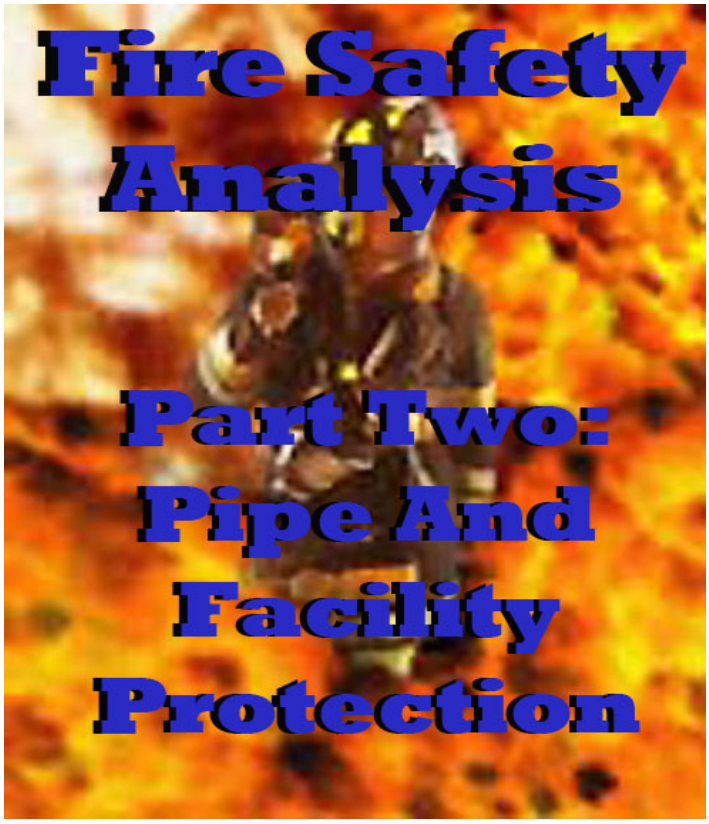
The Heat is on

Think Safety!

A Publication Of The West Virginia Propane Gas Association

Fall 2010



Inside . . .

This is the second part in our three-part series on a fire safety analysis. In the last *Think Safety* we discussed appurtenances necessary to control accidental product releases from tanks.

In this issue we will discuss the appurtenances used to control accidental product releases from liquid and vapor piping used to fill and withdraw product from the tank.

Once the appurtenances are in place, it is important to protect the system from accidents that could result in damage and possibly a product release. It is also important to evaluate the effect of any release on the plant and any neighboring facilities.

The material here is a very small sampling of a comprehensive fire safety analysis. A complete 200-page analysis can be found on the National Fire Prevention Association web site, www.nfpa.org.

Protecting The Piping:

Many propane facilities use manifolds to fill or withdraw product from one or more tanks. Both liquid and vapor may pass through these manifolds. There are several appurtenance requirements intended to control the accidental release of product.

The requirement depends on its size. We will focus on liquid transfer manifolds greater than one and one half inch in diameter or larger and a pressure equalizing vapor line one and one quarter inch or larger. The following appurtenances are required:

- An emergency shutoff valve (ESV) must be installed within 20 ft. of lineal pipe from the nearest end of the hose or swivel-type connections.
- Automatic shutoff through thermal (fire) actuation with melting point of less than 250 degrees Fahrenheit.
- Temperature sensitive

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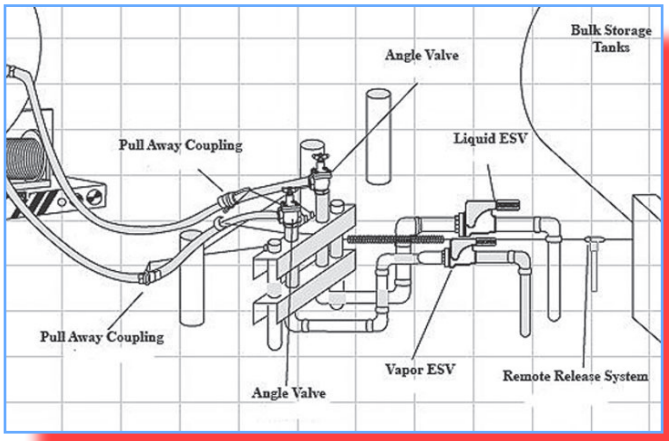
Protecting The Piping:

Continued From Page One

element (fusible link) installed within 5 ft from the nearest end of the hose or swivel type piping connected to liquid transfer line.

- A manual shutoff is required at the ESV.
- Manual shutoff device provided at a remote location, not less than 25 ft., and not more than 100 ft. from the ESV. This should be located at a point in the line of egress in the event that an emergency occurs. This is your "run-bubba-run" button.
- An ESV must be installed on each leg of a multi leg piping connected to a hose or a swivel type connection on one side and to a header of size 1½ inch in diameter or larger on the other side.
- The hoses should be protected from a pull-away break. It should be protected in such a manner that any break will occur on the hose or swivel connection while maintaining the integrity of the valves and piping on the plant side.



Keep in mind, the appurtenances mentioned above are required for product control. They do not represent a complete list of required appurtenances for a tank.

Protecting The Facility:

Once the correct appurtenances are installed it is important to make sure they are protected against potential threats such as vandalism and accidental collisions.

The protection should include:

- Sufficient lighting. One of the best defenses against vandalism, or even in some cases, accidents is proper illumination.
- Crash protection. The tank, piping and all appurtenances need to be protected from potential crashes. Any protective barrier used should be designed with area traffic in mind. For example, a tank at an industrial site should be protected from large trucks.

  - Some examples of barriers that could be used include guardrails, steel bollards or crash posts, or raised sidewalks.
- Protection against corrosion. Piping should be protected at the point it comes in contact with supports and any where it could come in contact with corrosion causing materials.
- Fencing. An industrial type or chain link fence must enclose the tank, all piping, all pumping equipment, all transfer equipment, and all tank filling facilities. At least two emergency access gates must be provided if the enclosure is greater than 100 square feet and if tanks are filled within the enclosure or if the point of transfer is within three feet of the gate.
- Security guards. If a security guard patrols the facility, he or she should be provided with the appropriate propane training in case of an emergency. Mainly, this person should have a clear understanding of the required role if an accident should occur. It might consist of a checklist of emergency contacts with instructions on who to contact first and thereafter.
- Lock-in-place devices. If a fence is not in use, all valves should be locked-in-place to prevent the unauthorized opening or closing of the appurtenances.

Ignition Sources:

The threat of danger becomes a reality when an accidental release of propane vapor meets an ignition source. Therefore, the greatest care should be taken to eliminate as many of those potential ignition sources as possible, especially during transfer operations. Electrical equipment should be "explosion proof" to reduce sparking. Known ignition sources such as running engines should be turned off during transfer. The list of potential problems could include:

- Combustible materials. Weeds and grass should be no closer than 10 from a tank. Besides being an eyesore, trash, old tires, pallets and other combustible materials should never be placed near the tank. You might think, "of course not," but surprisingly many bulk tank facilities have those things piled next to or under their storage tank.
- Flammable liquids. All flammable liquids such as diesel and gasoline with a flash point of less than 200 degrees Fahrenheit should be stored at least 20 feet from propane tanks.
- Wiring. All electrical equipment should be installed according to code with the correct size wiring.
- Flame equipment. Any equipment producing a flame such as a flaring torch should be used according to code. Smoking bans should be strictly enforced.
- Transfer procedures. Company policy should be firmly established and employees properly trained on safe transfer procedures including ignition control.
- Fire control. An approved fire extinguisher should be provided for the facility. It should have a minimum capacity of 18 pounds and have a B:C rating. One should also be included on each truck used to transport propane at the facility.

Other Property Exposures:

An accidental propane release can involve adjacent properties as well as the propane plant and could result in a fire. Propane that is not immediately ignited forms a vapor cloud, which is transported by the wind.

As the wind moves the cloud, it also thins the concentration of propane until it eventually reaches the concentration within the lower (2.15 percent) and upper (9.6 percent) levels of flammability.

When it reaches an ignition source it can result in a flashback fire. In rare cases, a vapor explosion and blast wave can occur when the vapor is confined within the flammability limits and finds an ignition source.

Propane vapor is heavier than air and will seek low-lying areas in and around the release area. If it finds an entry, it can accumulate inside the lower portion of a building producing an explosion hazard.

It is extremely important that any people in the area are evacuated according to a predetermined plan and all authorities are notified in a very timely manner.

The magnitude of a hazard and its affected distance depends on the size of the release point (bobtail hose verses a large pipe) and the duration of the release.

The information in Chart 1 on the next page should be used to determine what types of outside facilities fall within the danger zone of a potential release. Certain facilities will be particularly at risk because of their people density (churches, schools, factories) and perhaps other limiting factors if the facility is a nursing home, hospital or prison.

Chart 1

Separation Distances between Points of Transfer and other Exposures

A	B		C	D	E	F	G
#	Type of Exposure within or outside the facility boundary		Check if exposure is present	Minimum Distance (ft)	Is the Facility compliant? Yes	Is the Facility compliant? No	NFPA 58 Section Reference (2008 Edition)
1	Buildings, mobile homes, recreational vehicles, and modular homes with fire-resistive walls			10			Section 6.5.3 Table 6.5.3
2	Buildings with other than fire resistive walls			25			
3	Building wall openings or pits at or below the level of the point of transfer			25			
4	Line of adjoining property that can be built upon			25			
5	Outdoor places of public assembly, including school yards, athletic fields, and playgrounds			50			
6	Public ways, including public streets, highways, thoroughfares, and sidewalks	From points of transfer in LP-Gas dispensing stations and at vehicle fuel dispensers.		10			
		From other points of transfer		25			
7	Driveways			5			
8	Mainline railroad track centerlines			25			
9	Containers other than those being filled			10			
10	Flammable and Class II combustible liquid dispensers and aboveground and underground containers			20			
11	Flammable and Class II combustible liquid dispensers and the fill connections of LPG containers			10			
12	LP-Gas dispensing device located close to a Class I liquid dispensing device.			10			6.24.4.3

NOTE: Place a checkmark in column C against an exposure that is present in or around the facility. Fill columns E or F for only those rows for which there is a checkmark in column C.

The Heat is on! West Virginia Propane Gas Association

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Outside Events:

Sometimes the threat to a facility and/or personnel comes from outside events such as a fire or explosion that occurs at an adjacent facility. It is important that potential threats be identified and assessed.

Once these threats are identified, it should be discussed with the owner of that facility and precautions should be taken to make sure that a safety plan is developed in conjunction with your propane company.

Petroleum storage, metal cutting, welding, industrial manufacturing, gasoline stations, and many others are potential risks.

Emergency responders should be notified of any risks discovered during the evaluation process so it can be included in their emergency response plan.

Training Quiz

Name_____ Social Security Number_____

1. An emergency shutoff valve (ESV) must be installed within __ ft. of lineal pipe from the nearest end of the hose or swivel-type connections on liquid transfer manifolds greater than one and one half inch in diameter or larger and a pres sure equalizing vapor line one and one quarter inch or larger.
   A. 20 B. 30 C. 40 D. 60

2. An automatic shutoff through thermal (fire) actuation with melting point of less than ___ degrees Fahrenheit and a fusible link installed within _ ft from the nearest end of the hose or swivel type piping connected to liquid transfer line are required.
   A. 350,10 B. 250, 5 C. 200, 5 D. 300, 10

3. A manual shutoff is required at the ESV.
   A. True B. False

4. A Manual shutoff device must be provided at a remote location, not less than __ ft., and not more than __ ft. from the ESV.
   A. 35, 200 B. 30, 150 C. 25, 100 D. 20, 75

5. The manual shutoff should be located at a point in the line of egress in the event that an emergency occurs.
   A. True B. False

6. All flammable liquids such as diesel and gasoline with a flash point of less than 200 degrees Fahrenheit should be stored at least __ feet from propane tanks.
   A.10 B. 15 C. 20 D. 25

7. The hoses should be protected from a pull-away break in such a manner that any break will occur on the hose or swivel connection while maintaining the integrity of the valves and piping on the plant side.
   A. True B. False

8. Any protective barrier used should be designed with area traffic in mind.
   A. True B. False

9. Piping should be protected at the point it comes in contact with supports and any where it could come in contact with corrosion causing materials.
   A. True B. False

10. An industrial type or chain link fence must enclose the tank, all piping, all pumping equipment, all transfer equipment, and all tank filling facilities.
   A. True B. False

11. At least ___ emergency access gates must be provided if the enclosure is greater than 100 feet and if tanks are filled within the enclosure or if the point of transfer is within three feet of the gate.
   A. Five B. Two C. Three D. Four

12. If a fence is not in use, all valves should be locked-in-place to prevent the unauthorized opening or closing of the appurtenances.
   A. True B. False

13. Combustible materials. Weeds and grass should be no closer than __ from a tank.
   A. 10 B. 15 C. 20 D. 25

Training Quiz Answers

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