



Decommissioning of Propane Air Plants and Standby Systems

As Presented by Robert Armentano, President & CEO and Jennifer Arasimowicz, General Counsel, Total Energy Corp at the 2009 AGA Supplemental Gas Committee Meeting & Operations Conference.¹

Propane-air storage has been a common choice for natural gas utilities to meet their short-term peak demand energy supply needs and for large industrial customers to supplement or replace standard pipeline supply. Most propane-air peak systems produce propane-air to supplement the natural gas in the system during times of peak demand or when supplies are short, while industrial standby systems are typically used to replace natural gas when supplies are short or prices escalate. There are separate code provisions that govern such plants, dependent upon whether they are utility-owned or used as industrial standby systems. While the AGA Supplemental Gas Committee concerns itself with utility plants, which are governed by NFPA 59, there are occasions when utilities acquire or take over industrial plants and standby systems. In such instances, the rules of NFPA 58 and the different risks attendant to NFPA 58 plants should be reviewed.

Propane-air is the most common form of LPG-air mixture, which may also include other gas liquids, such as butane. Such plants are sometimes referred to as Substitute Natural Gas or Supplemental Natural Gas plants. Propane-air plants operate by withdrawing liquid propane from a tank or tank farm and converting it to vapor by heating it in a vaporizer. The vaporized propane is then blended with air and injected into the natural gas distribution system. Prior to the development of robust pipeline infrastructure, most utilities relied on propane-air plants, which can be refilled via supplies that are trucked in or delivered via rail without the need for a pipeline. In times of critical need and without other cost-effective options, propane-air plants were a valuable supply option. Additionally, when necessary, liquid propane could be trucked from one plant to another so the utility could avoid purchasing additional supply when prices were high. With the development of additional pipeline capacity and other supplemental gas supply options (including LNG, high deliverability underground cavern storage, and the purchase of peak supply needs from other sources), coupled with the fact that truck and rail supplies are typically needed for peak-shaving plants during times of energy shortages when costs are at a premium, many utilities are re-evaluating their peak shaving needs and considering the decommissioning of older, under-utilized propane-air plants. This paper explores the evaluation process, regulatory and safety issues and necessary considerations in choosing a vendor, should the utility decide to decommission.

I. Evaluation - Costs

Propane-air peak shaving systems can be costly to maintain, especially considering the minimal number of hours that they may be operated over the course of a year. The first step in evaluating whether to decommission a plant is to analyze the true costs of the peak-shaving plant. Costs to evaluate include:

A. Operation and maintenance expenses. Many of these plants are decades old. In addition to the expense of daily O&M and replacement parts, staffing and training expenses can be quite costly. Trained,

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skilled workers for propane-air plants are aging and many are retiring, creating a need for expensive training of new staff.

B. Property tax expense – real and personal

C. Insurance expenses

D. Security expenses. As discussed below, propane has been included in the list of covered substances in the Department of Homeland Security’s chemical security rules and some utility propane plants may be classified under this new rule. Additionally, some industrial plants or standby systems may also be classified under this new rule. In addition to traditional security measures taken by natural gas utilities and industrial plants, which may include fencing, cameras and security personnel, these new rules will likely increase costs, management time and hazard assessments for propane-air plants and industrial plants that are classified. The actual security measures DHS will require to be implemented on classified plants remain unknown, as do the costs for those measures.

E. Regulatory/code compliance. Codes are continually being updated and changed, requiring new policies and procedures to be implemented. As part of any evaluation, code compliance should be reviewed, especially if a plant is to remain in service and an evaluation has not been done in recent years. Code compliance should be reviewed on all acquired industrial plants prior to acquisition. Fire safety analysis and emergency response planning should be updated.² The basic code governing utility-owned propane-air plants in the United States is 40 CFR 192, specifically 192.11 which references NFPA 59 – 2004 edition - Utility LP-Gas Plant Code. Industrial and standby systems are governed by NFPA-58 – Liquefied Petroleum Gas Code.

1. 2011 Upgrades.

For any acquired industrial plant or standby system governed under NFPA 58, an acquiring utility will need to perform an assessment to make sure mandated upgrades have been completed. In 2001, the National Fire Protection Association amended NFPA 58 to require certain upgrades and retrofits to propane storage tanks in excess of 4,000 gallons. The industry was given ten years to complete the upgrades and retrofits. By July 1, 2011 all upgrades must be completed.³ Upgrade requirements include:

(a) Internal Valves: Internal valves must be installed on any container over 4,000 Gallons with an opening of 1 ¼” or greater.⁴ Automatic shutdown of internal valves in liquid service shall have thermal actuation within 5 feet of the internal valve.⁵

(b) Remote Shutdowns: At least one remote shutdown station for internal valves in liquid service must be installed not less than 25feet or more than 100feet from the liquid transfer point. This provision is retroactive to all internal valves required by code.⁶ Remote shutdowns must be identified by a sign incorporating the words Propane Emergency Valve Shutoff with letters not less than 2” in height.⁷

² The National Propane Gas Association provides a free Fire Safety Analysis Manual on its website to assist in the updating of a fire safety plan. See <http://www.npga.org/i4a/pages/index.cfm?pageid=962>.

³ Commonly known as “2011 Upgrades.” NFPA 58, ch. 5.7.7.2 (2004 ed.).

⁴ See NFPA 58, ch. 5.7.7.2 (D) (2004 ed.)

⁵ Id. at ch. 5.7.7.2(H).

⁶ Id. at ch. 6.9.4.

⁷ Id. at ch. 6.9.5.

(c) Emergency Shutoff Valves: On new or existing installations, stationary container storage systems with an aggregate water capacity of more than 4,000 gallons utilizing a liquid transfer line that is 1 ½” or larger and a pressure equalizing vapor line that is 1 ¼” or larger must be equipped with emergency shutoff valves.⁸ When the flow is only into the container, a backflow check valve can be used in lieu of an emergency shutoff valve.⁹

(d) Hydrostatic Relief Valves: A hydrostatic relief valve must be installed between shutoff valves to relieve pressure that could develop from the trapped liquid.¹⁰

(e) Flexible Connectors: Flexible connectors must be installed no more than 5 feet from internal valves on a tank, and shall not exceed 36” in length.¹¹ Flexible connectors should be used where there is the need for, or the possibility of, greater relative movement between the points connected than is acceptable for rigid pipe.¹²

(f) Pressure Relief Valves: Pressure relief valves shall be plainly and permanently marked with the following:

- 1) The pressure in psig at which the valve is set to start-to-leak.
- 2) Rated relieving capacity in cubic feet per minute of air at 60 degrees F.
- 3) The manufacturer’s name and catalog number.¹³

Relief valve stacks shall be 7’ in length but not more than 8’ when assembled on the tank. Rain caps shall be installed upon the relief valve stack to prevent water from entering during construction. While these requirements have been in place for some time, many industrial and standby systems have not yet performed such upgrades and some are even unaware of the requirements.

2. Separation Distances.

NFPA 59 mandates minimum separation distances between various LPG systems and exposures. For storage tanks, minimum separation distances are required from other tanks, buildings, adjoining properties and other structures. While existing plants are grandfathered, some utilities are incorporating these distance requirements into plant upgrades in order to mitigate liability and ensure code compliance. For tanks with a water capacity of 30,001 to 70,000 gallons, the minimum separation distance from a non-refrigerated container to the nearest important building or groups of buildings not associated with the propane-air plant, or adjoining property that may be built upon is 75 feet. For tanks with a water capacity of 70,001 to 90,000 gallons, it is 100 feet; for 90,001 to 120,000 it is 125 feet and for 120,001 to 200,000 it is 200 feet. Propane vaporizers and most fuel transfer stations (truck or rail delivery) also require separation from each other and from other exposures. NFPA 59 currently limits banks of tanks at propane-air plants to no more than 6 vessels, irrespective of size, in a bank or row, and each bank or row must be separated by a minimum of 50 feet, unless the plant is equipped with a fire protection system.

⁸ Id. at 6.10.1.

⁹ Id. at 6.10.3.

¹⁰ Id. at 6.11.

¹¹ Id. at 6.8.7.2.

¹² Id. at A.3.3.26.

¹³ Id. at 5.7.2.8.

3. Chemical Safety Rule.

The newly adopted Homeland Security Chemical Facility Anti Terrorism Standards (“CFATS”), also known as the Chemical Safety Rule, applies to propane-air plants and storage facilities. In 2005 and 2006, in attempt to mitigate the risk of future terrorist attacks, the U.S. Secretary of Homeland Security identified the need for legislation authorizing the Department of Homeland Security (DHS) to develop and implement rules regulating the security of “high-risk” chemical facilities in the United States. With respect to propane and other explosive and flammable chemicals (known as “release-flammable chemicals”), the ultimate goal of the legislation is to prevent a situation in which a terrorist would have access to enough of the chemical to pose a threat to the surrounding community or any nearby public gathering places (schools, shopping, malls, etc.) if it were ignited or detonated. Another possible scenario that the legislation seeks to protect against is the theft or diversion of these types of chemicals for use in improvised explosive devices. In October 2006, Congress passed and the President signed the Department of Homeland Security Appropriations Act of 2007, which in Section 550 authorizes DHS to require high-risk chemical facilities to complete security vulnerability assessments, develop site security plans, and implement risk-based measures designed to satisfy DHS-defined risk-based performance standards. The Act also authorized DHS to enforce compliance with the security regulations, including conducting audits and inspections of high-risk facilities, imposing civil penalties of up to \$25,000 per day, and shutting down facilities that fail to comply with the regulations.

The Act gave DHS six months from the date the President signed the bill (i.e., until April 2007) to promulgate interim final regulations implementing this authority. DHS published an Advance Notice of Rulemaking (Advance Notice) on December 28, 2006, which invited public comments on DHS’ proposed rules. After considering those comments, DHS published an Interim Final Rule (IFR), titled the Chemical Facility Anti-Terrorism Standards (CFATS), on April 9, 2007. In response to the Advance Notice, DHS received a total of 106 public comments totaling more than 1,300 pages. Within the April 2007 IFR, DHS also included a public comment period specific to “Appendix A,” a proposed list containing the DHS chemicals of interest and their corresponding screening threshold quantities (STQ). The public comment period for Appendix A closed on May 9, 2007. DHS received approximately 4,300 comments, and almost 4,000 of those comments were related to issues surrounding propane.

Under the IFR, if a facility possesses a “chemical of interest” at or above the listed STQ, the facility must complete and submit a consequence assessment known as a Top-Screen.¹⁴ A facility was required to complete its Top Screen within 60 calendar days of the publication of a final Appendix A or within 60 calendar days of coming into possession of the listed chemicals at or above the listed STQs. The threshold quantity for propane facilities was revised in response to numerous comments from the propane industry and agricultural providers and is currently set at 60,000 pounds, which amounts to about 14,285 gallons of liquid propane. This requirement is markedly different from other release-flammable chemicals of interest, for which DHS set an STQ of 10,000 pounds. According to DHS, 60,000 pounds is the estimated maximum amount of propane possessed by nonindustrial users, which are deemed to be lesser threats than industrial users. Confusion arose regarding the mixture provision of the standard, which provides that if a release-flammable chemical of interest is present in a mixture in a concentration equal to or greater than 1%, the facility must count the entire amount of the mixture toward the STQ for that chemical of interest. DHS clarified this requirement to provide that the 1% release-flammable mixture provision does not apply to propane. Propane is defined under the standard as a product containing at least 87.5% propane. Thus, if a product contains at least 87.5% propane and 1% or more of another release-flammable chemical of interest, such as butane, that product remains propane and would be subject to the 60,000 pound STQ. The chemical mixture would be subject to the 10,000 pound STQ if

¹⁴ To register to use the CSAT Top-Screen, facilities should visit ww.dhs.gov/chemicalsecurity.

it contained less than 87.5% propane and a release-flammable chemical of interest in an amount of 1% or more. Almost all propane peak-shaving plants are covered under CFATS, as even a single 18,000 gallon water capacity tank filled to 85% capacity with liquid propane triggers the regulation.

Most Top-Screens have been completed and DHS has determined which facilities are considered “high risk,” and, for those deemed so, placed each facility in a ‘tiered’ risk category, e.g. with Tier 1 being the highest risk. Many facilities that filled out the Top-Screen are not being subject to further regulation under CFATS by DHS.

For those classified facilities, in May 2009, DHS issued a Risk-Based Performance Standards Guidance Document.¹⁵ The guidance document is intended to assist classified facilities in selecting and implementing appropriate protective measures and practices. The document does not create legal requirements for classified facilities, but is intended to convey examples of measures and practices that classified facilities may choose to consider as part of the overall strategy to meet the risk-based performance standards based on each facility’s individual circumstances, including tier level, security issues and risks, and physical and operating environments. Each classified facility is responsible for devising its own unique plan and submitting the plan to DHS for review and approval.

Depending on the unique needs of a classified facility, some increased security measures, and even the planning process itself, can be expensive. Most, if not all of these costs can be avoided through plant decommissioning. These costs must be balanced against the need for additional supply; however, utilities should be asking whether supply can be procured from another, potentially cheaper source. For instance, it may be possible to procure needed peak-shaving supply from a neighboring LDC, either from that LDC’s own propane-air peak-shaving plant, cavern storage or from LNG facilities. Decommissioning should be evaluated in any cost comparison, especially for plants that are only rarely used.

II. Evaluation – Benefits

A. Real Estate Value.

The second step after analyzing the true costs of peak-shaving and determining potential areas for cost avoidance is to evaluate the potential benefits from decommissioning. This includes establishing the value of the real estate on which the plant currently sits. As many of these plants are older and neighborhoods have grown up around them, the real estate value may have appreciated significantly. The market value of the real estate is most likely significantly greater than the book value. Many utilities also have earnings sharing mechanisms approved by their respective public utility commissions whereby shareholders may share in the profits associated with real estate sales. Creative mechanisms also exist whereby unregulated subsidiaries and affiliates that hold peak-shaving facilities may engage in transactions that do not trigger ratepayer concerns. Some utilities have opted for land donations, below-market sales to non-profits or for open space preservation and passive recreation as a public relations measure.

Decommissioning presents not only the opportunity to realize operating savings, but also to turn inactive and underutilized assets into cash and reduce liability exposure and insurance costs. Peak shaving needs may also be procured through outsourcing, potentially through a sale/lease-back of plant assets, which absolves the utility from costs and risks while maintaining the strategic resource. If it is

¹⁵ The guidance document can be found at http://www.dhs.gov/xlibrary/assets/chemsec_cfats_riskbased_performance_standards.pdf.

determined that decommissioning is the best available option, full plant purchase options are an opportunity to negate decommissioning costs.

III. Evaluation – Risk Assessment

Maintaining and/or decommissioning a propane-air plant or industrial or standby system raises many issues of risk and/or potential liability, including odorant fade, BLEVE, and environmental risks. These factors have been the base of much litigation, often resulting in substantial verdicts and settlements. A review of relevant case law seems to indicate that accidents and litigation often involves some work on or entry to the plant by a third party. Plant owners should review contractor safety qualifications and insurance very carefully and supervise closely all work done at the plant to minimize such risks.

A. Odorant Fade.

One of the most commonly litigated risks is odorant fade. While most of this litigation centers on propane wholesalers or retailers, there is definitive risk to a utility plant that is being decommissioned and selling its remaining liquid propane to a wholesaler or retailer. In instances where propane from a peak-shaving plant or standby system is sold and is not tested or re-odorized, or appropriate records are not kept, liability can flow back to the utility or plant owner. In some cases, the utility or industrial plant owner will be the “deep pocket” and a target for plaintiff’s lawyers if it can be shown that unodorized propane was sold to a wholesaler or retailer.

In a natural state, propane and natural gas have no odor, taste, or color. An odorizing agent is added to the gas in order to warn consumers of a leak. The odorant in propane is ethyl mercaptan, a sulfur-based compound that gives propane a distinctive rotten-egg smell.

The properties of propane are much different than those of natural gas. Propane has 2.5 times more energy per cubic foot than natural gas. Propane is heavier than air, while natural gas is lighter than air. Propane, like natural gas, can lose its odor. However, while natural gas will tend to rise into the atmosphere and disperse, propane sinks to the ground and is prone to collect in low areas and enclosed spaces. Propane behaves more like water, hugging the ground and flowing downhill toward the lowest spot it can find, such as a basement, cellar, crawl space or utility room. Propane can even flow underground if leaked from buried pipes. Like water, propane can seep through a foundation into the space beneath a home or business. It has a propensity to accumulate and pool. When mixed in the proper proportion with air, propane is highly explosive. Propane explosions can be very powerful, causing severe structural damage and in many cases completely leveling a building. Fatalities and severe injuries are common. All of these facts tend toward a plethora of litigation at any time an explosion or fire occurs. Litigation is also often accompanied by claims of odorant fade and, although the genesis of a specific delivery of propane cannot be traced with any particularity, if a utility or standby system has sold a load of unodorized propane, there is a likelihood that it will be named in a lawsuit.

The odor of propane may be diminished or absent under a variety of conditions. Research shows that the mercaptan can chemically react and be absorbed by other materials, significantly reducing the level of odorant in the gas. The presence of air, water or rust inside a tank or cylinder can cause odorant fade. Mercaptan chemically reacts with steel and rust in tanks and fuel lines and bonds with refinery dust and mill scale that can be present in tanks, neutralizing the odorant over a period of time. Often odorant fade occurs in tanks that are new or have not been used continuously. Standby systems and peak-shaving plants are inherently rarely used, which is often the reason for considering decommissioning.

As stated, the risks of odorant fade litigation against an NFPA 59 plant owner arise mainly when propane is removed or sold from a peak-shaving plant, either in preparation for decommissioning or simply for sale into the market.¹⁶ The recent rise in the number of accidents and explosions, coupled with the substantial size of verdicts and settlements has caused odorant fade to become a specialty of some plaintiff law firms. For example:

- In Iowa, 7 family members were killed and 8 injured at a family reunion after a propane leak caused an explosion in the family home. Odorant fade was a large basis of the litigation and the settlement was in excess of \$20 million. Family and friends of the victims are actively advocating for the removal of propane from all residential zones. (Encroachment has become a problem for many peak-shaving facilities. Encroachment is the result of residential neighborhoods growing up around peak-shaving plants that were formerly in isolated or rural zones).

- A propane explosion resulting from a leak killed an infant child and its mother, who apparently did not smell the leak. The settlement was \$11 million.

- One Michigan law firm alone handled the following cases:

- Wrongful death of mother, father, and two young children due to leaking propane gas in a home on a hog farm. \$14.1 million dollar verdict.

- 7 year-old boy suffered burns in a propane explosion. \$4.5 million dollar settlement during litigation.

- Propane leak and fire with burn injuries to three occupants. \$2.005 million dollar settlement.

Odorant fade is taken very seriously by most industry participants and regulators and plant owners must be vigilant in ensuring odorant testing, reodorization and proper documentation of such tests and odorant levels any time propane is sold or transferred from the plant. Detailed logs of testing and reodorization should be maintained for at least as long as the applicable statute of limitations for filing suit, if not longer.

B. BLEVE.

Boiling Liquid Expanding Vapor Explosions, or BLEVEs, are the types of accidents that always make front page news. A BLEVE results from the rupture of a pressurized vessel containing a liquid substantially above its atmospheric boiling point. In propane peak-shaving plants, propane is stored partly in liquid form, with the gaseous propane vapors filling the remainder of the container.¹⁷ Rupture of a vessel can occur from an impact, an external fire near the vessel causing heating of the propane and pressure build-up, or from corrosion or failure under pressure. Once a vessel is ruptured, the vapor rapidly leaks, lowering the pressure inside the vessel. A sudden drop in pressure inside the vessel causes violent boiling of the liquid propane, which creates large amounts of vapor at extremely high pressure. This wave of pressure in turn causes an explosion, which in most cases can completely destroy the storage vessel and project steel fragments over the surrounding area. The resulting cloud of the propane vapor

¹⁶ During the end of the winter heating season in 2009 a propane shortage affected the Northeast, causing some utilities to take advantage of the high market prices and sell some propane from peak-shaving plants into the market.

¹⁷ To allow for expansion of liquid propane, tanks are never filled to 100% capacity. At 60 degrees F, the maximum filling density is approximately 85%. Thus a tank with 30,000 gallons water capacity will provide approximately 25,500 gallons of liquid propane storage.

will ignite after the BLEVE has occurred, forming a fireball and possibly a fuel-air explosion, sometimes referred to as a vapor cloud explosion. The greatest number of deaths and injuries and highest value property damage, and thus the largest lawsuit recoveries, typically occur with BLEVEs.

Notable propane BLEVEs include:

- 1972 – Lowell Gas Company, Massachusetts. A tanker truck setting up to unload backed over a pipe. The vapor cloud was ignited by the pilot light on the vaporizer at the plant. One person died and 18 were injured. This was a utility-owned plant where the BLEVE was caused by a third party contractor on the site.
- 1984 – San Juanico, Mexico. A water hammer damaged a feed pipe at an LPG terminal, causing a vapor cloud to drift toward a ground flare. 14 vessels BLEVED over a 5 hour period. 550 people were killed, 2000 people were severely burned and 7,231 people were classified as injured. Projectiles from the BLEVED tanks traveled as far as 1200 meters into surrounding neighborhoods.
- 1998 – Herrig Brothers, Iowa. Two teens riding on an ATV trespassing on the property hit propane piping causing a BLEVE. Two firefighters were killed. This installation was governed by NFPA 58. Again, this instance was caused by a third party on the property and could have been prevented with better security.
- 2008 – Sunrise Propane, Toronto, Canada. The cause of this BLEVE is still officially undetermined. Two were killed, hundreds injured. The BLEVE scattered asbestos across homes in the area, rendering 100 homes uninhabitable.

C. Environmental Risks.

Propane-air plants have a host of environmentally sensitive chemicals that pose risks to their owners. Potentially dangerous substances commonly found at propane-air plants include ethylene glycol, lead-based paint, asbestos, and mercury. As demonstrated above, environmental issues can be triggered by BLEVEs (such as the scattering of asbestos, as happened in Toronto which can be contained in the utility buildings at the plants). However, environmental incidents are more likely to occur in the decommissioning process, especially where tanks must be excavated. Underground tanks of older vintage almost always have asbestos and/or lead paint in the tank coatings which can be scraped or come loose in the excavation process, contaminating soil and groundwater. Mercury switches must also be carefully dismantled and disposed of in accordance with stringent regulations.

The PCB Mega Rule¹⁸ is applicable to some propane-air plants, and is sometimes overlooked in the decommissioning process. The PCB Mega Rule sets requirements governing the abandonment of gas piping upon decommissioning of the plant or the appropriate removal and disposal of the piping. Residual PCBs are present in some natural gas transmission and distribution piping and equipment for a variety of reasons including the former use of PCB-containing compressor lubricants and valve grease in some systems and the reported use of PCB-containing oils to intentionally wet components in older lines. PCBs are predominantly a concern in propane-air plants where a natural gas pad was maintained on the tank for moving the liquid propane. The federal Environmental Protection Agency (EPA) does allow the abandonment of buried gas pipe. However, there are specific steps that must be followed to ensure that the risk of future contamination to the ground and water is minimized. EPA requires that (a) no free liquids remain in the pipe and (b) the pipe will not be excavated at some future date and used in a manner that would result in increased human health risk (such as to convey water). In order to meet the

¹⁸ See 40 CFR Parts 750, 761.

requirements of the PCB Mega Rule for abandoning pipe in place when decommissioning a propane-air plant, gas utilities must ensure that their contractors:

- Drain all pipe of all free-flowing liquid.
- Cap any PCB-contaminated pipe at both ends.
- Seal any pipe containing PCBs at any concentration at both ends after the pipe is either (a) flushed with solvent (with 95% of the solvent recovered), and the last flush contains <50 ppm PCB; (b) the pipe is filled with at least 50% by volume of grout; or (c) the pipe is decontaminated according to EPA's decontamination standards¹⁹ or using a permitted treatment process.
- Seal pipe less than or equal to 4 inches in diameter at both ends and either (a) include in a public service notification program, or (b) fill with at least 50% by volume with grout.

Use of permitted cleaning systems is no longer required for piping, provided that these procedures are followed. It is reasonable to assume that any hardening material that renders the pipe useless if excavated would be acceptable. Use of fly ash cement, for example, is acceptable. The only noted exception is the filling of river or stream crossings with cement only, presumably to minimize leaching or deterioration if the pipe decays.

Utilities or contractors wanting to remove pipe for disposal or salvage may do so subject to specific requirements. Drained gas pipe may be disposed of in a licensed municipal landfill, non-municipal non-hazardous waste landfill, hazardous waste/TSCA landfill, or may be smelted. For any other disposal use or method, the pipe must be decontaminated to EPA standards.

Plant decommissioning must also be done in accordance with the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and the National Ambient Air Quality Standards (NAAQS). NESHAP governs air pollutants not covered by NAAQS that the EPA has found may cause an increase in fatalities or in serious, irreversible or incapacitating illness. The standards for a particular source category require the maximum degree of emission reduction that EPA determines to be achievable, which is commonly known as the Maximum Achievable Control Technology (MACT).²⁰ Asbestos and ethylene glycol, commonly found in propane-air plants, are regulated by the EPA as hazardous air pollutants under the MACT standards. NAAQS apply to outdoor air throughout the country. Primary standards are designed to protect human health, with an adequate margin of safety and are targeted toward sensitive populations such as children, the elderly, and individuals suffering from respiratory disease. Secondary standards are designed to protect the public welfare from known or anticipated adverse effects of a particular pollutant and are targeted toward building facades, visibility, crops and domestic animals. Lead, sometimes found in tank coatings, is regulated under both NAAQS primary and secondary standards.²¹

Decommissioning a plant in some cases should also be done with an eye toward CERCLA²² compliance. To avoid potential future liability, Phase I and, if necessary Phase II environmental assessments should be completed before and after tank removal. Documentation of all soil and groundwater samples should be maintained.

¹⁹ 40 CFR 761.79.

²⁰ See Section 112 of the Clean Air Act and accompanying regulations, found at 40 CFR Parts 61 and 63.

²¹ See 40 CFR 50.12.

²² The Comprehensive Environmental Response, Compensation and Liability Act of 1980. 42 U.S.C. § 9601 et seq.

D. Transportation Issues

The transportation of large ASME pressurized vessels, such as those removed from propane-air plants, presents unique logistical and regulatory issues. Utilities should familiarize themselves with the transportation process and requirements and ensure that contractors are duly qualified and experienced with such loads. Transportation of these tanks, known as “oversized loads” and “superloads” can require specialized roadway engineering, permits and often state police escorts.

Generally, the defining characteristic for a superload, as opposed to an oversized load is weight, but certainly length, width and height are also factors. A superload traveling by truck is first defined by the respective state Department of Transportation through which it is traveling. Unfortunately, every state is different. The lead time for permits is usually a minimum of 10 days but in some states the minimum can be 8 to 10 weeks. These permit lead times do not include the time necessary to conduct a route survey, which is necessary to determine whether the load can fit under bridges and overpasses or travel across culverts and bridges. Special considerations often arise on a state-by-state basis. For example, in Kansas, there are many underground mines which must be considered when planning to travel over the road with more than a 100,000 pound cargo.

Each respective state Department of Transportation has the final authority over how the load will be transported, over what route, at what times, at what speed and how many accessory vehicles the transportation company will need for the job (escorts, pole cars, police, utility companies, etc.). A 10-axle superload in one state might require 12 axles in another state, so even the dollies and equipment used must conform to the most restrictive state through which the tanks will travel or modifications will be required along the way.

The State of Pennsylvania, for example, defines a superload as “[a] vehicle or combination or load having a gross weight exceeding 201,000 pounds, a total length exceeding 160 feet, or a total width exceeding 16 feet; except that the following shall not be considered a superload:

- (i) A building moved under § 179.11(b) (relating to special vehicle load restrictions).
- (ii) A vehicle or combination moved across the highway under sections 4965 or 4966 of the act (relating to single permits for multiple highway crossings and permit for movement of quarry equipment).
- (iii) A dragline moved across the highway under the permit.”²³

Conversely, the State of Maryland defines a superload using the same width, but defines the weight of a super load as " 2) ‘Excessive size’ means an overall dimension of 16 feet or more in height, 16 feet or more in width, or 100 feet or more in length. 3) ‘Excessive weight’ means a gross vehicle weight exceeding 60 tons (120,000 pounds). ”²⁴

Thus, a tank that may be a simple oversized load in Pennsylvania becomes a superload in Maryland requiring a police escort. And, if the tank is larger than 12’ wide, it may only be moved through Maryland on Saturdays between the hours of 9 a.m. and noon. Further, if the tank has not been completely purged or contains any residual propane, it must be transported under applicable HAZMAT regulations. In selecting a contractor for transportation, keep in mind that not every heavy haul

²³ 75 Pa.C.S. § 179.1.

²⁴ COMAR 11.04.03.01.01(2) and (3).

transporter is also a HAZMAT-licensed carrier and not every HAZMAT-licensed carrier is a specialized heavy haul transporter.

IV. The Decommissioning Process.

Once a utility has determined to decommission a propane-air plant, it must select a vendor. Few utilities have the in-house expertise or manpower to perform a decommissioning. However, prior to selecting a contractor, it is important to understand the decommissioning process. First, any remaining liquid propane must be removed from the system and storage tanks. At the time of removal, odorant levels in the remaining propane should be tested and the propane should be reodorized before transport, if necessary. After removal, any remaining propane that cannot be removed must be flared and, once the flare will no longer burn, the system must be purged of residual vapors. Purging is typically done with either nitrogen or air. Once the tanks have been completely purged, the tanks are excavated (if mounded or underground). The contractor should verify that all data plates are legible and intact, otherwise the tanks may have to be recertified, if possible, before being resold or reused for pressurized service.²⁵

After excavation, the tanks, vaporizers, compressors and other equipment will be dismantled and prepared for transport. All piping will be cut and capped, typically 6 inches below grade unless specified otherwise. Hazardous materials, including ethylene glycol and mercury switches, if any, will be collected and properly disposed of. Appropriate cranes and rigging will be used to lift the tanks from their piers and onto trucks for transport. Concrete piers will be demolished and the entire site regraded, either using existing materials or clean fill, depending on the requirements of the project.

On some occasions, a contractor may have presold the tanks and the ultimate customer may require modifications to be made to the tanks (additional valves, flanges, etc.) In such cases, the contractor may desire to perform the work on the utility's property before the tanks are transported. Any modifications made to ASME pressure vessels must be performed by a certified R-stamp contractor and all safety precautions concerning hot work, confined space entry, etc. must be followed.

A. Selecting a Contractor

Probably the two most important issues in ensuring a safe, accident-free decommissioning process are the selection of the contractor and the scope of the work. Turnkey projects are often better

²⁵ A note on data plates: The true value in a decommissioning project for the contractor is the value of the tanks as reusable assets. However, the tanks are only suitable for pressurized service if they meet ASME and NBIC Code, typically demonstrated through the data plate attached to the tank at the time of manufacture. Data plates cannot simply be attached or reattached to tanks if they are missing or fall off. When the stamping on a pressure vessel becomes indistinct or the data plate is lost, illegible or detached, but traceability to the original pressure vessel is still possible, a National Board Commissioned Inspector will instruct the owner or user to have the stamped data plate replaced. All restamping must be done in accordance with the original code of construction. Requests for permission to restamp or replace nameplates must be made to the jurisdiction in which the pressure vessel is installed. Application must be made on the "Replacement of Stamped Data" Form NB-136 (NBIC Appendix 5). Proof of the original stamping and other such data as is available must be furnished with the NB-136 request. The restamping or replacement of data plates must be witnessed by a National Board Commissioned Inspector and must be identical to the original stamping. ASME Code items cannot be restamped with the ASME code symbol. Form NB-136 must be filed with the jurisdiction or the National Board by the owner or user together with a facsimile of the stamping or nameplate as applied and the form must also bear the signature of the National Board Commissioned Inspector who witnessed the replacement. NB-136 can be a time consuming and expensive process. **NB-136 recertification is never guaranteed and is only granted in the discretion of the National Board Commissioned Inspector.** The NBIC Code requires that, to recertify a tank, the Inspector must have irrefutable evidence of traceability.

than piecemeal projects for a number of reasons. In a turnkey project, one general contractor is responsible for the entire decommissioning process, from cradle to grave. This includes the purging, flaring, dismantling, excavation, scrap removal, environmental remediation, and transportation of the tanks and other salvageable equipment. The turnkey contractor should accept full liability and indemnify the utility from the date of contract signing through completion. With a piecemeal project (i.e., different contractors chosen for different portions of the project), the utility must spend a great deal more management time on the project and liability is not always clear. If a project is going to be performed piecemeal, the roles and responsibilities of each contractor must be clearly defined.

Contractor selection plays a critical role in ensuring a safe decommissioning. Propane-air plant decommissioning is a highly specialized, extremely complex undertaking that cannot be performed by any general contractor or demolition company. Contractor candidates should demonstrate familiarity with the process, including all applicable local, state and federal laws and regulations, including:

- Flaring/purging:
 - NFPA 59
 - AGA
 - US DOT Pipeline and Hazardous Materials Safety Administration²⁶
 - State Public Utility Control Authority
 - State and Local Fire Marshal
 - OSHA²⁷
 - Reodorization of any propane removed
 - Drug/Alcohol Testing

- Excavation
 - Local Land Use (Zoning, Wetlands)
 - OSHA

- Environmental
 - PCB Mega Rule
 - CERCLA
 - NESHAP/NAAQS
 - State DEP Requirements

- Tank Recertification
 - ASME
 - NB 136
 - R-Stamp

- Transportation
 - Federal DOT
 - State Superload and Oversized Load Requirements
 - State Police Escort Requirements

²⁶ 49 CFR 192.

²⁷ While AGA flaring/purging guidelines recommend purging to 85% LEL, if cutting torches are to be used to dismantle the tanks or other hot work performed, OSHA requires that the tanks be free of liquid and vapor. See 29 CFR 1910.110(b)(17)(v) (“Open flames (except as provided for in paragraph (b)(11) of this section), cutting or welding, portable electric tools, and extension lights capable of igniting LP-Gas, shall not be permitted within classified areas specified in Table H-28 unless the LP-Gas facilities have been freed of all liquid and vapor, or special precautions observed under carefully controlled conditions.”)

- HAZMAT regulations

Other requirements may be applicable, depending on the requirements of the particular utility and jurisdiction, including, but not limited to, American Petroleum Institute (API) guidelines, American Society of Civil Engineers (ACSE), American Society for Testing and Materials (ASTM), Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS), Plastics Pipe Institute, Inc. (PPI), NACE International, and Gas Technology Institute (GTI).

Contractors should be required to provide references from multiple similar decommissioning projects performed, including documentation of all appropriate permits, authorizations and the process utilized. Contractors should demonstrate that contractor personnel and subcontractors are appropriately trained and hold all necessary certifications, including but not limited to OSHA (10 hour and 40 hour), HAZWOPER, NFPA Fire Safety Training, use and proper operation of combustible gas indicators, heavy haul/HAZMAT transportation licensing, crane operation, and confined space entry, among others. Proposed on-site personnel should be identified and vetted by the utility.

B. Insurance and Bonding.

Insurance is an important consideration in any project, but especially for a propane-air plant decommissioning. Contractors should be required to provide, in addition to general liability, worker's compensation and automobile liability insurance and pollution liability insurance on an occurrence basis in sufficient amounts to protect the utility. Contractors should be vetted to determine how many claims have been made under their insurance for similar projects and how much litigation resulted from the performance of similar projects.

Some form of assurance of job completion should be required by the utility, such as a performance or payment bond. In some cases, unscrupulous contractors have removed the tanks (which carry the highest salvage value within the project) and then left the jobsite, failing to remove the remaining parts and equipment, complete demolition of concrete piers, clean up or remediate any environmental issues or restore the site as required.

C. Documentation.

A site specific health and safety plan must be developed by the proposed contractor and submitted for review to demonstrate familiarity with the hazards present on the job site.²⁸ MSDS sheets must be provided for all materials to be used or encountered at the site. Proposed contractors should identify the make and model of combustible gas indicators to be used and should detail the proper use in a written plan.²⁹ Sampling points should be identified in the plan and reviewed by the utility.

The contract should require the selected vendor to maintain documentation for the project for a specified period of time, including chain of custody documentation for hazardous materials, CGI readings, superload permits and weight slips, and odorization logs and provide copies to the utility.

²⁸ OSHA requires a site specific HASP be developed prior to commencing work at any site containing hazardous materials. See 29 CFR 1926.65(a)(1)(i); (a)(2)(ii). The HASP should take into consideration OSHA requirements contained in 29 CFR 1910.119, at a minimum.

²⁹ Some models of CGI are designed to work in an oxygen-free atmosphere, such as with nitrogen purging, some are not. Instances have been recorded where a tank was certified as inert, but because the wrong model CGI was used the tank was actually still "hot".

V. **Conclusion.**

In many cases, the costs of maintaining propane-air plants for peak shaving outweigh the benefits of the very few times they are used. In those cases, an analysis of the benefits of decommissioning should be performed. Propane-air plants provide the potential for a utility to realize revenue from a little-used asset. However, the decommissioning process is a complex and specialized undertaking that requires extraordinary planning and care. With the right process and contractor, it can be done quickly and efficiently, with little to no impact on operations. If your utility is considering decommissioning a propane air-plant or bulk storage facility, or if you are simply considering upgrading your plant, contact Total Energy at 1-800-682-0181. Total Energy provides free plant assessments and can perform plant modernization, upgrades, code compliance assessments, and full turnkey decommissionings.