SAFETY AND SECURITY GUIDELINES FOR AMMONIUM NITRATE

1.0 SCOPE AND PURPOSE

1.1 This Guideline covers a single hazardous material – Technical Grade Ammonium Nitrate (TGAN).

1.2 TGAN is a US Department of Transportation (DOT) Class 5 Oxidizer, Division 5.1, UN1942, PG III material.

1.3 TGAN is a US Department of Homeland Security (DHS) chemical of interest listed in Appendix A of the Chemical Facility Anti-Terrorism Standards with a theft and diversion security issue.

1.4 TGAN is a US Coast Guard (USCG) cargo of particular hazard.

1.5 The purpose of this Guideline is to outline best practices for the safety and security of TGAN in manufacturing, storage, and transportation from risks of fire, shock, and misappropriation. The manufacturing section of the document addresses precautions applicable to both solid and liquid forms of AN. All other sections apply only to solid AN.

2.0 SAFETY

2.1 Owner/operators of all TGAN facilities should be aware that the safety of their workplaces and operations may be subject to the OSH Act General Duty Clause at 29 U.S.C. § 654(a)(1).

2.1.1 Manufacturing

2.1.1.1 Where applicable, owner/operators of manufacturing sites must comply with the OSHA Process Safety Management Standard (PSM) at 29 CFR 1910.119.

2.1.1.2 Avoid heating TGAN in a confined space above 170°C (e.g., processes involving TGAN should be designed to avoid this possibility).[1]

[1] EPA Chemical Safety Alert, *Explosion Hazard from Ammonium Nitrate* (Dec. 1997). (Modified).

2.1.1.3 Avoid localized heating of TGAN, potentially leading to development of high temperature areas.[2]

2.1.1.4 Owner/operators should ensure that facilities have implemented a "hot work" program consistent with OSHA requirements at 29 CFR 1910.252.[3]

2.1.1.5 Ensure that TGAN is not exposed to shock (e.g., shock waves from explosives,).[4]

2.1.1.6 Avoid contamination of TGAN with combustible materials or organic substances including but not limited to; (i) organic chemicals, acids, or other corrosive materials, (ii) compressed flammable gases, (iii) flammable and combustible materials, solids or liquids, and (iv) other contaminating substances such as wood chips, organic materials, chlorides, phosphorus, finely divided metals, charcoals, diesel fuels and oils, sulfur.[5]

2.1.1.7 Avoid contamination of TGAN with inorganic materials that may contribute to its sensitivity to explosion, including chlorides and some metals, such as chromium, copper, copper alloys such as brass or bronze, cobalt, and nickel, and finely divided or powdered metals.[6]

2.1.1.8 Maintain the pH of ammonium nitrate (AN) solutions within the safe operating range of the process. In particular, avoid low pH (acidic) conditions.[7]

2.1.1.9 Ensure that all electrical components/systems are in compliance with the National Electrical Code.[8]

2.1.1.10 Ensure that the facility has implemented a Lock Out/Tag Out program in accordance with 29 CFR 1910.147.[9]

2.1.1.11 Avoid personnel exposure to hot AN solution.[10]

2.1.1.12 Avoid the introduction of gasses in hot, high strength AN solutions.[11]

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[2] EPA Chemical Safety Alert.
[3] IME (new).
[4] EPA Chemical Safety Alert. (Modified).
[5] NFPA 400 (2013).
[6] EPA Chemical Safety Alert. (Modified).
[7] EPA Chemical Safety Alert.
[8] IME (new).
[9] IME (new).
[10] IME (new).
[11] IME (new).

2.1.1.13 Facility access points should be posted "NO SMOKING, NO OPEN FLAMES."[12]

2.1.1.14 All manufacturing facility access points should be posted with a durable, reflective danger warning sign at least 4ft. x 4ft. where it is visible to fire responders and police. The warning sign text and important HazCom information should state: "WARNING. DO NOT FIGHT AMMONIUM NITRATE FIRES. Refer to ERG Guide 140 and Safety Data Sheet (SDS).[13] In case of an emergency CALL 9-1-1 or [local emergency number]."[14]

2.1.1.15 Emergency Action Plans (EAPs) should be provided to local emergency responders. Owner/operators should provide local emergency responders with current copies of SDSs and review appropriate fire response (DO NOT FIGHT AMMONIUM NITRATE FIRES).[15]

2.1.1.16 Owner/operators of manufacturing facilities should develop a written emergency evacuation plan and provide training to employees pursuant to 29 CFR 1910.120(q).

2.1.1.17 Owner/operators should provide information to customers describing the hazards associated with TGAN, proper management and housekeeping requirements, and information regarding regulatory requirements applicable to the safe storage of the material.[16]

2.1.2 Storage

2.1.2.1 General Requirements

2.1.2.1.1 All TGAN storage sites should comply with 29 CFR 1910.109(i).[17] At sites where compliance with any provision is impracticable, the owner/operator should

[12] IME (new).
[13] The term "material safety data sheet" is being replaced by the term "safety data sheet" pursuant to OSHA's implementation of the GHS through its Hazard Communication Rules. See 49 CFR 1910.1200.
[14] IME (new).
[15] IME (new). Facilities subject to PSM will have EAPs.
[16] IME (derived from the terms of the Settlement Agreement between IME and EPA, No. 94-1276 (1996)).
[17] We suggest the following amendments to 1910.109(i):

- 1910.109(i)(1)(ii)(*b*) – delete this provision. The document incorporated by reference is obsolete and is no longer available.
- 1910.109(i)(4)(ii)(*b*) – prohibit the use of wooden bins.
- 1910.109(i)(7)(ii)(*b*) – provide an exception for remote locations where access to a municipal/regional water supply is unavailable.

demonstrate that an equivalent level of safety is maintained through alternative means.[18]

2.1.2.1.2 Owner/operators of TGAN storage sites should ensure that facilities are in full compliance with applicable requirements of the Emergency Planning and Community Right to Know Act. 42 U.S.C. §§ 11001 – 11050.

2.1.2.1.3 Smoking, open flames, and unauthorized sparking or flame-producing devices should be prohibited.[19]

2.1.2.1.4 Bins and structural materials/members in immediate contact with AN should be constructed of non-combustible materials.[20]

2.1.2.1.5 Storage areas should be inspected regularly by an individual(s) trained to identify potential hazards and ensure that all safety control measures are being properly implemented. Any identified hazards should be addressed immediately.[21]

2.1.2.1.6 Owner/operators should ensure that facilities have implemented a "hot work" program consistent with OSHA requirements at 29 CFR 1910.252.[22]

2.1.2.1.7 All storage facilities should have a written EAP.[23] EAPs should be provided to local emergency responders. The owner/operator should provide local emergency responders with current copies of SDSs and review appropriate fire response (DO NOT FIGHT AMMONIUM NITRATE FIRES).

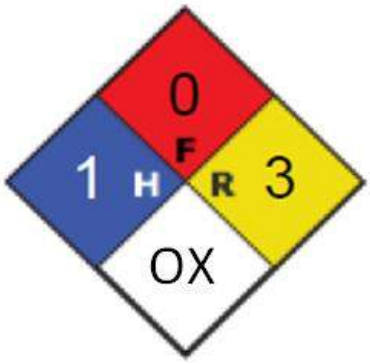
2.1.2.1.8 Owner/operators of storage facilities should develop a written emergency evacuation plan and provide training to employees pursuant to 29 CFR 1910.120(q).[24]

[18] IME (new).
[19] IME (new).
[20] IME (new). This provision differs from both 1910.109(i)(4)(ii)(a) and NFPA 400 11.3.2.3.3.3 which allow the use of wooden and aluminum bins.
[21] IME (new).
[22] IME (new).
[23] Settlement Agreement between IME and EPA, No. 94-1276 (1996).
[24] IME (new).

2.1.2.1.9 Owner/operators should host community awareness "open houses" to demonstrate to the community the measures taken to ensure safety and security.[25]

2.1.2.2 Notification Warnings

2.1.2.2.1 A 10" x 10" NFPA 704 hazard risk "fire diamond" used by emergency personnel to quickly and easily identify risks posed by hazardous materials should be affixed to each vertical member of each TGAN bin 5 to 6-feet off ground level and be situated where it is clearly visible to first responders, police, or other individuals attempting to access the area. The following is the NFPA diamond for TGAN: [26]



2.1.2.2.2 The contents of each bin should be clearly identified by the proper shipping name of the material, "**AMMONIUM NITRATE**" written in 2-inch high, capital letters below the NFPA fire diamond.[27]

2.1.2.2.3 All storage facility access points should be posted with a durable, reflective danger warning sign at least 4ft. x 4ft. where it is visible to fire responders and police. The warning sign text and important HazCom information should state: "WARNING. DO NOT FIGHT AMMONIUM NITRATE FIRES. Refer to ERG Guide 140 and Safety Data Sheet. In case of an emergency CALL 9-1-1 or [local emergency number]."[28]

[25] ATF Suggested Voluntary Actions.
[26] IME (new).
[27] NFPA 490, Chapter 6.2.4.
[28] IME (new).

2.1.2.2.3.1 All storage facility access points should be posted "NO SMOKING, NO OPEN FLAMES."[29]

2.1.2.3 Bulk Storage

2.1.2.3.1 ATF Licensed Locations

2.1.2.3.1.1 Bulk storage of AN at ATF licensed locations should comply with applicable ATF regulations at 27 CFR 555.220, in addition to the requirements in section 2.1.2.1.1.

2.1.2.3.2 Non-ATF Licensed Locations

2.1.2.3.2.1 Bulk storage of AN at non-ATF licensed locations should comply with the requirements in section 2.1.2.1.1.

2.1.2.3.3 Mine Sites

2.1.2.3.3.1 Bulk storage of AN at mine sites should comply with the requirements in section 2.1.2.1.1.[30]

2.1.2.3.3.2 AN storage at mine sites should be separated from explosives and blasting agents pursuant to 27 CFR 555.220.

2.1.2.3.4 Rail Sidings[31]

2.1.2.3.4.1 Bulk storage of AN at rail siding areas should comply with applicable requirements in section 2.1.2.1.1.

2.1.2.3.4.2 The hazards associated with TGAN should be communicated using a U.S. DOT placard pursuant to 29 CFR 1910.1201.

2.1.2.3.4.3 Storage bins at railcar siding areas should be posted with a CHEMTREC notice or other decal representing a nationally recognized emergency

[29] IME (new).
[30] The Mine Safety & Health Administration has not promulgated regulations addressing the storage of TGAN at mine sites. IME recommends that owner/operators apply the provisions of 29 CFR 1910.109(i) (or equivalent safety measures) for mine site storage.
[31] IME (new).

response information system for hazardous materials shipments to which the owner/operator of the TGAN bins is a subscriber. The decal should be of sufficient size and situated where it is clearly visible to first responders, police, or other individuals attempting to access the rail siding area.

2.1.2.3.4.4 Electrical Fire Hazards

2.1.2.3.4.4.1 An assessment should be made of all electrical hazards at rail sidings and safety measures taken to reduce the likelihood of a fire caused by the electrical power source, motors, and conduit required to off-load a rail car into a bin.

2.1.2.3.4.5 Fire Protection

2.1.2.3.4.5.1 Water supplies, fire hydrants, or other suitable fire control devices such portable fire extinguishers meeting the standards prescribed in IME SLP-14 should be readily identified for immediate use for small fires that have not engaged TGAN at the site.

2.1.3 Transportation

2.1.3.1 Owner/operators must ensure that all transportation-related activities are in full compliance with applicable DOT hazardous materials requirements at 49 CFR 171-178.

2.1.3.1.1 Truck

2.1.3.1.1.1 Motor carriers must comply with hazardous materials requirements at 49 CFR 177 and 397.

2.1.3.1.1.2 Maintain financial responsibility as required by 49 CFR 387.9

2.1.3.1.1.3 Drivers

2.1.3.1.1.3.1 Drivers should possess a current, state-issued commercial driver's license with a hazardous materials

endorsement as required under 49 CFR 383.121.

2.1.3.1.1.3.2 Drivers should have received hazardous materials training as required by 49 CFR 172.704.

2.1.3.1.1.4 Vehicles[32]

2.1.3.1.1.4.1 Vehicles used to transport TGAN should meet standards prescribed in IME SLP-23.

2.1.3.1.1.5 Bin Loading and Unloading[33]

2.1.3.1.1.5.1 The parking of vehicles under or near a bin for any purpose other than loading or unloading TGAN or necessary maintenance of the bin is prohibited.

2.1.3.1.1.5.2 The engine of the power unit should be shut off while under a TGAN bin except as needed for loading or unloading operations.

2.1.3.1.1.5.3 Wheel chocks should be used when loading or unloading TGAN from a bin when the vehicle is unattended.

2.1.3.1.1.5.4 After loading is completed, the vehicle should immediately be moved to a location at least 50ft. from the bin.

2.1.3.1.2 Rail

2.1.3.1.2.1 Rail transporters must comply with applicable DOT hazardous materials regulations at 49 CFR 174.

2.1.3.1.3 Barge

2.1.3.1.3.1 Facilities at which TGAN is loaded or unloaded from barges must comply with 33 CFR 126.

[32] IME (new).
[33] IME (new).

3.0 SECURITY

3.1 Manufacturing and Storage Facilities[34]

3.1.1 The owner/operator must comply with applicable regulations promulgated by DHS at 6 CFR 27, and USCG at 33 CFR 105.

3.1.2 The owner/operator should conduct a thorough site vulnerability assessment to identify gaps in TGAN security and develop and implement appropriate security control measures that will mitigate these security gaps. Considerations should be given to deter, to delay, to detect, and to respond to the identified potential security issues.[35]

3.1.3 Employees at TGAN manufacturing and storage facilities should undergo a background check by the employer.[36]

3.1.4 Access by visitors, service subcontractors, and third-party transporters should be approved by management.[37]

3.1.5 All TGAN manufacturing and storage facilities should institute a system for accountability of bulk TGAN pursuant to IME Safety Library Publication No. 28 (SLP-28). Accurate inventory records should be maintained.[38]

3.1.5.1 Owners/operators of manufacturing and storage facilities should document and report unexplained losses, thefts, or otherwise unaccounted for shortages of AN to the local Joint Terrorism Task Force (JTTF), as well as local law enforcement.[39]

3.1.6 All keys used to access AN manufacturing and storage areas should be controlled by the owner/operator and managed in the same manner as keys for explosive magazines.[40]

3.1.7 Lost keys should be immediately reported to management and should be considered a breach of security. The cores of all locks should be changed or new locks/keys issued as soon as possible.[41]

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[34] Owner/operators of non-CFATS regulated facilities should consider using the 18 areas of risk described in DHS' "*Risk-Based Performance Standards Guidance, Chemical Facility Anti-Terrorism Standards"* (May, 2009) to assess AN manufacturing or storage vulnerabilities when developing emergency response plans as recommended at sections 2.1.1.15 and 2.1.2.1.7.
http://www.dhs.gov/xlibrary/assets/chemsec_cfats_riskbased_performance_standards.pdf.

[35] IME (new).

[36] IME and ATF Suggested Voluntary Actions

[37] IME (new)

[38] IME (new).

[39] IME and ATF Suggested Voluntary Actions.

[40] IME (new).

[41] IME and ATF Suggested Voluntary Actions.

3.1.8 Bins should be kept padlocked at all times, except to load or unload TGAN.[42]

3.1.9 Locking points include the unloading hatch or gate, the ladder, and the top hatches.[43]

3.1.10 Report all suspicious behavior to an appropriate supervisor or, if unavailable, to the local JTTF or local law enforcement.[44]

3.1.11 Owners/operators should maintain regular communications with local law enforcement agency(ies), and should encourage regular patrols in the area of the facilities.[45]

3.1.12 Owners/operators should institute a "KNOW YOUR CUSTOMER" program. Information should include (but not be limited to) sales records, statements of intended use of purchased TGAN, and records of ATF permit/license numbers, where applicable. A record of this information should be retained for at least 2 years.[46]

3.2 Transportation

3.2.1 Highway

3.2.1.1 Owner/operators should consider implementing relevant and appropriate voluntary Security Action Items recommended by TSA for Tier 2 Highway Security-Sensitive Materials. See http://www.tsa.gov/highway-security-sensitive-materials-hssm-security-action-items-sais.

3.2.2 Rail

3.2.2.1 Rail cars should arrive at the rail siding with the shipper's security seals affixed to all top hatches and bottom gates.[47]

3.2.2.2 All shipper seal serial numbers should be checked to ensure they match the bill of lading for the rail car. If any seal number is incorrect, the owner/operator should call the shipper. If any seal shows signs of tampering or removal, the shipper, local JTTF, and local law enforcement should be contacted immediately.

3.2.2.3 The shipper's security seals attached to the gates should be removed and replaced by the rail siding owner/operator's padlock.

[42] IME (new).
[43] IME (new).
[44] IME (new).
[45] IME (new).
[46] ATF Suggested Voluntary Actions.
[47] TSA recommends that a "Seal/Lock Control Program" be implemented.

3.2.2.4 If any shipper's security seal is removed from the top hatches of a rail car by the rail siding operator to gain access for any reason, the rail siding operator's security seal should be affixed to the hatch.

3.2.2.5 Empty railcars do not have to be padlocked, but should be affixed with the rail siding operator's security seals and the serial numbers of these should be recorded and retained for at least 2 months.