



U.S. House of Representatives
Committee on Transportation and Infrastructure

James L. Oberstar
Chairman

Washington, DC 20515

John L. Mica
Ranking Republican Member

May 4, 2007

David Heysfeld, Chief of Staff
Ward W. McCarragher, Chief Counsel

James W. Coon II, Republican Chief of Staff

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Coast Guard and Maritime Transportation
FROM: Subcommittee on Coast Guard & Maritime Transportation Staff
SUBJECT: Field hearing on "The Safety and Security of Liquefied Natural Gas (LNG) Terminals"

PURPOSE OF THE HEARING

On May 7, 2007, at 10:00 a.m., in the Brookhaven Auditorium in Farmingville, New York, the Subcommittee will meet to examine the safety and security of Liquefied Natural Gas ("LNG") terminals and their impact on port operations. The hearing will also examine the proposed Broadwater floating LNG terminal in Long Island Sound.

BACKGROUND

Shipping Liquefied Natural Gas (LNG)

When natural gas is cooled to a temperature of less than 260 degrees Fahrenheit, it becomes a liquid. As a liquid, natural gas occupies only 1/600th of the volume it occupies as a gas – so a larger quantity can be stored in a smaller space.

LNG is shipped as a liquid. LNG shipping began in 1959. Historically, less than one percent of the total amount of natural gas utilized in the United States was imported – because domestic production capacities yielded cheap gas in large quantities. However, as the use of natural gas in the United States has increased (due to low prices in the 1980s and 1990s), domestic production capacity has not kept pace with demand and prices have risen – making imported gas competitive with domestically produced gas.

On-Shore Facilities

By definition, a facility is considered to be “on-shore” if it is located within three miles of shore (that is, in the waters controlled by coastal states), except off Texas and the West coast of Florida where a facility is considered “on shore” if it is within three leagues (approximately nine miles).

At the present time, there are only five active, on-shore LNG import facilities in the United States:

- Everett, Massachusetts
- Cove Point, Maryland
- Lake Charles, Louisiana
- Elba Island, Georgia
- Penuelas, Puerto Rico

In some cases, these LNG terminals are not physically on land. For instance, at Cove Point, Maryland, ships dock at an LNG terminal pier that is 1¼ miles from shore.

The process governing the siting of off-shore facilities involves different agencies from the process pertaining to on-shore facilities. This memorandum examines the siting of on-shore facilities.

Agencies and Entities Regulating LNG Terminal Sitings and Operations

A new on-shore, LNG facility must obtain approximately 100 permits and approvals from a variety of Federal, state, and local agencies before the project can begin construction. This memorandum provides a brief overview of some of the main regulatory requirements governing the siting of on-shore LNG facilities.

In general terms, the U.S. Department of Transportation (“DOT”) is responsible for setting safety standards for on-shore LNG terminals (due to its regulatory authority over pipelines) – including the siting, construction, and operation of these facilities. However, DOT does not approve or deny specific siting applications – that authority resides with the Federal Energy Regulatory Commission (“FERC”).

Federal regulations do not contain requirements for remote siting of LNG terminals. However, the Pipeline Safety Act requires DOT to consider the need to encourage the remote siting of LNG terminals. The Governmental Accountability Office (“GAO”) testified to Congress in 1979 that the public could best be protected by placing LNG terminals away from population centers.

FERC enforces the standards set by DOT – but also has the authority, pursuant to a memorandum of understanding between FERC and DOT, to set more stringent standards for facilities when these are warranted.

The Coast Guard participates in reviewing applications as a cooperating agency. Its specific role is to conduct a Waterway Suitability Assessment (“WSA”), which assesses the potential impact

of an LNG terminal on existing maritime operations in the vicinity of the proposed terminal as well as the security risks that the proposed site may pose. The WSA also evaluates the potential thermal effects of a pool fire that could occur at a terminal site.

The development of the WSA runs concomitantly with the assessments conducted by FERC, including development of an Environmental Impact Statement. Upon receipt of a WSA, the Coast Guard submits it to review by a committee of stakeholders from the port at which the terminal is proposed to be located and may even conduct public meetings to solicit public comments on the WSA. Upon conclusion of the review, the Coast Guard reaches a preliminary determination about the results of the WSA and communicates its findings to FERC in a document called the Waterway Suitability Report (“WSR”).

The U.S. Army Corps of Engineers maintains its responsibility for any dredging required to provide suitable access channels needed by the terminal.

Other agencies are involved in specific aspects of the regulation of issues associated with terminal siting, including the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce (review and consultation under Endangered Species Act), the U.S. Department of the Interior (review and consultation under Endangered Species Act), and the Environmental Protection Agency (permitting under the Clean Air Act, processing wastewater permits, etc.).

The authority to approve the siting of a facility rests solely with the Federal Government for on-shore facilities. In contrast, under the Deepwater Port Act, the Governor may veto a project built beyond State waters. States also have the authority to regulate issues pertaining to coastal zone management, environmental control, and certain other matters for on-shore facilities.

Safety Concerns Surrounding On-Shore LNG Terminals

Several safety concerns regarding on-shore LNG terminals are discussed below.

Safety Exclusion Zones: Federal safety regulations require LNG terminals to be surrounded by “exclusion zones” designed to protect neighboring sites from fires and/or flammable cloud vapors. Critics argue that current regulations produce exclusion zones that are too small – and that siting plans may not adequately anticipate the results of terrorist acts or other accidents. A report recently released by GAO examined six studies on the potential effect of a fire resulting from an LNG spill and found that they produced varying results – in large part because there is a lack of data on large spills from actual events and because the various studies utilized different modeling assumptions.

Safety Hazards in the Marine Environment: There are several concerns pertaining to potential LNG spills in water. First, if a spill occurs near a source of ignition, the LNG will burn, even if the spill is on water. As the LNG spreads across the water, the LNG will continue to burn creating what is known as a “pool fire”. Pool fires cannot be contained and will burn until all LNG is consumed in the fire. Further, such fires burn hotter than regular gas fires – and may emit thermal radiation that could burn people nearby. Second, LNG spilled on water is theoretically capable of re-gasifying almost instantly – creating a vapor cloud that may also explode if it finds a

source of ignition. Importantly, however, unlike gas, LNG dissipates completely and leaves no residue – so environmental damage will result only from the fires associated with LNG emissions.

Role of the Coast Guard in Securing LNG Tankers

LNG tankers in use today are double-hulled. The Coast Guard indicates that LNG tankers have carried more than 40,000 LNG shipments since international shipping began in 1959 and there has never been a breach of a ship's cargo tanks or a major LNG spill. The Coast Guard further reports that there have been approximately 30 LNG tanker safety incidents (including leaks as well as groundings and collisions) through the year 2002. Of these incidents, 12 involved small spills but none ignited.

Currently, there are more than 200 LNG tankers in operation and approximately 100 additional tankers are under construction. None of these tankers fly the flag of the United States.

LNG tankers calling on the United States are required to submit detailed vessel plans to the Coast Guard's Marine Safety Center ("MSC") before they may enter United States waters. The MSC conducts on-site verifications to ensure that the tankers meet applicable construction standards and then issues a Certificate of Compliance valid for two years.

Like all ships calling on the United States, LNG tankers are required to provide notice of their impending arrival 96 hours before reaching a U.S. port. When an LNG tanker is transiting a port or the approaches to a port, the Coast Guard escorts the tanker and enforces special security zones around the vessel to prevent other vessels from approaching it. The Coast Guard also reports that it will board LNG vessels at-sea prior to their arrival.

Safety History of Existing LNG Terminals

In 1944, a storage tank that was not outfitted with an impoundment dike failed at an LNG terminal at Cleveland, Ohio, resulting in a spill and subsequent explosion that killed 128 people. In January 2004, an accident at a terminal in Algeria killed more than 100 people.

In 1979, an accident at the Cove Point LNG facility in Maryland resulted in several fatalities and the terminal ceased operations until recent years. Cove Point is a unique terminal because ships dock to a pier located 1¼ miles off-shore. The terminal is then connected to shore by a tunnel constructed using rectangular blocks sunk directly into the water. These tunnels include electrical conduits. The accident occurred when gas leaked on the site and was ignited by a spark. Regulatory changes have since been made to ensure the safety of facilities of similar design.

Increased Interest in Developing LNG Terminals

There are approximately 40 LNG terminal projects that are in some phase of seeking permits from FERC (for on-shore sitings) or from the Coast Guard and the Maritime Administration (for off-shore sitings). The majority of the applications are for on-shore facilities. Recent interest in building LNG terminals arises not only from the rising cost of natural gas but also

from recent statutory and regulatory changes intended to streamline the permitting process for such facilities.

Proposed Broadwater LNG Terminal in Long Island

Broadwater Energy LLC, which includes Broadwater Pipeline LLC, is a joint venture of TransCanada PipeLine and Shell US Gas and Power LLC. Broadwater Energy is proposing to construct and operate a permanently moored LNG import, storage, and re-gasification facility to be located in Long Island Sound and known as “Broadwater”.

Overview of the Proposed Broadwater Terminal

Broadwater would be located near the middle of Long Island Sound approximately nine miles from the shore of Long Island and 11 miles from the shore of Connecticut. Long Island Sound covers 844,800 acres; the proposed Broadwater terminal would be located on fewer than five acres but would require a security zone likely to extend for approximately 1,000 acres.

The Broadwater terminal is designed to receive, store, and re-gasify one billion cubic feet of LNG per day – enough LNG to generate approximately 5,800 megawatts of electricity or approximately 50 percent of the gas-fired electricity generated in New York City, Long Island, and southern Connecticut. Broadwater Energy estimates that approximately 50 percent of the natural gas from the proposed terminal would be transported to New York City, 25 percent to 30 percent would be transported to Long Island, and the remaining gas would serve customers in Connecticut. According to documents produced by Broadwater, these supplies would produce household energy cost savings of approximately \$300 per year in New York, Long Island, and Connecticut.

The proposed Broadwater terminal will consist of a Floating Storage and Re-gasification Unit (“FSRU”) approximately 1,215-feet long, 200-feet wide, and rising 80 feet above the water line; the FSRU will draw approximately 40 feet of water and will float in water 90-feet deep. The FSRU, which will be shaped roughly like a maritime vessel, will have eight LNG tanks, each capable of holding approximately 44,850 cubic meters of LNG. The cargo containment system will be protected by a double hull. The terminal will receive shipments of LNG from LNG tanker ships approximately two to three times per week.

The FSRU will be held in place using a yoke mooring system attached to a stationary tower secured to the seafloor by a four-legged support structure, which will also connect the FSRU to the pipeline through which natural gas will be transported away from the terminal. The terminal design, which is expected to have a lifespan of 30 years or more, has been specially engineered to survive strong wind storms and high wave conditions.

The Broadwater terminal will link to the existing Iroquois pipeline through a pipeline 30 inches in diameter laid beneath the seafloor and connecting to a subsea interconnection approximately 22 miles from the FSRU mooring location.

The construction of the mooring facility and the laying of the associated pipeline will cause some disruption of bottom sediments on the seafloor. The planned pipeline installation method involves the use of a subsea plow to lower the pipeline to a depth of five feet for the first two miles

of pipeline and a depth of three feet for the remaining length of the pipeline. Broadwater reports that all but 10 percent of the trench created by the subsea plow will be allowed to backfill naturally through sediment deposition.

Assuming that the proposed terminal is approved by FERC, construction of the Broadwater facility is proposed to proceed in two phases. The first phase would include the installation of the subsea pipeline between October 2009 and April 2010. The second phase of the project would include the installation of the yoke mooring system, the hookup of the FSRU, and the connection of all project components between September and December 2010.

Other Terminal Locations Were Evaluated

Broadwater LLC reports that a number of other potential terminal locations were evaluated, including a variety of on-shore sites. On-water locations were also examined in the Atlantic Ocean and the Block Island Sound, but these sites were rejected because weather conditions would have created numerous periods when tankers could not have unloaded LNG at these sites. These sites would also have required longer pipelines to reach the Iroquois pipeline.

The site in Long Island Sound was chosen because it was a centralized site in the Sound that was protected from the open ocean, maximized the distance from shore (therefore lessening potential impacts on populated areas), and reduced interference with recreational boating and commercial activities that are prevalent in the western portion of the Sound and along the Sound's shorelines.

Waterway Suitability Assessment/Security Assessment

The Coast Guard Captain of the Port for Long Island Sound submitted the WSR on September 21, 2006, following completion of the WSA. The Coast Guard did not express support for or opposition to the proposed terminal but did identify safety and security issues that must be addressed as part of the development of the terminal if the project is approved by FERC.

Importantly, however, the Coast Guard indicated in the WSR that "Based on current levels of mission activity, Coast Guard Sector Long Island Sound currently does not have the resources required to implement the measures that have been identified as being necessary to effectively manage the potential risk to navigation safety and maritime security associated with the Broadwater Energy proposal." The Coast Guard indicates that, to provide the resources to implement the necessary security measures, it would need to either curtail current activities or seek additional resources through the budget process. These measures may be carried out by the project operator through funding of State or local marine patrol operations.

The WSR identifies specific risk management strategies to manage the risks associated with the Broadwater terminal.

Security of the Proposed Broadwater Terminal: According to the Coast Guard's WSR for the Broadwater terminal, there are "currently no known, credible threats against the proposed Broadwater Energy facility." However, the Coast Guard indicated that periodic threat assessments would need to be conducted to assess changing threat scenarios and ensure that adequate security measures are in place.

The Coast Guard also indicates that the relatively remote location proposed for the terminal (in the middle of Long Island Sound) will require the projection of law enforcement capacity to that location. The Coast Guard indicates that the probable security regime would consist of a mix of Coast Guard and state and local law enforcement units. According to the WSR, State and local law enforcement units will require additional personnel, training, and equipment to provide security to the Broadwater terminal – and the Coast Guard indicates that Broadwater would be responsible for brokering a cost-sharing arrangement to cover the costs that would accrue to state and local law enforcement to meet these needs.

Further, the Coast Guard indicates that existing marine firefighting capabilities in Long Island Sound are inadequate and must be enhanced before the Broadwater terminal becomes operational.

Security of LNG Tankers in Long Island Sound: The anticipated LNG transit routes to the proposed Broadwater terminal are at least three miles from the shoreline at all locations except in the vicinity of Fishers Island and Plum Island, where the shoreline is between 1.1 and 1.3 miles from the proposed transit routes. The Coast Guard indicates that the security/safety zone around LNG tankers transiting Long Island Sound would extend two nautical miles in front of, one nautical mile behind, and 750 yards to either side of the LNG tanker. This zone would move with the tanker. Assuming a tanker is traveling at a speed of 12 knots, it would require 15 minutes for the zone to clear any one specific point. Vessels that are anchored or drifting in the security zone would need to leave the area through which the zone would pass. Recreational vessels could travel outside of the security zone and still remain within the Sound. The Coast Guard has indicated that considerations of recreational use would factor into the scheduling of LNG tanker transits.

Vessel Traffic in the Sound: The Coast Guard reports that between 2003 and 2005, there was an average of 462 foreign flagged vessels call on ports in Long Island Sound on an annual basis while 4,000 to 7,000 domestic commercial vessels transit the Sound. While the introduction of LNG tankers would increase the traffic of foreign flagged vessels by 20 to 30 percent, these tankers would increase the total amount of commercial vessel traffic in the Sound by less than one percent. In addition, there are several commercial ferry systems operating between Connecticut, Rhode Island, and Long Island that would cross the transit route that would be followed by an LNG tanker.

Draft Environmental Impact Statement (DEIS)

FERC issued the DEIS for the Broadwater terminal on November 17, 2006. The DEIS concludes that “approval of the proposed Project with appropriate mitigating measures as recommended, would have limited adverse environmental impacts.” Further, the DEIS concludes that this proposed location results in fewer environmental impacts than any alternatives considered as part of this assessment.

FERC is expected to issue the final environmental impact statement for the Broadwater facility sometime during the summer of 2007. Decisions on additional pending applications for permits related to the proposed construction of the facility are anticipated in the mid- to late-2007 time period.

WITNESSES

PANEL I

The Honorable Steve Levy
County Executive
Suffolk County, New York

The Honorable Brian Foley
Supervisor, Town of Brookhaven
Brookhaven, New York

The Honorable William E. McGintee
Supervisor, Town of East Hampton
East Hampton, New York

The Honorable Kevin McCarrick
Councilman, Town of Brookhaven
Brookhaven, New York

The Honorable Marc Alessi
New York State Assemblyman
Wading River, New York

PANEL II

Captain Peter Boynton
Captain of the Port – Long Island Sound
United States Coast Guard

Captain Mark O'Malley
Chief, Ports and Facilities Activities
United States Coast Guard

Mark Robinson
Director, Office of Energy Projects
Federal Energy Regulatory Commission

Mark Gaffigan
Acting Director, Natural Resources and Environment
Government Accountability Office

PANEL III

John Hritcko
Senior Vice President/Regional Project Director

Broadwater Energy LLC

Stephen E. Flynn

Jeane J. Kirkpatrick Senior Fellow for National Security Studies
Council on Foreign Relations

Bruce Johnson

Riverhead Town Fire Marshall
Wading River Fire Department, New York