To All, 26 December 2004

Recently there were several establishments burned to the ground in Maryland which involved the compromise of natural gas line fixtures. In USDA we have four gas environments (The presence of Compressed Gas Cylinders to support Lab equipment; Outside LP Tanks to support facilities; Natural gas lines next to facilities for their support; and above ground petroleum tanks). As we conduct our security assessments these are areas of concern that we focus in on because of the deadly results they could cause if compromised. Because of these types of environments, the perpetrator does not have to bring a bomb to the facility. They only need to bring an ignition tool of some sort. Below is one of the establishments that were attacked in Maryland.

*Investigators said both fires were set near **natural gas lines** that feed the buildings and Paul Patel, the owner of the motel, said the person responsible put a lot of lives in jeopardy.*

Prior to the September 11th tragedy, each of these four gas environments were not presumed to be a concern from a criminal or terrorist perspective. Now we are looking at these environments as potential compromise points from a possible criminal/terrorist attack that could result in total destruction of the facility and possibly death or serious injuries to USDA employee or others within the vicinity as collateral damage occurs.

Now let me address each environment;

1. **Compressed Gas Cylinders**: If the gas is flammable, flash points lower than room temperature compounded by high rates of diffusion present a danger of fire or explosion. Additional hazards of reactivity and toxicity of the gas, as well as asphyxiation, can be caused by high concentrations of even "harmless" gases such as nitrogen. Since the gases are contained in heavy, highly pressurized metal containers, the large amount of potential energy resulting from compression of the gas makes the cylinder a potential rocket or fragmentation bomb.

Cylinder Storage:

- Cylinders should be stored in compatible groups
    - Flammables from oxidizers
    - Corrosives from flammables
    - Full cylinders from empties
    - Empty cylinders should be clearly marked and stored as carefully as those that are full because residual gas may be present.
    - All cylinders from corrosive vapors.

- Store cylinders in an upright position.
- Keep oxygen cylinders a minimum of twenty feet from flammable gas cylinders or combustible materials. If this can not be done, separation by a non-combustible barrier at least 5 feet high having a fire-rating of at least one-half hour is required.
- Compressed gas cylinders should be secured firmly at all times. A cl amp and belt or chain, securing the cylinder between "waist" and "shoulder" to a wall, are generally suitable for this purpose.
- Cylinders should be individually secured; using a single restraint strap around a number of cylinders is often not effective.
- Keep valve protective caps in place when the cylinder is not in use.
- Mark empty cylinders EMPTY.
- Keep valves closed on empty cylinders.
- Cylinders must be kept away from sources of heat.
- Cylinders must be kept away from electrical wiring where the cylinder could become part of the circuit.
- Store cylinders in well-ventilated areas designated and marked only for cylinders.
- Cylinders should be secured to prevent easy removal from the site (cage, cabinet, chain with appropriate lock, etc.)

2. **Propane, or liquefied petroleum gas (LP-gas) Tanks.** These tanks are vulnerable to vehicular accidents and intentional compromise. They must be installed in accordance with such regulations as NFPA Gas Code 58. Here are a couple of recommendations to help secure this type of environment.

- LP gas tanks should be fenced and or bollard
- LP gas tanks are kept clear of weeds and other combustibles for a minimum of 10 feet
- LP gas tanks should **NOT** be mounted on <u>hollow</u> concrete blocks
- Check tank and line connections periodically to be sure that they are tight.
- Check for leaks using detergent or soapy water - never use a match or flame.

BLEVE (Boiling Liquid Expanding Vapor Explosion)

LP-GAS BLEVES RESULT IN FIRE FIGHTER FATALITIES

On April 9, 1998 a Boiling Liquid Expanding Vapor Explosion (BLEVE) involving an 18,000-gallon LP-Gas tank on a turkey farm outside of Albert City, Iowa resulted in the death of two fire fighters. Since 1993, at least two other similar incidents, involving LP-Gas in a farm setting resulted in the death of six fire fighters. The first incident in Ste. Elisabeth de Warwick, Quebec, Canada, on June 27, 1993, resulted in the death of four fire fighters. The other BLEVE occurred in Burnside, Illinois, which resulted in two fatalities on October 2, 1997.

An NFPA Fire Investigator traveled to the scene to document the incident. On the basis of the fire investigation and analysis, the NFPA has determined that the following significant factors directly contributed to the explosion and the firefighter deaths:

- Lack of protection around the LP tank installation and associated equipment that allowed the ATV to strike the piping.
- The impingement of flame on the propane tank, causing the tank shell to weaken and eventually fail.
- The close proximity of fire department operations to the LP tank while the tank was being exposed to direct flame contact.
- The lack of an adequate and reliable water supply in close proximity to the site to allow for sufficient hose streams to be rapidly placed in service to cool the LP-Gas tanks that was being impinged upon by flames from the broken pipes
- The decision to protect the exposed buildings and not relocate all personnel to a safe location given the fire impinging directly on the LP-Gas tank and the lack of a life hazard exposure.

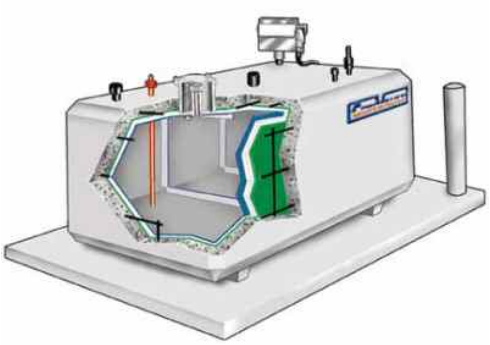
Note: Paragraph 3-2.4.1 of NFPA 58 -- Standard for the Storage and Handling of Liquefied Petroleum Gases (1995 edition) states that where physical damage to LP-Gas containers, or systems which they are a part, from vehicles is a possibility, precautions shall be taken against such damage. The type of traffic encountered in the area determines the type of protection (i.e. fencing, concrete bollards, etc.). Also, please ensure that Material Safety Data Sheets are present in all environments.

3. **Natural Gas Lines:** This environment is a great example of Pre and Post 911 thinking. Pre 911 this environment was normal with little or no thinking that it could be used as a weapon of mass destruction. Now, after 911, this open and unsecured environment is not acceptable. There are four key offices/agencies that must coordinate in the planning to protect this environment. They are the Security Specialist, Facility Manager, the Owning Gas Authority, and the Responding Fire Department. As with the other environments, this one must be protected from both accidental and intentional compromise. Caging and/or bollards, depending on the location of the utility would be something that could protect this vulnerability from being compromised.

4. **Above Ground Petroleum Storage Tanks:** Most of these environments we have seen throughout the country have been, for the most part, well protected. However,

there are still some sites that have not thought out the security of this asset in a comprehensive manner. At one site we observed an above ground 500 gallon diesel fuel tank, unlocked, located next to a large amount of ammonia nitrate. Given the Murrah Federal Building, Oklahoma bombing experience as an example (nitromethane was used instead of diesel, diesel is still as effective) can still be used as, this is not the kind of environment we want to have to help protect our assets. Just as a side note and most farm sites are doing this, it is a good practice to only order enough ammonia nitrates, hopefully the non-explosive type, for the immediate requirement. And then store the product away from potentially hazards areas in a secure location.

Individual States address the maintaining of above and below ground storage of petroleum and are very strict with the laws that govern this environment. Here is an example of above ground recommendations.



Tanks of greater than 60 gallons and less than 1,100 gallons that store flammable or combustible liquids on farms or in rural areas are covered under the NFPA Code 395. This code essentially covers most of State's farm fuel tanks. The code outlines details concerning the construction and venting of these tanks as well as a few other regulations. Provisions in this code that Georgia farmers should be aware of include:

1. Locate the tank and storage area at least 40 feet away from any building. Although not stated, it would also be beneficial to place the tank as far away from surface water, wells and property lines as possible.
2. Keep the storage area free of weeds and other combustible materials.
3. Conspicuously mark the tank with the name of the product it contains and **"Flammable - Keep Fire and Flame Away."**
4. Support the bottom of the tank with concrete blocks (not hollow) approximately 6 inches above the ground surface to protect the bottom of the tank from corrosion.
5. If a pumping device is used, it should be tightly and permanently attached and meet NFPA approval. Gravity discharge tanks are acceptable, but they must be equipped with a valve that will automatically close in the event of a fire.
6. Submit plans for the installation of all storage tanks that will contain more than 60 gallons of Class I liquids or 120 gallons of Class II or Class III liquids to the State Fire Marshall for approval.
7. Report all tanks that catch on fire to the State Fire Marshall within 72 hours of the fire.
8. Protect the tanks with bollards and/or fencing materials.

Story Lines:

1. Police say an unoccupied **pickup truck crashed through a chain-link fence** and into a propane tank, triggering explosions in southern New Mexico that sent fireballs a hundred feet into the sky and caused 17 minor injuries in the town of Truth or Consequences. Buildings shook miles away. The blasts destroyed everything in an area covering three city

blocks, including storage trailers, recreational trailers and mobile homes, police said. Windows were broken throughout the community. Although the fire is now out, a three-square-block area still smoldered Monday.

A retired fire inspector said he understands that the National Fire Protection Association adopted a new standard for flammable liquids. New code No. 58 calls for installing 4-inch diameter steel posts filled with concrete. The 6-foot-long posts are to be buried three feet into the ground and laid with three-foot centers between posts.

2. Tanker Blast Would Impact Mile Radius

WASHINGTON (AP) - A terror attack on a tanker delivering liquefied natural gas at a U.S. port could set off a fire so hot it would burn skin and damage buildings nearly a mile away, government scientists say in a report expected to influence where new multibillion-dollar terminals will be built.

3. Every year the Rocky Mountain Gun Owners sponsor a large caliber weapon firing event in Colorado (.50 Cal and Machine Gun Fun Shoot Sept. 14, 15 & 16) and they use half filled propane tanks as distant targets. Yes you guessed it, they do explode. Other than a cornucopia of actions firing the .50 caliber cartridge, there are 20mm Swiss anti-tank weapons, bowling ball mortars, black powder cannons, fully automatic rifles and machine pistols of all types, and the list goes on. And these weapons are fired at fully reactive targets: partially filled propane tanks, vehicles filled with gas, etc.