Impact

A regulatory impact analysis must accompany every economically significant federal rule or regulation. The Office of Policy Development and Research performs this analysis for all U.S. Department of Housing and Urban Development rules. An impact analysis is a forecast of the annual benefits and costs accruing to all parties, including the taxpayers, from a given regulation. Modeling these benefits and costs involves use of past research findings, application of economic principles, empirical investigation, and professional judgment

Acceptable Separation Distance Standards for Residential Propane Tanks

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Summary of Analysis

Propane is the third most widely used fuel in the United States by number of households, after electricity and natural gas. Residential households primarily use propane for space heating, water heating, and cooking (U.S. Energy Information Administration, 2015). The U.S. Department of Housing and Urban Development's (HUD's) safety regulations establish standards for the acceptable separation distance (ASD) between HUD-assisted projects and hazardous operations that include the storage of substances that have the potential to cause an explosion or fire. Currently, the ASD from an aboveground tank ranges from 125 to 139 feet. The proposed rule would reduce the ASD of aboveground tanks to 10 feet if the capacity of the tank is 250 gallons or less and if the storage tank complies with National Fire Protection Association (NFPA) Code 58 concerning liquefied petroleum gas (LP-gas) (NFPA, 2017).[1]

The benefits of the rule include reduction in costly mitigation measures, increased availability of HUD-assisted projects, and improved administrative efficiencies. The reduction in cost

[1] NFPA is a nonprofit organization that develops consensus codes and standards and provides research, training, and education to eliminate death, injury, property loss, and economic loss due to fire, electrical, and related hazards. NFPA developed Code 58, which provides voluntary consensus standards used by the propane industry for the storage, handling, transportation, and use of LP-gas.

from mitigation measures is estimated to be from $100,000 to $4 million per year and involve approximately 20 projects per year. Given the quality of propane tanks, allowing a more proximate placement of a propane tank to property will present an imperceptible increase of risk to that property. Consequently, the savings from reducing mitigation costs is likely to outweigh the reduced safety benefits.

Costs of the Proposed Rule

The costs of the rule stem from increased danger due to proximity. LP-gas is flammable at a wide range of concentrations. Allowing greater proximity to a potential hazard will expose properties and individuals to greater risk from explosions and fires. The reliability of propane tanks has increased significantly, however, since HUD's rule was originally promulgated more than 30 years ago. HUD's original regulation was based on studies from 1975 and 1982 and so, does not take into consideration increased safety features of new technology in tank designs and updated fire safety codes and standards, including NFPA Code 58.

More recent studies suggest that the evolution of industry safety practices has reduced the probability of propane tank failure (Aherns, 2018, 2017; Flynn, 2010; Hall, 2014). NFPA, for example, asserts that home structure fires in which LP-gas was the type of material first ignited have fallen by 62 percent from 1980 to 2007 (Flynn, 2010), or an average annual decrease of 3.5 percent. Among the reasons for the safety improvement are improved construction techniques and materials and strengthened fire codes (U.S. Fire Administration, 2017).

One study (Bullerdiek, 1986) revealed that particulate contamination; leaks from corroded or damaged piping; nonprofessional installation, inspections, and maintenance; and failure to detect odor or leakage were the major factors leading to appliance failure and subsequent injury. Later studies examined the adequacy of ethyl mercaptan as an odorant to warn residents of potential leaks (Arthur D. Little, Inc., 1987; U.S. Consumer Product Safety Commission, 1987). Many research studies tested several odorants, but ethyl mercaptan remains the odorant of choice.[2] Related to the issue on odorant fading, two new requirements have recently been added to the 2017 edition of NFPA Code 58 to facilitate tracking and recognition of LP-gas. Although the risk of tank failure cannot be totally eliminated through better design, significant progress has been made in safety standards to make HUD's ASD overly cautious.

Benefits of the Proposed Rule

Reduced Costly Mitigation Measures

If a developer is not able to meet the minimum ASD requirement, there are acceptable ways of mitigating the hazard. Those measures—including tank burial, building a blast wall to surround the tank, or building a structure on a HUD-assisted property site to shield a proposed project from the hazard—require an elaborate process involving costly construction procedures. The

[2] This conclusion was based on series of tests and research studies published by the Joint Industry Task Force on Propane Odorization (see Nette, 2017). It is recognized, however, that no odorant will be completely effective as a warning agent in every circumstance. The most recent study is Roscioli et al. (2017).

labor and materials for burying a tank or constructing a blast wall can range from $5,000 to $200,000 per unit.[3] Specifically, the cost of burying a tank ranges from $20,000 to $100,000 per unit, depending on several factors, such as local costs of labor and materials, volumetric capacity of the tank, location of the water table, frost level, and type of soil where the tank will be buried. Additional costs include permit and design fees—especially in an urban environment—corrosion protection, and tank vaulting. Blast walls, which usually are made of concrete block, mortar, or rebar, can range from $5,000 to $200,000 per unit (a wider range than that for tank burial). Aside from the local costs of labor and materials, the type of materials used for the tank, proximity of the wall to the tank (the closer to the wall, the more robust the design of the wall should be), size of the footing of the wall (depending on the size and weight of the wall), and length of the wall are among the other factors that can affect the costs of constructing a blast wall.

The proposed rule would eliminate the need for mitigation measures such as tank burial or a blast wall. Using the available information on the cost per mitigation measure, the construction cost would be $5,000 to $200,000 per unit of mitigation measure. At least 20 mitigation measures per year involve propane tanks of 250 gallons or less in HUD-assisted projects. The aggregate annual reduction in cost would be $100,000 to $4 million (multiply $5,000 to $200,000 by 20). Over a 30-year structure life, the aggregate discounted savings range from $2.0 million to $80.8 million, assuming a 3-percent discount rate, and $1.3 million to $53.1 million, assuming a 7-percent discount rate.

Increased Availability of HUD-Assisted Projects

With the proposed rule, HUD-assisted projects could be closer to propane tanks, increasing the availability and choices for siting projects, especially in areas in need of additional housing units. An estimated 30,890 housing projects with onsite propane tanks could be affected by the proposed rule. Land is usually a significant cost of development and, depending on location, can be the greatest cost. Reducing the amount of land needed for development will reduce a regulatory barrier to development and possibly increase the supply of housing.

Improved Administrative Efficiency

The proposed rule clarifies HUD's regulations on propane containers and aligns them with industry practices. Under NFPA Code 58, the minimum separation distance required for containers between 125 and 500 gallons from a building or line of an adjoining property is 10 feet (NFPA, 2017).[4] Having a regulation more consistent with standard practice makes siting projects easier for HUD grantees.

[3] Estimates include only costs of labor and materials. Other costs such as associated permits, design, and other administrative fees involved in burying a tank or building a blast wall are not included.

[4] See NFPA 58, Table 6.4.1.1. The separation distances are based on the potential hazard of LP-gas; size and type of equipment used to contain it; possibility of leaks (which can ignite); and need for fuel in buildings—not on a worst-case scenario in which the LP-gas container fails catastrophically but as a minimum safe distance for radiant heat exposure to the containers and from the containers. Research has been done to evaluate the effects of radiant heat from fires to LP-gas containers. For example, see Raj (2005).

Conclusion

This proposed rule would reduce the regulatory burden on communities restricted in their ability to site HUD-assisted projects—including low- and moderate-income housing—because of nearby stationary aboveground propane storage tanks. The proposed exception will save HUD grantees the cost of constructing mitigation measures to address residential propane tanks on properties that do not meet the ASD. Based on current technology, developments in industry safety practices, increased awareness to new safety standards, and improved quality of propane tanks, HUD does not expect a noticeable increase in risk.

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