not included in definition

- Unclear scope

- **Part Number:** 1910
- **Part Title:** Occupational Safety and Health Standards
- **Subpart:** H
- **Subpart Title:** Hazardous Materials
- **Standard Number:** 1910.109
- **Title:** Explosives and blasting agents.
- **GPO Source:** e-CFR

1910.109(a)

"Definitions applicable to this section".

1910.109(a)(1)

"Blasting agent." Blasting agent - any material or mixture, consisting of a fuel an which none of the ingredients are classified as an explosive, provided that the fir detonated by means of a No. 8 test blasting cap when unconfined.

1910.109(a)(2)

"Explosive-actuated power devices." Explosive-actuated power device - any tool propellant-actuated power devices. Examples of explosive-actuated power device

1910.109(a)(3)

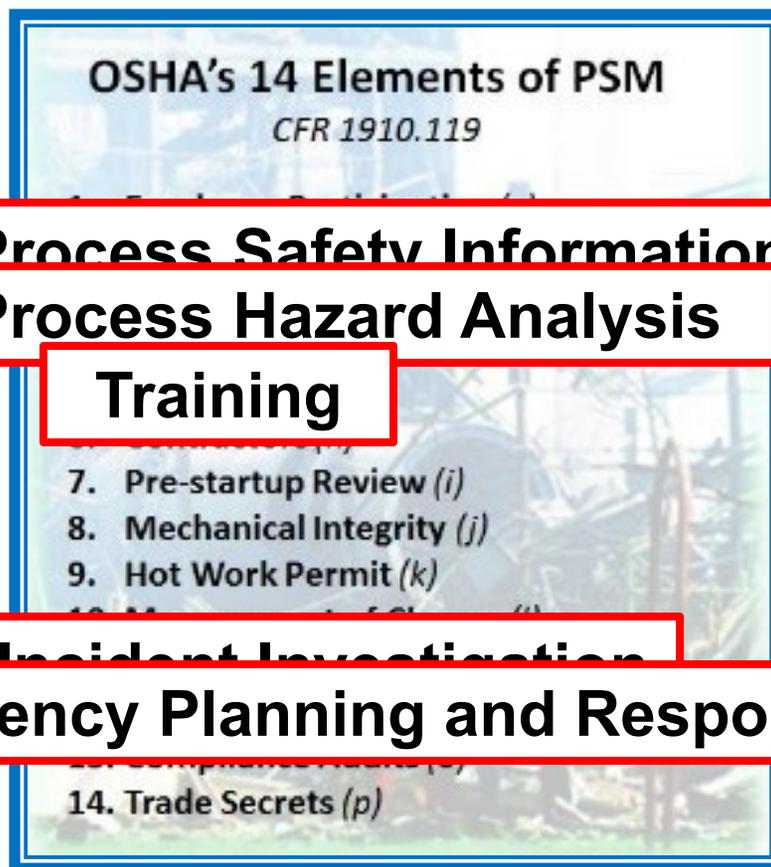
1910.109(a)(3)

"Explosive." Explosive - any chemical compound, mixture, or device, the primary instantaneous release of gas and heat, unless such compound, mixture, or devic see 49 CFR chapter I. The term "explosives" shall include all material which is cl Transportation, and includes, but is not limited to dynamite, black powder, pellet fuse lighters, fuse igniters, squibs, cordeau detonant fuse, instantaneous fuse, ic smokeless propellant cartridges for propellant-actuated power devices, and cart



OSHA Process Safety Management Standard (29 CFR 1910.119)

- Contains requirements to prevent or minimize the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals
- Applies to processes that involve a chemical on the PSM list at or above a specified threshold quantity
 - More than 130 toxic and reactive chemicals
 - Flammable liquids and
- “Process” means any activity involving a highly hazardous chemical





Application of PSM to FGAN & WFC

- CSB found that OSHA omitted FGAN from the PSM list
 - FGAN possesses reactive characteristics that would have triggered inclusion
 - **CSB believes FGAN should be included on the PSM list**
- Anhydrous ammonia is on the PSM list at a threshold quantity of 10,000 pounds
 - WFC stored 34,000 pounds at the time of the incident
 - WFC should have adhered to PSM, but it did not do so due to an exemption

Ammonium Nitrate

Colorless crystals; odorless. Irritating to eyes/skin/respiratory tract. **ALSO causes difficulty breathing, acidic urine, systemic acidosis, and abnormal hemoglobin.** Strong oxidizer capable of igniting combustible materials.

CAS No. 6484-52-2

Anhydrous Ammonia

HEALTH HAZARD

4 Deadly
3 Extreme Danger
2 Hazardous
1 Slightly Hazardous
0 Normal Material

FIRE HAZARD Flash Points:

4 Below 73°F
3 Below 100°F
2 Below 200°F
1 Above 200°F
0 Will Not Burn

INSTABILITY

4 May Detonate
3 Shock + Heat may Detonate
2 Violent Chemical Change
1 Unstable if Heated
0 Stable

SPECIFIC HAZARD

OX Oxidizer ACID Acid
ALK Alkaline COR Corrosive
W Use No Water ☣ Radioactive
SA Simple Asphyxiant



EPA Risk Management Program Rule (40 CFR Part 68)

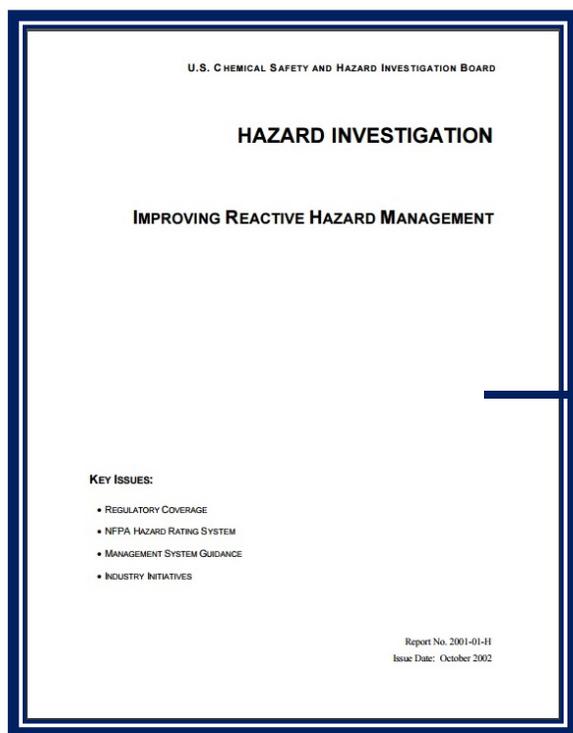


- Intended to prevent or minimize the consequences of accidental releases of toxic or flammable substances
- Applies to facilities that contain a substance on the RMP list at or above the substance's specified threshold quantity
 - Processes are then categorized into three program levels, depending on size and risk level
- Covered facilities must:
 1. Perform a hazard assessment
 2. Establish an emergency response program
 3. Develop a Risk Management Plan and submit it to EPA



Application of RMP to FGAN & WFC

- FGAN is not on the RMP list
- FGAN possesses explosives and reactive characteristics that should trigger inclusion
 - **CSB believes FGAN should be included on the RMP list**



- This recommendation coincides with an existing CSB recommendation

Reactive Hazard Investigation

10-17-02, page 91

U.S. Environmental Protection Agency (EPA)

1. Revise the Accidental Release Prevention Requirements, 40 CFR 68, to explicitly cover 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. Take into account the recommendations of this report to OSHA on reactive hazard coverage. Seek congressional authority if necessary to amend the regulation. (2001-01-H-R3)



Application of RMP to FGAN & WFC

- WFC qualified as a Program Level 2 facility for its storage of anhydrous ammonia
 - WFC submitted a Risk Management Plan in 2011 and implemented a prevention program that included a hazard review





EPA Emergency Planning and Community Right-to-Know Act

- Intended to address concerns about local preparedness for chemical emergencies and ensure public access to information

	Emergency Planning	Emergency and Hazardous Chemicals Inventory Reporting
Chemicals Covered	355 Extremely Hazardous Substances (EHSs)	Approximately 500,000 hazardous chemicals
Thresholds	Threshold Planning Quantity: 1 to 10,000 lbs. onsite at any one time	<ul style="list-style-type: none"> •For EHSs: 500 lbs. or TPQ (whichever is lower) •For gasoline: 75,000 gallons •For diesel: 100,000 gallons •For all other hazardous chemicals: 10,000 lbs.



EPA Emergency Planning and Community Right-to-Know Act

- EHSs and hazardous chemicals must be reported to State Emergency Response Commissions, Local Emergency Planning Committees, and local fire departments
- LEPCs must be composed of at least the following:
 - Elected state and local officials
 - Police
 - Fire, civil defense, public health, transportation, and environmental professionals
 - Representatives of facilities subject to EPCRA emergency planning requirements, community groups, and the media
- LEPCs develop and review emergency response plans and provide information to the public





Application of EPCRA to FGAN & WFC

- FGAN is listed as a hazardous chemical under EPCRA
 - FGAN triggers reporting requirements for Safety Data Sheets and Tier I/Tier II forms
- WFC complied with EPCRA by reporting its anhydrous ammonia and FGAN to the Texas SERC, McLennan County LERC, and the West Volunteer Fire Department
 - CSB found that WFC was not listed in the McLennan County emergency response plan due to a misunderstanding of an exemption
 - **CSB recommends that guidance be developed to provide greater clarity on this exemption**



Agency	OSHA		EPA	
Rule	Explosives and Blasting Agents Standard	Process Safety Management Standard	Risk Management Program Rule	Emergency Planning and Community Right-to-Know Act
Requirements	Based on prior versions of NFPA Codes (has not been revised since 1971)	Covered processes must follow 14 minimum performance-based elements	Based on Program Level classification for covered processes	Emergency planning and reporting sections based on chemicals covered at specified thresholds
Applicability	Storage, use, and transportation of explosives and blasting agents	Chemicals at or above specified threshold quantities on the PSM list of covered chemicals	Substances at or above specified threshold quantities on the RMP list of covered flammables and toxics	Substances and chemicals covered at specified thresholds
Covers FGAN	✓	✗	✗	✓
WFC Compliance	✗	✓	✓	✓

U.S. Chemical Safety and Hazard Investigation Board



Recommendations





U.S. Environmental Protection Agency (EPA)

2013-02-I-TX-R1

Develop a guidance document on EPCRA requirements that is issued to SERCs and LEPCs, that explains which chemicals are exempt and what must be reported.



U.S. EPA

2013-02-I-TX-R2

Develop a guidance document pertaining to the agricultural exemption under EPCRA to clarify that fertilizer facilities that store or blend fertilizer are covered under EPCRA. Communicate the guidance document to the fertilizer industry.



U.S. EPA

2013-02-I-TX-R3

Revise the RMP rule to include FGAN on the List of Regulated Substances.

- Ensure the calculation for the offsite consequence analysis considers the unique explosive characteristics of FGAN.
- Develop RMP guidance documents for FGAN facilities.



U.S. Occupational Safety and Health Administration (OSHA)

2013-02-I-TX-R4

Develop a Regional Emphasis Program for Section (i) of the Explosives and Blasting Agents Standard in regions where FGAN facilities similar to the WFC facility are prevalent.



U.S. OSHA

2013-02-I-TX-R5

Implement one of the following regulatory changes to address the hazards of FGAN:

- a) Add FGAN to the OSHA List of Highly Hazardous Chemicals, Toxics and Reactives and establish an appropriate threshold quantity. Identify NFPA 400 as a source of Recognized and Generally Accepted Good Engineering Practices (RAGAGEP) for PSM-covered FGAN equipment and processes.



U.S. OSHA

2013-02-I-TX-R5 cont'd

- b) Revise the OSHA Explosives and Blasting Agents Standard (29 CFR 1910.109) to ensure that the scope establishes that the standard applies to facilities that store bulk quantities of FGAN. Revise “Storage of Ammonium Nitrate,” to include requirements similar to NFPA 400-2016, *Hazardous Materials Code*, Chapter 11.



International Code Council (ICC)

2013-02-I-TX-R6

In a subsequent edition of the International Fire Code (IFC), include requirements for the storage and handling of AN. The CSB recommends that requirements include: automatic fire detection, ventilation requirements, smoke and heat vents, minimum separation distances, and prohibition on the use of combustible materials of construction.



Department of Homeland Security (DHS) / Federal Emergency Management Agency (FEMA)

2013-02-I-TX-R7

Through a new or existing program, create and implement a competitive funding mechanism to provide training to regional, state, and local career and volunteer fire departments on how to respond to fire and explosion incidents at facilities that store FGAN. Continue to use available funding to ensure training effectiveness.



DHS/FEMA

2013-02-I-TX-R8

During the program proposal review process, ensure that the FGAN training includes multiple delivery methods to allow for a broad reach. The training should allow for instructor led, web-based and “train the trainer” courses, initial orientation, and refresher training. The training should allow for flexibility in delivery.



DHS/FEMA

2013-02-I-TX-R9

Assist training partners to develop and provide continual oversight for an FGAN training program. In addition, evaluate the training curriculum to confirm that it adequately meets course objectives as well as the details of recommendation 2013-02-I-TX R8.



DHS/FEMA

2013-02-I-TX-R10

Develop an outreach program that notifies regional, state, and local fire departments of available FGAN training opportunities.



Texas Commission on Fire Protection (TCFP)

2013-02-I-TX-R11

- Develop standards for course curricula to include hazard awareness of FGAN for those fire departments that have FGAN facilities in their jurisdiction.
- Develop a training program specific to FGAN.

2013-02-I-TX-R12

Implement outreach to fire departments that either have FGAN facilities in their jurisdictions them about the new FGAN training certification requirements and opportunities to receive training.



State Firefighters and Fire Marshals' Association of Texas (SFFMA):

2013-02-I-TX-R13

Develop an FGAN training certification program. The certification program should include multiple delivery methods to allow for a broad reach and flexibility in delivery.



SFFMA

2013-02-I-TX-R14

Develop an outreach component to the training certification program that notifies regional, state, and local fire departments with FGAN facilities in their jurisdiction of training certification opportunities available for FGAN.



Texas A&M Engineering Extension Services (TEEX)

2013-02-I-TX-R15

Develop a hazardous materials training module that addresses FGAN and other hazardous materials. Ensure that the training includes multiple delivery method.

2013-02-I-TX-R16

Develop an outreach program that notifies state, regional, and local fire departments about available FGAN training opportunities.



Texas Department of Insurance

2013-02-I-TX-R17

For companies that provide insurance to agricultural facilities storing FGAN, develop and issue guidance to assist in underwriting risk and conducting annual loss control surveys.



West Volunteer Fire Department

2013-02-I-TX-R18

Develop standard operating procedures for pre-incident planning for facilities that store or handle HAZMAT such as FGAN.



El Dorado Chemical Company (EDC)

2013-02-I-TX-R19

For all distributors and bulk retail sites that receive FGAN: encourage customers to conduct internal monitoring and communicate that such internal monitoring and auditing may be conducted through established product safety programs; and develop a process to establish mutual product stewardship expectations for the downstream chain of customers.



Board Questions



Slide 115

TL4

i think we should put the following 4 or 5 agenda items on one slide. We usually won't change slides during this portion of the presentation anyway.

Tyler, Lucy, 1/12/2016

U.S. Chemical Safety and Hazard Investigation Board



Public Comment



U.S. Chemical Safety and Hazard Investigation Board



Board Deliberations

U.S. Chemical Safety and Hazard Investigation Board



Board Vote



U.S. Chemical Safety and Hazard Investigation Board



Final Comments/ Adjourn

U.S. Chemical Safety and Hazard Investigation Board



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