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# Highlights

Highlights of [GAO-07-840T](#), testimony before the Subcommittee on Coast Guard and Maritime Transportation, Committee on Transportation and Infrastructure, House of Representatives

## Why GAO Did This Study

Liquefied natural gas (LNG) is a supercooled liquid form of natural gas. U.S. LNG imports are projected to increase to about 17 percent of natural gas supplies by 2030, from about 3 percent today. To meet this increase, energy companies have submitted 32 applications for new terminals. If a terrorist attack on an LNG tanker caused a spill, potential hazards, such as fire, asphyxiation, and explosions, could result. The Department of Energy (DOE) recently funded a study to conduct small- and large-scale experiments to refine and validate models that calculate how heat from large LNG fires would affect the public.

This testimony is based on GAO's report, *Maritime Security: Public Safety Consequences of a Terrorist Attack on a Tanker Carrying Liquefied Natural Gas Need Clarification* (GAO-07-316). To prepare this report, GAO examined the results of six recent studies on the effects of an LNG spill and convened a panel of 19 experts to identify areas of agreement on the consequences of a terrorist attack on an LNG tanker.

## What GAO Recommends

GAO recommended that DOE incorporate the key issues GAO's expert panel identified, particularly the potential for cascading failure, into its current LNG study. DOE concurred with this recommendation.

[www.gao.gov/cgi-bin/getrpt?GAO-07-840T](http://www.gao.gov/cgi-bin/getrpt?GAO-07-840T).

To view the full product, including the scope and methodology, click on the link above. For more information, contact Mark Gaffigan at (202) 512-3841 or [gaffiganm@gao.gov](mailto:gaffiganm@gao.gov).

## MARITIME SECURITY

# Opportunities Exist to Further Clarify the Consequences of a Liquefied Natural Gas Tanker Spill

## What GAO Found

The six studies GAO reviewed examining the potential effect of a fire resulting from an LNG spill produced varying results; some studies also examined other potential hazards of a large LNG spill and reached consistent conclusions on explosions. Specifically, the studies' conclusions about the distance at which 30 seconds of exposure to the heat (heat hazard) could burn people ranged from less than 1/3 of a mile to about 1-1/4 miles. Sandia National Laboratories (Sandia) conducted one of the studies and concluded, based on its analysis of multiple attack scenarios, that a good estimate of the heat hazard distance would be about 1 mile. Federal agencies use this conclusion to assess proposals for new LNG import terminals. The variations among the studies occurred because, with no data on large spills from actual events, researchers had to make numerous modeling assumptions to scale up the existing experimental data for large LNG spills. Three studies considered LNG vapor explosions and concluded that such explosions are unlikely unless the vapors were in a confined space. Only the Sandia study examined the potential for the sequential failure of multiple tanks on the LNG vessel (cascading failure) and concluded that only three of the five tanks in a typical tanker would potentially be affected, and that such failure would increase the duration of the LNG fire.

GAO's expert panel generally agreed on the public safety impact of an LNG spill caused by a terrorist attack, disagreed on specific conclusions of the Sandia study, and suggested future research priorities. Experts agreed that the most likely public safety impact of an LNG spill is the heat impact of a fire and that explosions are not likely to occur unless LNG vapors are in confined spaces. However, the experts did not all agree with the heat hazard and cascading failure conclusions reached by the Sandia study. Finally, they suggested priorities to guide future research aimed at clarifying uncertainties about heat impact distances and cascading failure. DOE's recently funded study involving large-scale LNG fire experiments addresses only some of the research priorities the expert panel identified.

### LNG Tanker Passing Downtown Boston on Its Way to Port



Source: GAO.