

# Regional Emphasis Program (REP)

## Fertilizer Grade Ammonium Nitrate (FGAN) and Agricultural Anhydrous Ammonia Facilities

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### Region VI

DIRECTIVE NUMBER: 02-02-031

**EFFECTIVE DATE:** October 1, 2018

# Summary

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Encourage employers to take following steps:

1. Address hazards
2. Ensure facilities are evaluated to determine if the employer is in compliance with all relevant OSHA requirements
3. Help employer's correct hazards, thereby reducing potential injuries, illnesses, and death for their workers.

# Purpose

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To evaluate the employers' workplace(s) at all programmed, unprogrammed, or other limited-scope inspections pertaining to fertilizer grade ammonium nitrate and agricultural anhydrous ammonia operations

- To assure that employees are being properly protected.

# Background

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- Workers employed in the fertilizer storage, mixing/blending, and distribution industry face many hazards that can lead to serious injury, illness, and death, including fire, explosions, and hazardous chemicals.
- Ammonium nitrate (AN) in its pure form is a solid, stable material and is usually not sensitive to mild shock and other sources of ignition or detonation. However, AN has both oxidizer and unstable reactive properties that can make it extremely hazardous under certain circumstances including fire exposure and when contaminated with combustible materials.

# Background

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- As an oxidizer, AN promotes the combustion of other materials. In turn, heating due to fire exposure can cause AN to thermally decompose, releasing toxic gaseous ammonia ( $\text{NH}_3$ ), Nitric Acid ( $\text{HNO}_3$ ), nitrogen oxides ( $\text{NO}$  and  $\text{NO}_2$ ), and nitrous oxide ( $\text{N}_2\text{O}$ ). Decomposing and/or molten AN can detonate when confined or exposed to a strong impact or shock. When AN contains combustible contaminants such as grain dusts, fuel oils, or metal flakes, the likelihood and intensity of detonation is increased
  - Section (i) of the Explosives and Blasting Agents standard, 29 CFR1910.109, applies to any employer storing AN or any mixture containing more than 60 percent AN by weight. NFPA 400 - 2016 *Hazardous Materials Code* is also recognized as a consensus standard that includes useful guidance on the safe storage of AN.

# Background

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- In addition, agricultural anhydrous ammonia storage and dispensing potentially exposes employees to airborne concentrations of toxic gas. Storage and Handling of Anhydrous Ammonia, 29 CFR 1910.111, addresses all anhydrous ammonia systems except for ammonia manufacturing plants and refrigeration plants where ammonia is used solely as a refrigerant.
  - Anhydrous ammonia, a toxic gas stored under pressure as a liquid, is involved in many releases each year including an incident in Stewardson, Illinois in April 2016 that forced the evacuation of most of the town.

# Scheduling REP

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Evaluate the following safety and health program elements and issues during all inspections at the covered NAICS sites under this REP.

- Grain and Field Bean Merchant Wholesalers - 424510
- Other Farm Products Raw Material Merchant Wholesalers – 424590
- Nitrogenous Fertilizer Manufacturing - 325311  
Phosphatic Fertilizer Manufacturing - 325312  
Fertilizer (Mixing Only) Manufacturing - 325314  
Grain and Field Bean Merchant Wholesalers - 424510  
Other Farm Product Raw Materials Merchant Wholesalers - 424590  
Farm Supplies Merchant Wholesalers - 424910  
Farm Product Warehousing and Storage - 493130  
Various explosives storage, explosives wholesale, and blasting industries

The compliance inspections cover all portions of the employer's operations at the site.

# Storage of Ammonium Nitrate under 29 CFR 1910.109(i)

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- The standard applies to establishments storing, having, or keeping AN, including fertilizer grade, and other mixtures containing 60 percent or more AN by weight.
- To determine the means and manner that FGAN is stored and handled at the facility.
- To determine the adequacy of ventilation and the construction of the building to allow for self-ventilation during a fire event.
- To evaluate the flooring in storage and handling areas. Flooring shall be of noncombustible material and protected against impregnation by AN and without open drains, traps, tunnels, pits, or pockets into which molten AN could flow and be confined in the event of fire.

# Storage of Ammonium Nitrate under 29

## CFR 1910.109(i) *continued*

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- To evaluate the potential for contamination of AN with galvanized iron, copper, lead, and zinc used in the construction of bins and partitions dividing storage areas. Partitions dividing AN shall be of tight construction.
- To evaluate height or depth of AN piles to ensure they are not higher than 36 inches below the roof or supporting structure of the storage building roof.
- To evaluate the adequacy of sprinkler systems in the storage building or structure and the suitability and availability of water supplies, fire hydrants, fire control devices, and fire extinguishers.

# Storage and Handling of Anhydrous Ammonia under 29 CFR 1910.111.

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- This standard applies to all facilities storing, handling, and dispensing anhydrous ammonia except those facilities where anhydrous ammonia is used for refrigeration or those facilities where anhydrous ammonia is manufactured.
- To evaluate the storage vessel integrity, operation, and maintenance.
- To ensure the storage vessel is approved for the service and appropriately marked.
- To determine that all piping, tubing, and hoses are appropriate for the service.
- To evaluate suitability of emergency relief from the storage vessel.

# Hazard Communication 1910.1200

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- To evaluate the employer's use of chemicals in the work environment for compliance with [29 CFR 1910.1200](#) – Hazard Communication.
- Use [CPL 02-02-079](#), Inspection Procedures for the Hazard Communication Standard (HCS 2012), as guidance. To determine compliance with OSHA's HCS requirements for safety data sheets (SDSs), labeling and worker training.

# Other Hazards

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## Review the injury and illness records

- Including first aid and nursing logs, for the past five years for trends that may identify a common hazard at the workplace.

Conditions and hazards vary from plant to plant depending on process design. However, a variety of hazards are common industry-wide, including noise, chemicals, thermal, electrical, and struck-by hazards. In addition to any hazards identified in the injury and illness records review.

Identify and evaluate operations performed in permit-required confined spaces including but not limited to: pits, bins, silos, and limited-access spaces.

Identify and evaluate employee contact with or entrapment in moving machine parts both during normal operations and preventive maintenance/periodic self-inspection of production, facility, and shop machinery.

Evaluate the condition of electrical equipment such as panels, cabinets, motor control centers, conduits, etc.

# Outreach to Industry, Workers and other Stakeholders

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- Encouraging employers to utilize OSHA's free on-site consultation programs and providing educational and compliance assistance information relevant to the industry, along with other applicable outreach materials to appropriate stakeholders.
- Informing employers and other stakeholders that many new resources exist in many languages on hazard identification and prevention.
- Upon establishing a list of affected worksites, providing a letter to inform industry, employees, government and other stakeholders of hazards associated with that particular industry, and informing employers of your outreach and targeting plan prior to commencement of inspection activities.

# Resources

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- Fertilizer Industry Guidance on Storage and Use of Ammonium Nitrate
- Fertilizer Industry Guidance on Storage and Use of Ammonium Nitrate | Occupational Safety and Health Administration
  - OSHA Letter to the Fertilizer Industry, February 14, 2014.
- [https://www.osha.gov/dep/fertilizer\\_industry/letter\\_fertilizer\\_industry.html](https://www.osha.gov/dep/fertilizer_industry/letter_fertilizer_industry.html)
  - OSHA, EPA, and Fertilizer Safety and Health Partners alliance.  
<https://www.osha.gov/dcsp/alliances/fshp/fshp.html#!2B>
  - Worker protection training, information and materials to specific groups, appropriate to the industry.
  - NFPA 400 - 2016 Hazardous Materials Code, which includes key practices for facility design and operation for safe storage of AN.