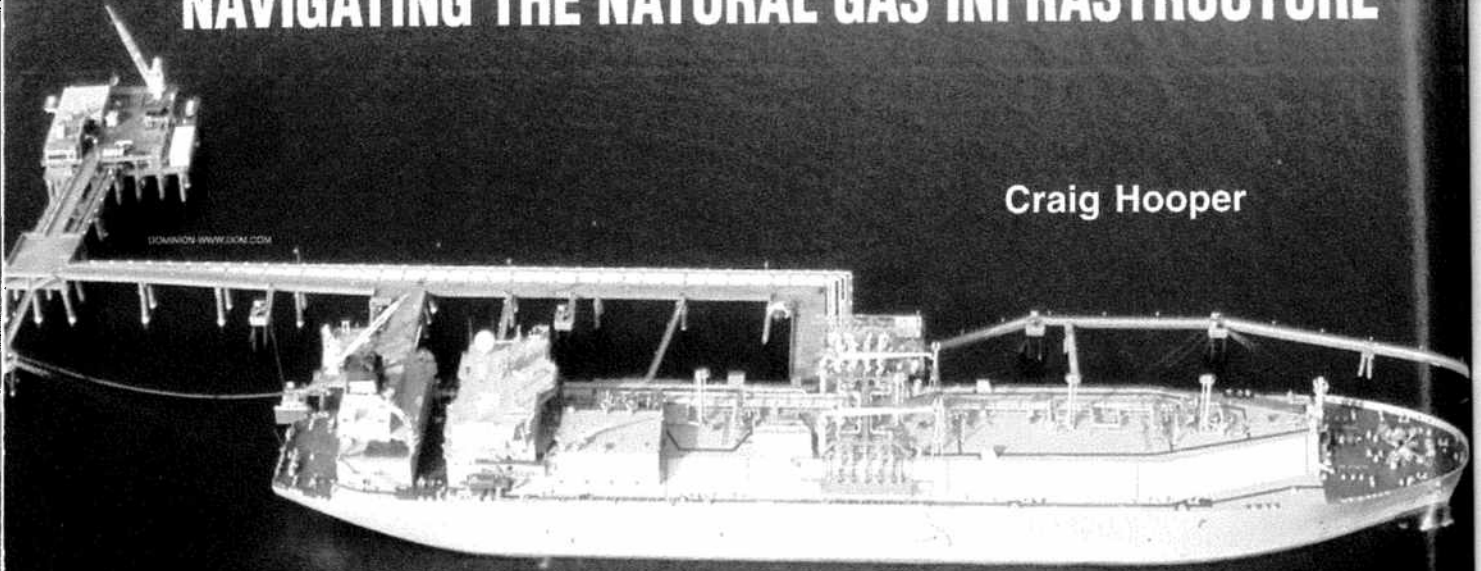


# THE PERIL OF POWER: NAVIGATING THE NATURAL GAS INFRASTRUCTURE

Craig Hooper



The legacy of 1980s liquefied natural gas fear-mongering still exists. However, in the absence of hard factual evidence spin doctors on both sides have the floor. What does this mean for Navy interests and national security?

**A**n energy-starved world is in a race to find new energy sources. Natural gas, distributed through a complex, multi-billion-dollar chain of pipelines, processing plants, and tankers, only recently became a cost-effective source of power. This clean-burning, highly efficient fuel is now in such high demand that the gas industry is preparing to pump \$100 billion a year into infrastructure development for the next 20 years. Most of this development will be in unstable regions or perched in areas that are, at present, critical for efficient naval operations.<sup>1</sup>

For the naval warfighter, natural gas raises many unanswered strategic and tactical questions. Evaluating the potential hazard of natural gas is very difficult, and the technology used in natural gas infrastructure is immature and still under development. The Navy lacks the tools for evaluating this new arrival in the global littoral.

The rapid pace set by gas importers and the accompanying political complexities make natural gas threat assessment a perilous place for naval warfighters whose training in natural gas matters is probably limited to reading Tom Clancy's *The Hunt for Red October*. This, America's first, albeit brief exposure to natural gas security, is an appropriate place to start discussing this multifaceted and complex national-security challenge.

Clancy was the first to widely popularize the idea that liquefied natural gas (LNG) carriers could serve as floating bombs. He did not need to be such a bad influence. On

publication in 1984, Clancy's fear-mongering was dated. American demand for imported natural gas had dried up years before, and as the novel exploded onto the *New York Times* bestseller list, Maryland's Cove Point LNG terminal, a facility briefly featured in the book, was inactive and anticipating a fourth year in mothballs.

Today, however, Clancy's concerns seem rather prescient. American LNG receiving terminals are operating for the first time at full capacity, and with only five overworked terminals in the continental United States ready to accept imported gas, limited access to overseas natural gas is a worrisome—and potentially profitable—economic chokepoint that petrochemical companies are eager to relieve. Cove Point terminal, reactivated only in mid-2003, is adding capacity. About 40 other terminals are seeking permits and approvals for construction.

An industry with huge economic incentives to be the firstest-with-the-mostest in the marketplace has little time for critics. And, when LNG foes exploit fantasy and fiction to stir up anti-gas sentiment, there just are not many effective ways to respond. It is hard to build public support for a new natural gas facility when the movie *Syriana* and former counterterrorism czar Richard Clarke's new novel, *The Scorpion's Gate*, are feeding voters negative natural gas publicity.

In response, petrochemical companies are recruiting public-relations experts, high-priced lobbyists, and fake

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Maryland's Cove Point liquefied natural gas terminal on Chesapeake Bay was reactivated in mid-2003 after 23 years in mothballs.

grassroots campaigners to overcome the "Clancy Effect." Temptation to use these heavy-handed tools of perception management in papering over genuine security questions or operational challenges is overwhelming.

This highly politicized public-relations war impacts the Navy. Any corruption of the nation's permit and site selection processes puts the United States—and the Navy—in considerable peril. There is no substitute for boisterous, all-American civic engagement, and an educated, informed Navy can do a lot to ensure the debates are rigorous, truthful, and befitting the best traditions of U.S. democracy. In addition, an informed Navy can guarantee that the naval community does not get a raw deal.

### Is LNG a Threat?

Natural gas facilities are, in strategic terms, high thermal-yield targets. But LNG, in terms of energy-per-unit volume, is, for some, a particular worry. Each gallon of the super-cold, liquefied methane gas, when heated to room temperature, becomes more than 600 gallons of the gas used for commercial purposes. To put this in perspective, average-sized LNG tankers hold 150,000 to 200,000 cubic meters of liquid gas—enough energy to fuel 14 million homes for a day.

While it seems, for LNG foes, frightening to have that much energy locked up in a tanker, LNG advocates counter that pure methane is a stable, easy-to-handle fuel that makes a poor choice for those interested in creating a floating bomb. Both sides are correct. Rather than explode, methane vapor, if supplied with just the right amount of oxygen, burns. But when natural gas ignites, the conflagration gets hot enough to compromise structural steel and, at great distances, sear unprotected skin. Beyond these broad parameters, debate over the threat potential of natural gas and LNG becomes highly technical and clouded by dispute.

Some longer-term trends make LNG threat assessment a much more difficult task. Presently, the term "natural gas" lacks a precise technical definition, so comforting threat assessments based on a "natural gas" of pure methane lack relevancy. Depending on the gas supplier, the percentages of explosive propane, butane, ethane, or other heavy hydrocarbon contaminants can vary, potentially modifying the characteristics of a normally sedate, pure methane cargo. The negative security implications of mixed methane and heavy hydrocarbon cargoes have yet to be fully understood, and the developing global market for LNG makes cargoes of this "hot" natural gas difficult to track.<sup>2</sup>

While gas composition is a safety issue, the technologies used to transport natural gas are also changing. Today, the world LNG fleet consists of robust, tough ships. In 1981, the LNG carrier *Taurus* held together after being run hard aground and battered for three stormy days. But as natural gas importers hurry to double the global fleet of gas carriers and tanker operators are pressured by increased competition, crew quality will suffer and the large safety margins engineered into present-day LNG carrier designs will shrink.

Similar dynamics—rapid growth combined with a rush to exploit economies of scale—influenced early oil supertanker development. As tankers got bigger, technology outpaced safety engineer expertise, and, in December 1969, an overlooked design error caused three flawed supertankers to explode within a 16-day period. Unlike oil shippers, natural gas exporters have far too much energy at stake, and can ill-afford to design by trial and error. Present trends, however, are worrisome. Several brand-new LNG carriers were recalled from service last year because of cargo containment issues, and even more sophisticated pressurized LNG and compressed natural gas carriers are under development.

LNG tankers, though they hold an enormous amount of energy, comprise only a single, high-profile piece of a sprawling and vulnerable distribution system. Within



*The three-year-old Granatina, sailing for Shell Gas & Power, is typical of the new generation of LNG carriers. Her 114,000-ton displacement supports more than 140,000 cubic meters of cargo.*

this infrastructure, however, occasional accidents are inevitable. From a security standpoint, every gas storage facility, every distribution pipeline, and even the software that guides gas from wellhead to consumer are avenues for potential exploitation. The threat of either accident or sabotage is a constant concern.

### Security

Threat assessment information is difficult for naval personnel to access or verify. The truth is elusive, with flawed analysis favorable to the gas industry being promoted,

while more negative studies are attacked or classified as too sensitive for public release.<sup>3</sup>

There are signs of concern. During the first Gulf War, Navy Vice Admiral John B. LaPlante requested the destruction of a liquefied natural gas plant at the port of Ash Shuaybah, Kuwait. Marine planners working up assault plans worried that the facility could “turn into a fireball”



*The unpredictable results of destroying the liquefied natural gas plant at the port of Ash Shuaybah, Kuwait, saved it from attack and the port from invasion during the first Gulf War.*

if the plant “were blown up by the Iraqis or accidentally ignited during the landing.” Army General Norman Schwarzkopf rejected the proposal and nixed the amphibious attack by reportedly saying, “I do not want to destroy Kuwait in order to save it.”<sup>4</sup>

Prudence dictates that natural gas facilities get a wide berth during warfare. But such facilities pepper many

potential global flashpoints, making them hard, if not impossible, to avoid. The Navy needs concrete assessments of the threat posed by natural gas.

So does industry. For an industrial commodity, natural gas has a very good—although imperfect—safety record. Comforting, highly nuanced corporate statements that Boston’s LNG receiving terminal has a three-decade “track record of safe and secure deliveries” mask a history that includes an LNG spill in an adjoining generation plant, a fire and generator failures on off-loading tankers, a tanker cargo spill in the days before 9/11, and an official reprimand over security training. This less-than-forthright papering over of an average safety record creates a false sense of confidence.

Such trends are disturbing because the military is, at present, over-reliant on natural gas industry-affiliated experts for threat assessments. A steady diet of best-case, hair-splitting non-assessments risks creating command and force protection biases that are ripe for exploitation by sophisticated opponents.

Natural gas threat assessments need to be grounded in concrete data. Everybody has a fancy quantitative model, but nobody, not even the big maritime insurance companies, has real-world data on actual vulnerabilities. The Navy must get this information, and, though the up-front expense might be difficult to justify, it might be a good idea to use some older, scrap-bound natural gas carriers for target practice.

Anti-tank weapons, mortars, rocket-propelled grenades, anti-infrastructure munitions, and sniper rifles are all considered potential hazards to natural gas infrastructure. Weapon-specific vulnerability assessments are sketchy, but, during the Iran-Iraq War, rocket-propelled grenades and some air-to-ground rockets compromised fuel containment structures on liquefied petroleum gas (LPG) carriers—but LPG, with a much lower thermal output per unit volume than LNG, makes a poor model for LNG accidents.

The only appropriate way to solve this question is for naval analysts, with assistance from insurance experts, to conduct trials on the real thing. Either that, or be content to wait until some pirates conduct their own tests. The problem is that terrorists can, of course, conduct their SINKEX (sinking exercise) anywhere—in Nigeria, Algeria, or even at the LNG terminal in Boston Harbor.

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## Encroachment

While security assessments are vigorously debated, the extensive impact of encroachment by natural gas infrastructure on naval research and development areas, training centers, and other critical facilities is indisputable. As more and more commercially viable coastal areas turn away this uncomfortably critical infrastructure, the Navy can only expect pressure to host natural gas facilities will increase.

Some skirmishing is under way. The Narragansett Bay Shallow Water Test Facility, a part of the Naval Undersea Warfare Center in Newport, Rhode Island, was completely excluded from discussions on a proposal to build a liquefied natural gas facility in nearby Fall River, Massachusetts. A last-ditch court filing that claimed the regular transit of large, often foreign-flagged tankers through the facility would "significantly impact cost, schedule, program development risk, as well as fleet delivery" of "critical Navy programs" was withdrawn in early 2006, just before Navy Secretary Donald C. Winter visited the region. After the court fight ended, the company immediately shifted the goalposts on the Navy by revealing that smaller tankers, making twice the number of transits, would supply the Fall River LNG facility.<sup>5</sup>

The Navy is adrift, unable to plot a course between economic and physical security. Official guidance, beyond broad presidential enthusiasm for more LNG imports, is lacking, and deference to security or other concerns from within the armed forces, on the part of civilian Pentagon leadership, is hard to find. In December, Defense Secretary Donald Rumsfeld put a damper on natural gas drilling off the Florida coast, and stated drilling was "incompatible" with planned military activities there. But leadership of a more substantive sort is needed. Without debate, strong analytical support, and a wide-ranging Defense Secretary-endorsed plan to handle natural gas encroachment, mid-level officers will simply be consigned to wage a series of losing battles at lower-profile facilities.

Natural gas companies are looking for ways to work with bases. In 2004, former Marine Commandant General P. X. Kelley was directly involved in advancing Chevron-Texaco's efforts to gain access to Camp Pendleton, the giant Marine training base on the Southern California coast. The general was a partner in a small company, Penguin Partners, which worked with Chevron-Texaco to help siting and permitting of a liquefied natural gas receiving terminal on the West Coast.

Far too many leaders within the national security community are, given the Navy's analytical void, relying on natural gas importers to serve up unbiased information about natural gas infrastructure. It is very easy to forget

*The national-security community must discover the extent of the United States' Cold War-era dalliance with economic warfare.*

that corporations have interests that may be at odds with prudent national-security judgment. And when the perks are nice, the presentations crisp, and the company pleasant, it is just as easy to forget that, as General Kelley told Congress in 1983, days after the Marine Barracks bombing in Beirut, there are "skilled and professional terrorists out there right now who are examining our vulnerabilities."

## Economic Security

The bottom line is that natural gas facilities are militarily significant, and shadowy practitioners of economic warfare can be expected to exploit U.S. missteps both at home and abroad.

Non-state advocates of unrestrained economic warfare are building on more than 20 years of success against petrochemical targets. Before the 9/11 attacks, al Qaeda affiliates, entering the United States on board ill-managed and almost derelict LNG tankers, became familiar with natural gas infrastructure.<sup>6</sup> As powerful weaponry becomes increasingly portable, the terror threat to petrochemical infrastructure remains acute and underestimated. With terrorist manuals offering details on how to turn LNG tankers into floating bombs, and al Qaeda deputy leader Ayman al-Zawahiri's call to attack petrochemical infrastructure last December, the likelihood of terror attacks on natural gas infrastructure should be accepted as significant.

Economic warfare is a feature of state conflict, too. According to KGB defector Vasili Mitrokhin, the Soviet Union spent decades documenting vulnerabilities in natural gas and other critical American infrastructure. This activity continues. In 2004, a high-level Russian diplomat was caught snapping photos of the Cove Point gas terminal and the neighboring Calvert Cliffs nuclear power plant.<sup>7</sup>

Russia was not alone in targeting natural gas infrastructure. In his book *At the Abyss: An Insider's History of the Cold War*, Thomas Reed, former Secretary of the Air Force and Reagan-era National Security Council staffer, notes that the United States, with allies, degraded the Soviet economy by exploiting natural gas. The results were quite spectacular. Counterintelligence operatives, using information from KGB defectors, fed bug-laden software to Soviet agents seeking pipeline technology. The hidden Trojan horses exploited poor Soviet construction standards and pipeline maintenance practices to cause accidents. By resetting "pump speeds and valve settings to produce pressures far beyond those acceptable to the pipeline joints and welds" the "modified" Western technology the Soviets had pilfered generated "the most monumental non-nuclear explosion and fire ever seen from space" in June 1982.<sup>8</sup>



The Norman Lady, shown arriving in July 2003 at Cove Point, Maryland, to make the facility's first delivery in more than two decades, had been involved in a collision with the USS Oklahoma City (SSN-723) nine months earlier.

The Navy is wise to note that Russian petrochemical interests have proved adept at exploiting civic shortcomings to gain a surer strategic lodgment in Western democratic societies. Cheap gas from an under-regulated Gazprom foothold, put in place by semi-legal political gamesmanship, can quickly become a crippling economic stranglehold.

Without an analytical focus the Navy will continue losing when it bumps up against natural gas. Just as the attack submarine USS Oklahoma City (SSN-723) was put out of action in 2002 after colliding with the LNG carrier Norman Lady in the Straits of Gibraltar, naval operational and security prerogatives risk running into hard-charging economic interests. On a tactical level, if the Navy is forced to make decisions based on neatly phrased information from a well-compensated lobbyist or public

relations person, the nation is in serious trouble. But it is just as wrong to use Tom Clancy-like fear-mongering as a guide. There are no easy answers when economic and physical security interests collide, but the Navy had better start helping the nation find some solutions right now.

Such revelations color all future natural gas trade with Russia while, at the same time, the leaks associate the West with a string of grim pipeline accidents that were likely to occur without extra assistance. One breach, in June 1989, produced a massive hot gas fuel-air cloud of methane, propane, and other gases that, in time, detonated with a force of 10 kilotons, killing almost 600 passengers on two passing trans-Siberian railway trains. According to Soviet Gas Minister Viktor S. Chernomyrdin, the incident forced a 60% reduction in gas exports, eliminating one of the Soviet Union's few remaining sources of foreign currency at the time.<sup>9</sup>

The national-security community must discover the extent of the United States' Cold War-era dalliance with economic warfare. The likelihood of peer competitors adapting U.S. methods and specifically targeting the just-in-time natural gas market is very high. Reagan-era proponents of cold-eyed economic warfare may squirm a bit, but the United States needs a full, prompt accounting of past covert activities to make informed decisions on securing critical economic infrastructure. A review is warranted, particularly since Gazprom, a global energy giant controlled by the Russian government, is shipping natural gas to the United States and considering the purchase and operation of natural gas infrastructure worldwide. If Russia's defense establishment is, according to the old military adage, preparing to fight its last war, then Gazprom's attempt to seize control of Ukrainian natural gas pipelines in early 2006 becomes very interesting.<sup>10</sup>

<sup>9</sup>Jeff Johnson, "LNG Weighs Anchor," *Chemical and Engineering News*, Vol. 83, Number 17, 25 April 2005.

<sup>10</sup>Y. Bramouille, et al., "Differing Market Quality Specs Challenge LNG Producers," *Oil and Gas Journal*, 2004; "Industry reps, landowners, others debate validity of FERC LNG risk-assessment report," *Platts Inside FERC*, 2004.

<sup>11</sup>R. Gold, "Tanker-Port Study is Being Misused, Says Its Author," *The Wall Street Journal*, 5 December 2003; J. Blum, "Report Assesses Risks of Attack On Tankers," *The Washington Post*, 22 December 2004; M. Reynolds, "Developers Rebut Anti-LNG Claims Before FERC," *The Providence Journal*, 8 October 2004.

<sup>12</sup>E. Marolda, et al., *Shield and Sword: The United States Navy and the Persian Gulf War*, Annapolis, MD: Naval Institute Press, 1998; M. Gordon, et al., *The General's War: The Inside Story of the Conflict in the Gulf*, Boston: Back Bay Books, 1995.

<sup>13</sup>J. Kirkland, "Navy Protests Weaver's Cove LNG Project; Sponsor Stands Firmly Behind Plan," *Platts Inside FERC*, 22 August 2005; "Navy Asks FERC to Reconsider LNG Permit," *Platts Inside Energy*, 2005.

<sup>14</sup>R. A. Clarke, *Against All Enemies: Inside America's War on Terror*, New York: Free Press, 2004.

<sup>15</sup>"Book Preview, Energy Security: Lessons Learned," *Petroleum Economist*, 2004; A. Santana, "Russian Diplomat Queried Over Photos at Gas Terminal," *The Washington Post*, 31 August 2004.

<sup>16</sup>T. C. Reed, *At the Abyss: An Insider's History of the Cold War*, New York: Presidio Press, 2004; W. Safire, "The Farewell Dossier," *The New York Times*, 2 February 2004.

<sup>17</sup>"Seven Charged in Rail Disaster That Killed 575," *The Associated Press*, 29 July 1990; B. Keller, "500 on 2 Trains Reported Killed by Soviet Gas Pipeline Explosion," *The New York Times*, 5 June 1989; "Soviet LPG Supplies Tight in Aftermath of Pipeline Blast," *The Journal of Commerce*, 11 July 1989.

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