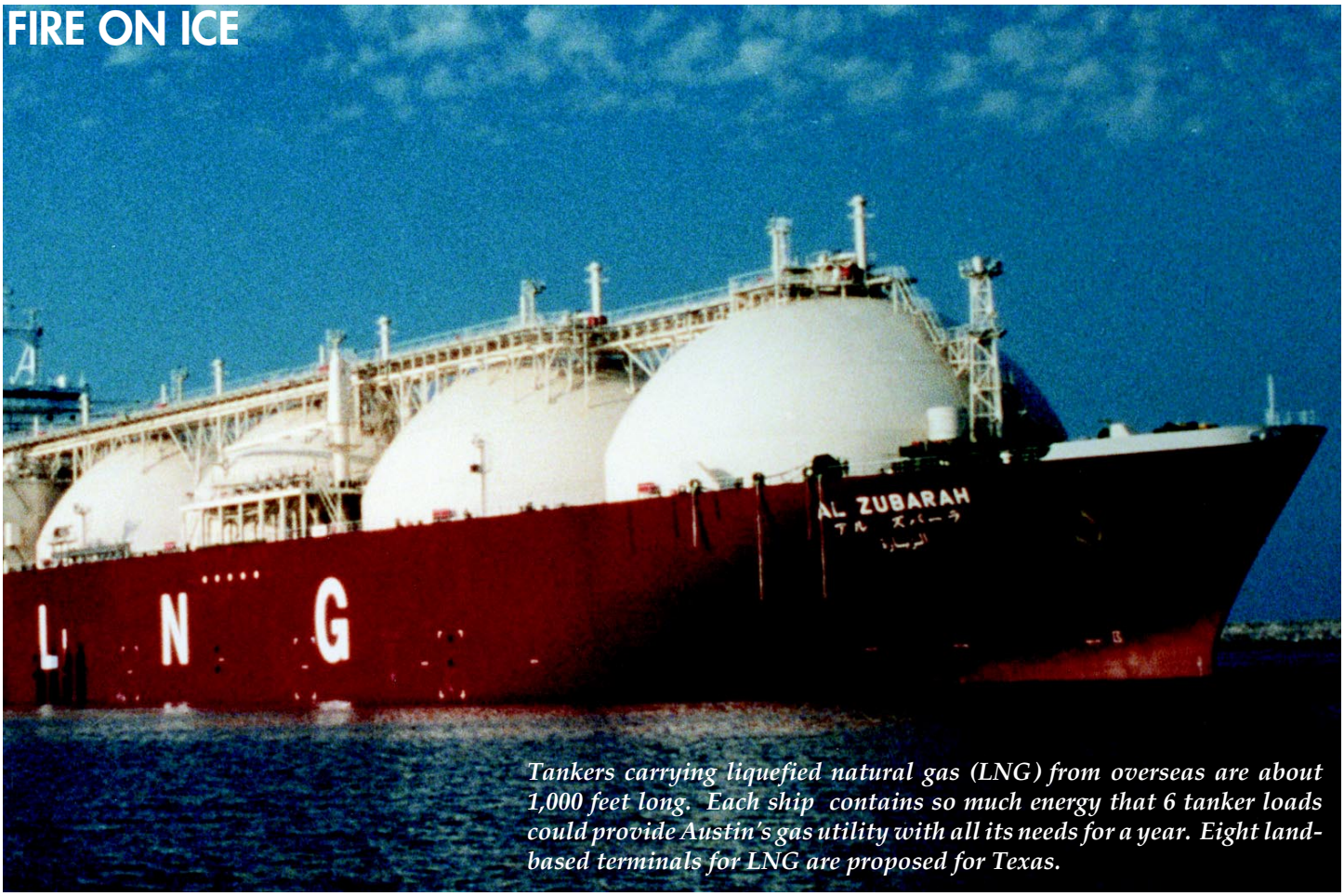
FIRE ON ICE



Tankers carrying liquefied natural gas (LNG) from overseas are about 1,000 feet long. Each ship contains so much energy that 6 tanker loads could provide Austin's gas utility with all its needs for a year. Eight land-based terminals for LNG are proposed for Texas.

After Washington had warned them of the possibility that terrorists were onboard during previous shipments, all transported material had been suspended for 7 weeks until security was reviewed and improved. When the shipment came through the harbor, a fleet of Coast Guard and security escort vessels came loaded for bear. No other ships were allowed passage while she was whisked to port. If any had approached they would have been detained, or in a worst-case scenario, destroyed. Consider the alternative: a successful attack would have destroyed the entire harbor and devastated downtown – the deadly cargo could burn people as far as 4 miles away.

If this passage sounds like a suspense thriller, that is just a coincidence. It happens to be true. After the 9/11 terrorist attacks, Richard Clarke, former antiterrorism czar and author of *Against All Enemies*, ordered that Liquefied Natural Gas (LNG) tanker shipments going through Boston Harbor to Everett, MA, be suspended because of their susceptibility to terrorism.**(1)** There were indeed Al Qaeda operatives infiltrating the U.S. via Algerian LNG tankers to Boston**(2)**, and all future shipments were delayed until a security procedure was created.**(3)** While the LNG industry claims worst-case accidents are almost impossible, theoretically they could be as damaging as a firestorm from a nuclear weapon.**(4)**

Meet the new face of the petroleum industry in America. LNG is natural gas that has been chilled to 259° F below zero.**(5)** This compresses it to 1/610th of its former volume, allowing for shipment in double-walled tankers across the oceans. Upon delivery it is regasified and delivered to customers through standard pipelines. The LNG industry was established in the mid-1960s and has been slowly growing to the point where it now supplies 6% of all the natural gas demand in the world. Currently about 2/3 of the world's LNG is supplied to the gas-poor industrial nations of Asia: Japan; South Korea; and Taiwan. But

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noticeable amounts are exported to Europe, and small but growing amounts find a market in the U.S.

Major exporting nations include: Trinidad; Algeria; Nigeria; Libya; the Middle East countries of Oman, Qatar, and the United Arab Emirates; and the Pacific nations of Australia, Brunei, Indonesia, and Malaysia. New exporters will include Egypt, Iran, Yemen, Norway, and Russia.

In the gas world, the method of transport is determined by distance. After 2,375 miles, LNG is a less expensive method for gas transport than overland pipelines. For undersea pipelines, the breakeven point is only 1,250 miles.

In the past, LNG was a premium-price fuel. It went to gas-poor nations that could afford it, and was sparsely used in North America because of the continent's large domestic supply and its relatively low cost. But the situation has all changed. The U.S. imported 15% of its gas in 2004.**(6)** Most was from Canada, though 2% of total domestic supply was LNG. Natural gas production in both the U.S. and Canada has leveled off, and without conservation efforts, will not supply all of future demand. And this is despite intensive new drilling efforts in North America.

The cost of LNG production and shipping has fallen enormously in the past few years. The breakeven cost of delivered LNG to the U.S. is now $2.50-3.50 per million BTUs.**(7)** This is roughly comparable to the breakeven cost for new domestic gas wells**(8)**, and a barnstorm bargain compared to $14 per million BTUs for gas on the New York Mercantile Exchange in October 2005.**(9)**

And there are enormous supplies in LNG exporting countries. In the past, this overseas fuel was considered "stranded" gas or assets because there was no cost-effective way to market it. Countries with this resource often reinjected gas produced from oil wells back into the ground to add to oil production, flared it, or used to make value-added products such as chemicals and metals with the cheap energy. "Unassociated" gas fields (where gas was not found as a byproduct of oil exploration) were usually ignored.

But again, this has all changed. LNG is now the largest growth sector in the petroleum business, increasing at 7% per year! The U.S. gas industry predicts the need for a $100 billion investment in LNG infrastructure (most of it overseas) by 2010.**(10)** *By 2016, there are predictions that LNG could provide the energy equivalent of between 14-28% of today's domestic gas consumption.***(11)**

There are currently 5 LNG port terminals in the U.S: Everett, MA; Cove Point, MD; Elba Island, GA; Lake Charles, LA, and the Energy Bridge, an offshore location in the Gulf of Mexico. (Two of these, Cove Point and Elba Island, were mothballed for many years due to lack of demand, and only began operating again in 2003.) The capacity of these existing plants is being greatly expanded, and at average levels of operation, they will provide the equivalent of 8% of current (2004) annual U.S. gas use.**(12)**

But as of March 2006, there were 44 more LNG ports proposed in the continental U.S., and another 17 in Mexico, Canada, and the Bahama Islands.**(13)** Most of the facilities in foreign countries will also be used to provide U.S. supply. In Texas, there are at least 8 proposed land-based facilities.**(14)** One, located near Freeport, is approved and scheduled to be completed by 2009. Texas has the largest number of onshore terminals proposed for any state in the U.S.

But LNG's safety, affect on the environment, national security implications, and even its economic impacts, have only come to the media's attention in the last 2 years. The American public at large has yet to realize what LNG means to its future.

Safety - A Look At The Record

The LNG shipping industry is proud of its record. Between 1964 when it began and June 2002, there have been at least 30 reported accidents, including 5 groundings, 7 collisions, and 16 leaks of liquid or vapor.**(1)** But there has never been a loss of life related to an LNG spill or explosion. This includes over 30,000 voyages totaling more than 63 million collective miles.**(2)** But there have been several fatal accidents at LNG terminals and chilling facilities.

• The most serious incident to date was in Cleveland, OH, in 1944.**(3)** An LNG tank made of inferior steel leaked large amounts of LNG into a sewer system. The gas vaporized and caught fire, killing 128 and injuring 225. The accident is believed to have delayed the U.S. LNG industry by a generation. LNG boosters believe that the Cleveland incident is almost impossible with today's technology and safety standards.

• More recently, there was an explosion at the large LNG chilling facility in Skikda, Algeria on January 19, 2004.**(4)** A large volume of LNG escaped from a pipe and formed a cloud of explosive, flammable vapor that spread over the facility. The gas cloud exploded after coming into contact with a flame, killing 27 people and injuring 72. The explosion reportedly shattered windows 6 miles away, and the fire burned for over 8 hours. Though initial judgement was that the accident was not related to LNG, an autopsy of the calamity revealed that a gas leak did occur. An explosion also occurred at a chilling operation in Trinidad on June 12, 2004, though no casualties occurred.**(5)**

• In 4 separate incidents in the U.S. and England between 1965 and 1989, a collective total of 2 deaths and 10 injuries occurred to workers at LNG facilities from explosions due to gas leaks.**(6)** And in 1977, a gruesome fatality occurred when a worker was frozen to death by LNG sprayed from a ruptured valve.**(7)**

• A controversial incident in 1973 that killed 37 people has also been linked to LNG.**(8)** Workers conducting maintenance on an empty LNG storage tank were inside the container when its insulation caught fire. This increased

pressure in the tank, causing the collapse of the concrete roof, which crushed the workers inside. While the New York City Fire Department ruled it a construction accident, LNG critics believe latent LNG vapors were the cause.

Safety - The Best and Worst Case

LNG tankers are incredibly large vessels. Many are about 1,000 feet long, literally the length of an aircraft carrier. LNG terminals can hold as much as 4 tanker loads onsite at any given time waiting to be regasified and dispatched. These huge quantities have caused people near terminals and tanker routes to be concerned with its potential danger.

Proponents of LNG say the fuel is not explosive, and only flammable if the liquid gas vaporizes to mix with air under the right (wrong) circumstances. If the gas fraction of the mixture is less than 5% (5% gas/95% air), it is too lean and will not burn.(1) If the gas percentage is more than 15% (15% gas/85% air), it is too rich and will not burn either.(1) Since LNG is flammable only in this small range, advocates of the fuel consider accidents improbable. But if LNG vapors ignite, they burn quicker and hotter than oil or gasoline, and their harmful effects can be felt at a greater distance.

There are generally three types of major harm from an LNG mishap or intentional attack: a spill on land or water; a vapor plume; and a fireball.(2)

The most pronounced type of spill is a "pool fire." In this type of incident, a hole or leak from a tanker or terminal allows the liquid fuel to spill on top of water, where the heat in the water can vaporize it into a flammable gas. If it catches fire, it cannot be extinguished until the fuel is exhausted. A vapor plume allows a flammable gas/air mixture of escaped LNG to spread with the wind to ignite and then sustain a fire. A fireball could occur if there was a direct intentional attack from sources like an airplane collision or bomb.

Since most new facilities are surrounded by some amount of vacant land, and LNG terminals and tankers in U.S. waters are heavily guarded, advocates of LNG say that odds of a worst-case scenario are highly unlikely.

Regarding a spill or vapor plume, defenders of the fuel generally say that even if a collision or explosion ripped a hole in a tanker, not enough LNG would leak to cause a pool fire or vapor plume large enough to affect the general public. They further state that spilled LNG might not ignite for lack of a proper fuel/air mixture, and if ignited, a vapor plume would burn back to its source (the terminal or tanker) rather than towards the public. They add that the fire would burn out quickly for lack of a proper fuel/air mixture. Theoretically.(3)

But there are problems with these theories. First, they do not account for the structural limitations of the tankers. The tankers generally have 5 LNG containers on each vessel, which are heavily insulated to mitigate "boil off," the amount of LNG that vaporizes from the heat of the ambient environment.(4) And many of them are insulated with flammable materials.(5) Compounding this is the relief valves that accommodate boil off. They are designed for relatively low pressure.(6)

If a hole from an accident or terrorist attack were to cause a fire from a small amount of leaking LNG, the fire could suddenly accelerate the pressure in one or more tanks past design specifications. It is then possible that any or all of the 5 LNG tanks on the ship would rupture, not from an explosion caused by flammability, but from one caused by pressurized gas. Once containment is breached, much larger amounts of LNG can vaporize to fuel a fire.(7)

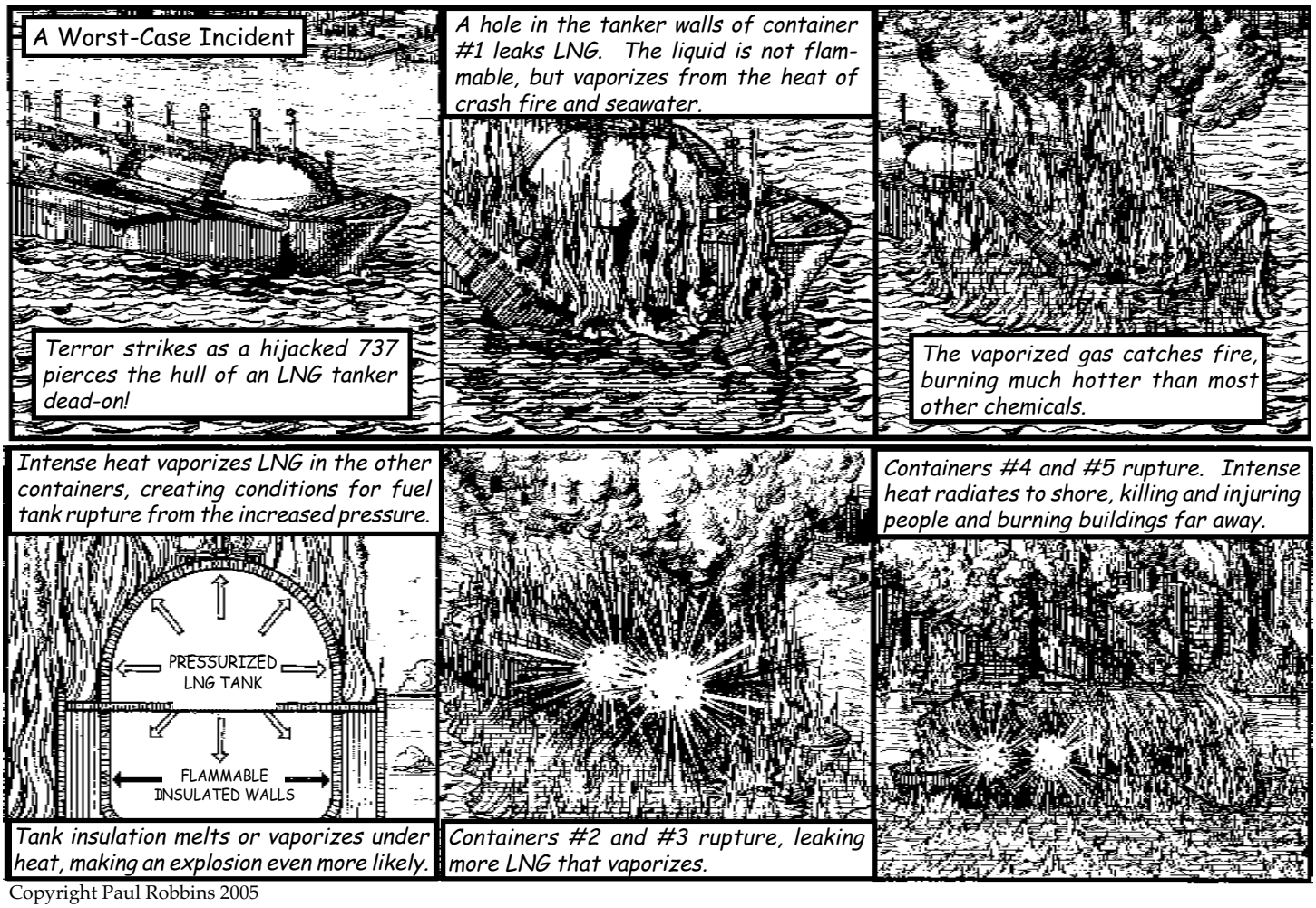
Second, the theories do not take into account how much LNG could spill from a severe breach. If only half of a tank (1/10th of total cargo) spills on water and catches fire, it is enough to cause injuries well over a mile away.(8)

Third, they do not consider the fuel's lack of purity. When shipped, LNG is usually mixed with about 14% non-methane hydrocarbons such as propane and butane, which have different flammability and explosion characteristics that make accidents more unpredictable. Because of this, LNG cargoes can turn flammable outside of the narrow range of fuel-to-air mixtures previously discussed.(9)

Fourth, regarding the possibility of a fireball from an intentional attack, no LNG regulator or advocate has explained this possibility away to the author's satisfaction. Tankers and terminals are not designed to withstand such an onslaught.

Federal regulators and LNG proponents had previously relied on studies that downplayed the threat of a worst-case accident or attack. But these studies' assumptions were vulnerable to criticism from scientists in the field, and ultimately even the technicians undertaking the studies conceded they were flawed.(10) In late December of 2004, Sandia National Laboratories released an analysis commissioned by the Federal Energy Regulatory Commission (FERC), the lead federal agency that licenses LNG terminals that are not deepwater ports.(11) (Deepwater ports are licensed by the U.S. Coast Guard.)

The study looked at terrorist attacks from several sources: a suicide run from an explosive-laden boat, a suicide attack from a bomb-laden small aircraft, and a paramilitary strike with rocket-propelled grenades. It concluded that while risks to tankers were unlikely, a worst-case scenario could cause second-degree burns within 30 seconds and major property damage as far as 1.3 miles away. In the case of an unignited vapor plume that migrates with weather conditions, the study asserted that an attack could be hazardous as far as 2.2 miles away if this plume catches fire. It should be noted that the standard of harm discussed in the Sandia study, 5 kilowatts per square meter, is generally considered safe for firefighters in protective gear, but not civil-



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ians. A more appropriate civilian standard would be 1.6 kilowatts per square meter.**(12)**

Dr. James Fay, professor emeritus at MIT, has stated the hazardous distance from a vapor plume in a worst-case scenario for a proposed terminal in Maine to be 3.25 miles away.**(13)** And a study of a proposed terminal in Vallejo, CA stated that an intentional airplane attack could harm people 4 miles away.**(14)**

There are additional environmental concerns associated with LNG. Natural gas is still the cleanest burning of all fossil fuels. It has virtually no particulates or sulfur, and when burned properly has reduced smog-producing emissions compared to coal or oil. In also emits 40% less carbon dioxide (the largest greenhouse gas) per unit of energy than coal.

But air pollutants and greenhouse emissions are increased in LNG's processing and transport. It takes a lot of energy to process energy, and about 20% of the original energy in LNG is used up in the chilling, transport, vaporization, and regasification losses inherent in delivery.**(15)**

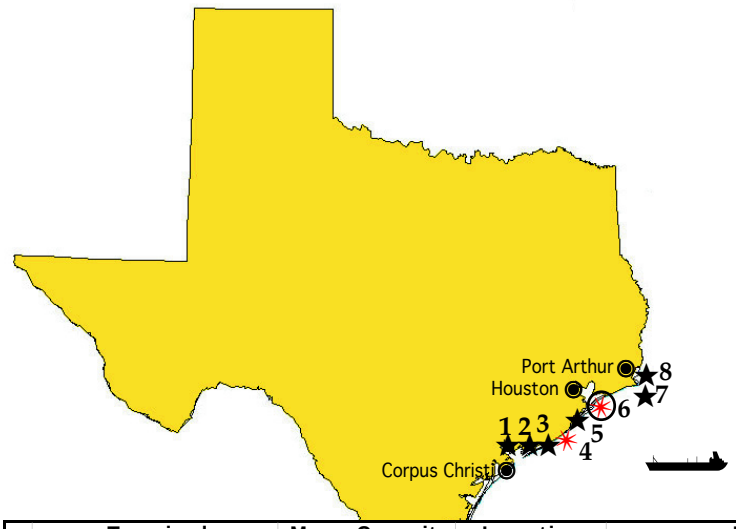
The Great Cold Rush

The 2004 North American Gas Strategies Conference was held on 2 warm spring days in April at the luxurious Houstonian Hotel in the heart of the nation's oil and gas capital. Approximately 130 petroleum industry officials convened to discuss the exorbitant price hikes and shortages of domestic natural gas while a gas log fireplace burned in two of the hotel's lobbies, creating a cozy ambience across from the frigid, over-air conditioned meeting room crowned with crystal chandeliers. The conference was quite instructive as to how the industry intends to make radical changes in the way it does business by supplying chilled LNG, gas from the Arctic, and unconventional sources of gas from the Rocky Mountains.

Steve Beasley, President of the eastern division at El Paso Pipeline Group, discussed factors in siting LNG terminals.**(1)** Despite the need and relatively high costs that customers would be willing to pay on the Western and New England Coasts of the U.S., the public's tolerance of such facilities in these areas is generally limited or outright hostile. Ironically, public tolerance is high along the Gulf Coast where the need is not nearly as critical.

Of the 42 LNG terminals in the United States proposed as of March 2005, 8 are onshore in Texas, the most onshore facilities proposed in any single state.**(2)** There are a total of 22 terminals proposed in the Gulf Coast region (on or offshore). Another 6 are in Bahama islands or Mexico that will largely be dedicated to the U.S. market. And another 6 potential LNG terminals are proposed in Canada near

LIQUEFIED NATURAL GAS IN THE LONE STAR STATE
Come Oun In, Pardner



■ Existing LNG Terminal
★ Approved for Construction
✳ Proposed
X Cancelled Due to Opposition
⊛ Proposed With Opposition

There are 8 LNG terminals proposed for the Texas coast. There is little or no opposition anywhere but Galveston. The amount of terminal capacity is so huge that if all of it is built, it will exceed the natural gas production in the state. While some would call Texans docile, the state has over 140,000 jobs in the petrochemical industry, providing salaries of $9 billion. And moderately priced fuel from LNG terminals is generally seen as supporting the Texas economy.

The most advanced of these is in Freeport. The project benefitted from state-subsidized road improvements, and has a direct connection to George W. Bush's family.

	Terminal	Max. Capacity Bil Cu.Ft/Day	Location	Developers	Status Mar-06	Year Online	Estimated Cost (Mil $)
1	Corpus Christi LNG	2.6	Corpus Christi	Cheniere	Approved	2008	$750
2	Vista Del Sol LNG	1.1	Corpus Christi	ExxonMobil	In Construction	2008	$600
3	Ingleside Energy Center	1.0	Corpus Christi	Occidental Energy	Approved	2008	$450
4	Calhoun LNG	1.0	Port Lavaca	Port of Pt. Lavaca/Haddington Energy	Pending Approval	2009	$450
5	Freeport LNG	1.5	Freeport	ConocoPhillips/Cheniere	In Construction	2009	$400
5	Freeport LNG Expansion	1.5	Freeport	ConocoPhillips/Cheniere	Proposed	NA	NA
6	Bay Crossing LNG	1.2	Galveston	BP-Amoco	Proposed	2010	$600
7	Golden Pass LNG	2	Port Arthur	ExxonMobil	In Construction	2008	$600
8	Port Arthur LNG	3	Port Arthur	Sempra Energy	Approved	2009	$600
Total LNG Supply		14.9				Total Cost	$4,450
Total Texas Gas Production		12.9					
Total U.S. Gas Consumption		61.5					

enough to the border for part of their capacity to be diverted to the U.S.

The combined capacity of these proposed facilities, plus existing LNG terminals, is equivalent to America's current use! As such, it is not likely that all of these will be built, or at least built quickly. But given current demand, 7-10 of these plants may be built within a decade.**(3)**

Which of these ports will be the winners depends on several factors, including local support or opposition, guarantee of supply, and guarantee of customers. But many companies and proposals are trying to be first in line for what one observer calls "the competition of perception," trying to look like a winner so you will actually be one by discouraging other competitors. This perception, plus long-term contracts, may collectively be worth over a trillion dollars in sales over a 25-year period. Staking your claim is the new gold rush in the energy business, or given the nature of the cargo, the new "cold rush."

There is a lot of money to be made in building these terminals and marketing their imports. So the *Directory* has taken an in depth look at proposals around the country and their status, starting with Texas.

LNG in the Lone Star State

Texas is in fact the largest gas producer in the U.S. It provided about 21% of the nation's domestic consumption in 2004.**(1)** The entire Gulf, including offshore wells, provided 28% of U.S. consumption in the same year.**(2)** While at some point this production will decline, the need is not nearly as critical as in other parts of the country. So LNG facilities are not being sited because of immediate local needs; they are being sited because the Texas public (either tolerant or docile) will allow it.

The combined capacity of the 8 proposed Texas LNG terminals is massive. At full buildout, they would more than double the amount of gas that Texas supplied to the country in 2004! So it is obvious most of this surplus fuel will go north or west.

All these terminals are scheduled to be in service on by before 2010. The cost amounts to about $4 billion**(3)**, and this is just a fraction of total investment. In ballpark numbers, LNG ports amount to only 5-13% of the cost for the infrastructure needed for this supply option.**(4)** By the time gas production, chilling facilities, and tankers are added, the cost is much steeper.

These proposed terminals include 2 in the Port Arthur

area, 3 near Corpus Christi, and 1 each near Port Lavaca, Galveston, and Freeport. And the Houston area is the administrative center for 7 of these 8 proposed terminals.

These areas are key to the massive Texas petrochemical industry and its pollution. Due to this industry, Texas already leads the nation in poisonous emissions from manufacturing facilities detailed in the annual federal Toxic Release Inventory. And these areas of the state collectively had emissions of some 89,000 tons, over 77% of all Toxic Release Inventory industrial emissions from the entire state in 2002.**(5)** They also include 35 of the top 50 sites that emit these poisons.**(6)** But because of the 142,000 jobs and $9 billion in wages that the petrochemical industry provides Texas, a greater tolerance for LNG ports exists than in other regions of the country.**(7)**

Many of these facilities will not be built as soon as proposed because of market demand. But there will be some short-term winners.

Freeport – One facility that is extremely likely to be completed is in Freeport, TX, the factory town 50 miles southeast of Houston. It has already been licensed by the FERC, and has begun construction. It will be the first LNG plant in Texas. The terminal is scheduled to be completed by 2009.**(8)** If the first phase is run at capacity, it will supply the equivalent of 11% of Texas natural gas production in 2003.

The terminal, sponsored by Freeport LNG, is actually 1 mile from Freeport, TX, located in the town of Quintana Island – population 38. Next to Terlingua, it is the smallest town in Texas. The town is named for the island it sits on, which is actually an artificial island created by the dredging of the Intercoastal Canal. Up to now, it has been a beach resort area. On the weekends it can have as many as 5,000 visitors.**(9)**

Protest of the facility has been limited to a few people. There was no organized opposition from groups concerned with environmental issues or safety concerns. The small town and the general Freeport area have welcomed the plant. To most of the public, it is just another petrochemical facility that provides employment. And Quintana Island's revenue (in lieu of taxes) will go up 1000%

The first phase of the plant has 2 anchor tenants; Dow Chemical, which will use 1/3 of the LNG for its industrial operations (some of which are just across the Canal from the terminal), and ConocoPhillips, which will supply its 2/3 share of fuel to industrial users and power plants.**(10)** Unlike the other proposed ports, which aspire to sell their fuel nationwide, Freeport will only provide gas in Texas. And even though the terminal has yet to be built, the company is applying for a license to *double* plant capacity. The company already has commitments or options on half of this new storage. Part of the LNG for this facility will come from Oman.

The plant has had a political history you could call colorful.**(11)** One of the partners in the terminal happens to be Neil Bush, brother of George W. Bush.

As of late 2004, Neil Bush was affiliated with Crest Investment Company, a partner in the terminal. In a 2003 deposition for his divorce case, it became public that he was paid $60,000 a year for consulting 3-4 hours per week for the company (about $300 per hour). The head of Crest was a Bush family friend, Jamal Daniel. Daniel was a contributor to the various political campaigns of Neil's brother. But Daniel also hosted Neil's wedding ceremony at his $3.3 million Memorial Drive mansion in Houston in March 2004 when Bush remarried. Crest also arranged a rent-free cottage for Neil near the Bush family home in Kennebunkport, ME. As of 2004, Crest's CEO was one Joe Allbaugh, at one time a highly placed aide to George W. Bush when he was Governor of Texas, and a critical person on Bush's campaign staff when running for national office in 2000. Allbaugh went on to head of the Federal Emergency Management Agency during Bush's first term.

Crest and energy giant Cheniere Energy (which currently has another proposed LNG facility near Corpus Christi) entered into talks in early 2000 regarding the project and the site. Cheniere approached the area port authority, the Brazos River Harbor Navigation District, about leasing the site, but Crest also approached the District without Cheniere's knowledge after it had attended a confidential briefing on the matter.

The port authority granted the lease to Crest instead of Cheniere, even though the District had not asked for bids as required by law, and even though energy giant ExxonMobil had obtained options on the land already.

Cheniere filed a lawsuit against Crest, but the two companies reconciled. They formed a partnership where Cheniere would manage the day-to-day operations, while Crest would handle licensing aspects and the politics involved with them. ExxonMobil declined to take legal action.

Cheniere ended up having to bid on the land anyway because state law requires this for anything over a 10-year period. But for its inconvenience, Cheniere demanded and received $1 million in compensation. The company bid against no competition, and was again awarded the site. Since then, both Cheniere and Crest have had their roles in the project reduced by another large investor. But Crest will begin receiving $2 million a year for its role in permitting once the plant begins operation.

The Freeport project is the first LNG plant to benefit from a streamlined permitting process managed by the Federal Energy Regulatory Commission. Though these changes in regulation were adopted after the project applied for licensing, they were applied retroactively.

It is conjecture to think that the Bush Administration is responsible for this favorable treatment to help a family

member, as its philosophy has always been partial to the energy industry. But the *appearance* of conflict is staggering.

Another wrinkle in the plant's history is how it received state and federal funds to build a critical and expensive bridge to the terminal site proximity. Quintana Island was until recently connected to the mainland by a rickety pontoon bridge. The residents liked it because it cut down on visitors and afforded them more privacy. But such a bridge would not bear the traffic from heavy construction of an LNG port.

According to the *Houston Press*, in the period around 1997-98, the Texas Dept. of Transportation elevated a proposal for a modern bridge to the island to priority status over the objection of residents by manipulating the "score" that awards money to construction projects.**(12)** This manipulation was openly discussed in memos within the agency. Ultimately, $10.7 million was awarded to a project that was built to service 200% more traffic than the old bridge was currently handling.

Chief among the supporters of the bridge was Dow Chemical, who offered to solicit support from other businesses and institutions. Dow's support was soon followed by the port authority, the Country Commissioners, and the local Chamber of Commerce.

Corpus Christi - On the north side of Corpus Christi Bay, there are 3 more proposed LNG ports within a 2-mile radius of each other. The builders include Cheniere Energy, ExxonMobil (now under construction), and Occidental Chemical. The Occidental Chemical port, if built, will use waste heat from an adjacent chemical facility for its regasification process, saving money and energy. Again, there is no organized opposition at this time. The plants are supported by the local Chamber of Commerce and local government because they create jobs in construction and operation of the ports, as well as provide affordable energy to numerous preexisting industries. The regional Sierra Club actually supported the Cheniere plant.**(13)** Again, many jobs are provided by the petrochemical industry in the area, and the public's sensibilities are not easily offended by pollution from them.

Port Arthur - Two more LNG ports have been approved for the Port Arthur area, sponsored by ExxonMobil (under construction) and Sempra. The ExxonMobil facility is in some ways a twin of its Corpus Christi location, with approximately the same size and capacity.

The Sempra plant, if built, will be the company's third. Two other plants to supply imported gas to the U.S. market have already been approved and are approved for construction. These are located in Hackberry, LA, and the Baja Peninsula in Mexico. The two East Texas terminals are extremely close to a proposed LNG terminal just across the Sabine River in Louisiana owned by Cheniere.

Limited opposition developed in the Pleasure Island residential community near the proposed ExxonMobil site – the neighborhood is as close as 1,800 feet, and will be afflicted with noise, unscenic views, and any potential dangers that the terminal and tankers may cause. The 2 other proposed sites are more isolated, and substantial opposition is not apparent.

Calhoun County - A private firm, Calhoun County LNG, is attempting to provide LNG to the industrial cities of Port Comfort and Port Lavaca. Unlike other proposed Texas LNG facilities, the governmental port authority in the region, the Calhoun County Navigation District, may help the project economically by providing industrial revenue bonds.**(14)** The District sees the terminal as a way to ensure low cost fuel and the jobs that come with it. Again, there does not appear to be initial local opposition to the proposal, which became public in late 2004.

As in the case of the Freeport project, there does not appear to be a competitive bid for use of the port authority's land. When asked about the situation, District Director Robert Van Borssum laughed dismissively and assured the author the lease option was legal.**(15)**

Galveston - The most recent LNG terminal to be proposed is on Pelican Island, directly to the northeast of nearby Galveston Island. The LNG terminal is proposed by BP (British Petroleum)-Amoco, which has a refinery in nearby Texas City. The company has attempted to site the plant in a relatively isolated part of the island. But unlike other places in Texas, there has been more substantial opposition from the public.

To begin with, the Port of Galveston secretly worked for 3 years to negotiate a lease option with BP. Then the wording for the lease approval was vaguely written in the public notice for the meeting of the Wharves Board (the public body that approves port contracts), escaping public scrutiny.**(16)** Critics have alleged that the Board and the Port violated the Open Meetings Act by obfuscating the intent of the vote. The lack of process has irked a segment of the population, and created distrust.

And while the city of Galveston is in close proximity to heavy industry, it is not itself highly dependent on it for its economy. As such, a segment of the public has opposed past attempts to attract industrial growth. Past efforts, such as creating a Superport, building a fish processing plant, and constructing a copper smelter, have been defeated.

Interest in the proposal is widespread. At a meeting held in November 2004 about the LNG terminal by BP to introduce the project, 300 people attended.**(17)** Several activists are gearing up for what they think may be a protracted battle. Tactics include a lawsuit to bust the current contract because of Open Meetings Act violations.**(18)**

As in the case of Calhoun LNG, Steve Cernak, Director

TEXAS LNG SUMMARY Harm Within 2-Mile Radius									
	TOTAL	RESIDENTS 1-MILE RADIUS	RESIDENTS 2-MILE RADIUS	WORKERS MAJOR EMPLOYERS	STUDENTS	RECREATIONAL VISITORS	RECREATION ACCESS PTS.	OTHER	SITES WITH COMBUSTIBLES
Corpus Christi	37,830	3,282	2,331	7,217	*	25,000	9	0	4
Calhoun	1,210	25	565	620	0	NA	8	0	0
Freeport	16,153-23,770	387	293	473-8,090**	0	15,000	9	0	3
Galveston	16,968	0	2,877	1,030	200	10,161	10	2,700	0
Jefferson	1,074	85	446	NA	243	300	4	0	0
TOTAL	73,235-80,852	3,779	6,512	9,340-16,957	443	50,461	40	2,700	7
* Included with Major Employers		** Larger estimate includes all of Port facility							

of the port authority, noted that it was legal to grant a lease option without a competitive bid, but did not specify how.**(19)**

Secure the Perimeter

The original federal legislation that regulates the siting of modern LNG terminals was passed in 1979. It specifically called for these plants to be located in remote areas, but gave the judgement of what this means to federal agencies (the Dept. of Transportation and FERC).**(1)** These agencies have never written rules regarding this dictate. FERC has instead interpreted "remote" to mean that there is some buffer acreage around the terminals. **(2)** Although this buffer differs from site to site depending on the infrastructure, climate, and location, "exclusion zones" are sized for what FERC considers a worst-case accident, and typically extend only 1,000 feet or less. Often, these buffers do not even extend beyond terminal property.

Several LNG terminals that have been approved or are in the approval process have based their future safety on studies that have been heavily criticized by top LNG scientists and fire prevention experts. The studies predict minimal effects if tankers are damaged or attacked by terrorists.**(3)**

But the recent report by Sandia Laboratories has now thrown the safety issue into question. Since it is the first federally commissioned statement that danger from LNG is greater than first thought, its pedigree carries some weight. As stated earlier, various studies assert harm to civilians without protective fire gear at distances ranging from 1.3 miles for a fire to 4 miles in a worst-case intentional attack.

While most of the terminals proposed in Texas are relatively far away from residential areas, they are not isolated. All are either in proximity to other industrial sites or recreation areas or both, which could cause great harm to workers or recreational visitors in a worst-case accident. But the tanker route widens the population at risk, which in the event of a worst-case terrorist attack, could endanger a much greater area.

The author has read relevant parts of two Environmental Impact Studies published by FERC on Texas LNG terminals. Despite the detail in these documents (I have read product labels more interesting) there are no efforts to calculate the number of residents, workers, students, hospitals, recreational visitors, and other large numbers of people or important infrastructure within 1-2 miles of the terminals or LNG tanker routes.

For this reason, the *Directory* conducted a review based on likely tanker routes to terminals within a two-mile radius of harm. The review tried to discern the number of people that would be adversely affected by an LNG catastrophe. Recreational visitors were also estimated for some of the affected sites.

The review revealed that almost 81,000 people would be somehow impacted near the 8 proposed terminal locations and the tanker routes to access them. These include 10,291 residents, up to 16,957 workers at major employers including colleges (more than 100 employees per site), 2 schools with 443 students, at least 50,461 peak recreational visitors for sites where estimates could be obtained, 40 recreation sites, and at least 7 factories or petroleum storage facilities that would be vulnerable in case of fire. If 2 large universities are added at Galveston at the edge of the 2-mile radius of harm, another 19,513 people will be affected.

There are obviously limitations to this analysis. It is important to note that not all workers, residents, or other people would be simultaneously impacted. And LNG tankers are moving targets (pun intended), so that not everyone along a route will be in a danger zone at the same time. It is also extremely doubtful that all 8 of these ports would experience an accident or terrorist attack at the same time. But there are no estimates here for smaller employers and most recreation sites, and there are no estimates for people traveling through these areas.

It is dumbfounding to me that no federal, state, or local government agency or major media source has made such an estimate previously. A spokesperson for the Federal Energy Regulatory Commission stated that employees working near terminals are simply not considered as much at risk as residents, but offered no explanation as to why.**(4)**

Critics of this assessment will probably see no relevance. The Sandia report itself states that a terrorist attack of the magnitude needed to cause danger is unlikely. The tankers are double-hulled and have intense security surrounding their U.S. visits.

But in 2002, the oil tanker Limburg was bombed in a terrorist attack off the coast of Yemen. The double-hulled tanker lost almost a quarter of its oil from the assault.**(5)**

Moreover, so many politicians have demagogued about terrorist threats since the 9/11 tragedy that many people started believing them. And it is hard to imagine even a

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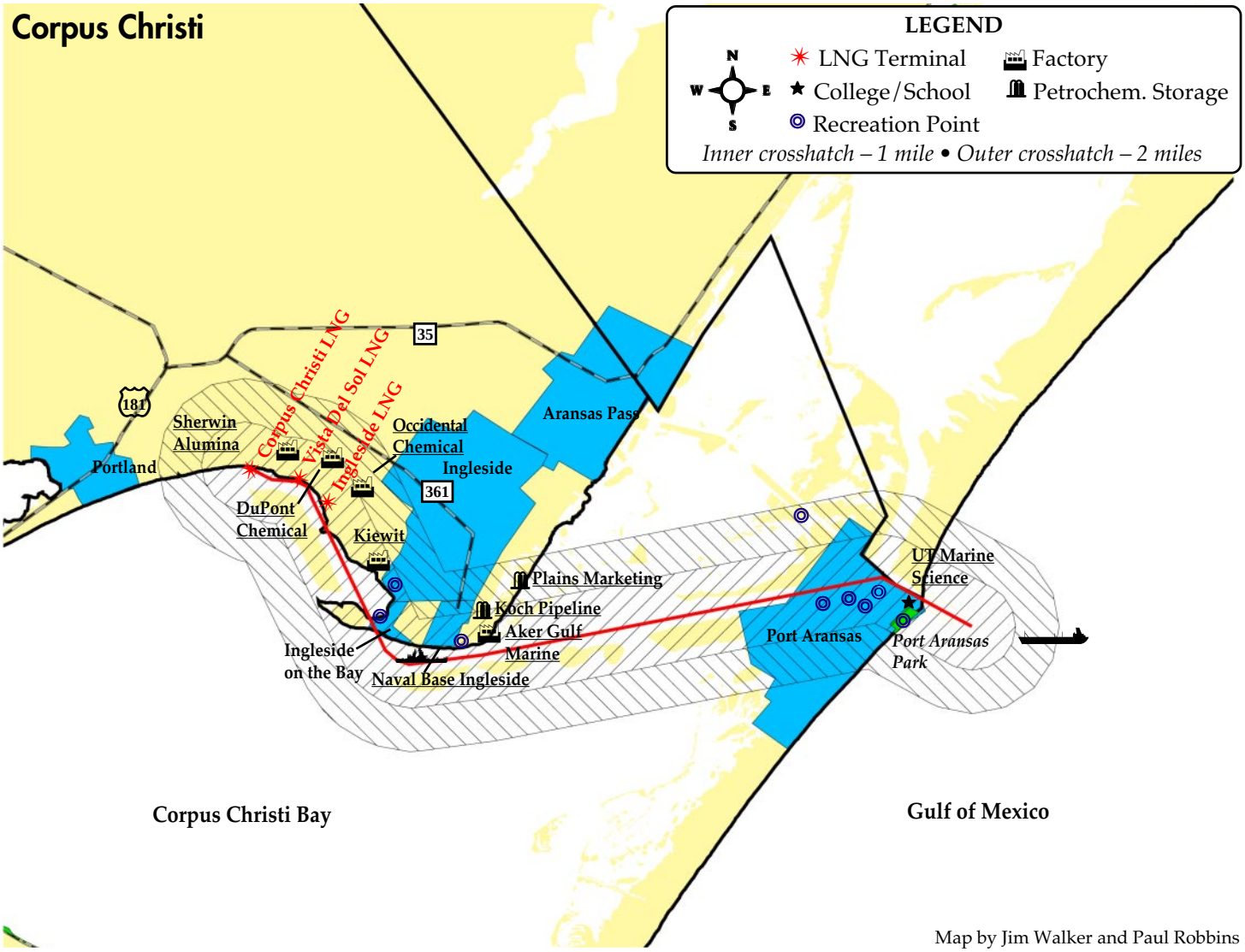


Map by Jim Walker and Paul Robbins

There are three proposed terminals within 2 miles of each other on the north side of Corpus Christi Bay in San Patricio County. The radius of harm in a worst-case accident or intentional attack is more severe than any of the other proposed port sites in Texas. There are over 5,600 residents within 2 miles of the terminals and tanker route.

There are over 7,200 workers at major employers in the same area, including 2 chemical facilities and 2 petroleum bulk storage facilities (that would themselves probably be vulnerable to combustion dangers if exposed to the high heat of an LNG fire) and the U.S. Naval headquarters for mine sweeping operations. Many more people work at small employers in the vicinity.

There is also significant tourist traffic in the area of Port Aransas, including the beach at Port Aransas Park with about 25,000 peak day visitors.

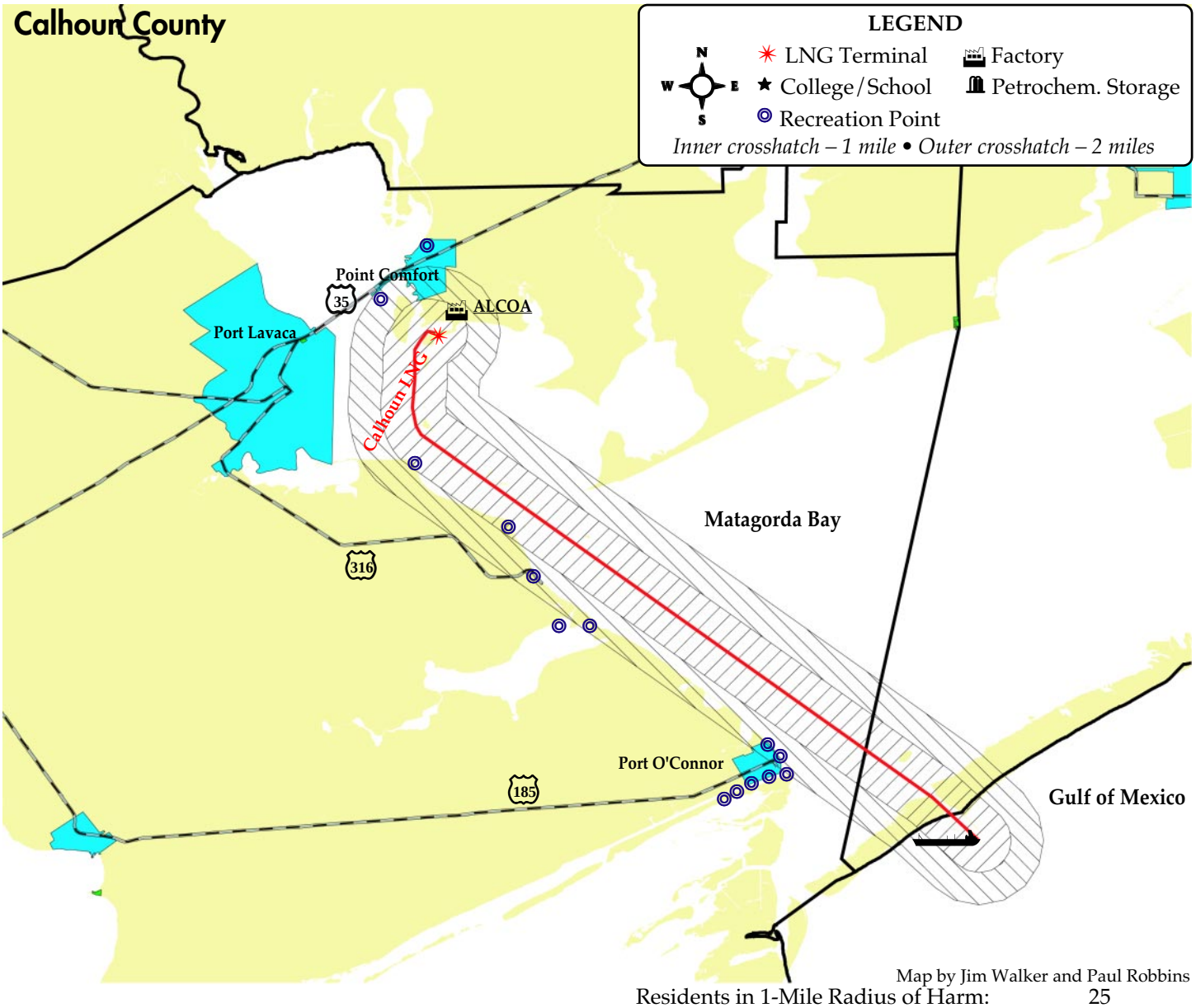
It is significant that the Navy has not weighed in as a critic of the plant. In Radio Island, NC, the Navy was adamantly against plans to place an terminal next to its base, and it was a major factor in stopping the proposal in 2002. The Marines in Camp Pendleton, CA, are outraged over a proposed site in their vicinity. In a post-911 world, Naval Base Ingleside would logically be vulnerable. But no opposition from the base has been expressed to date.

Residents in 1-Mile Radius of Harm:	3,282
Residents in 2-Mile Radius of Harm:	2,331

Major Employers:	
Sherwin Alumina	732
Aker Gulf Marine	600
Dupont Chemical	500
Occidental Chemical	250
Kiewit Offshore Services	4,500
U.S. Navy Mine Warfare Center of Excellence	500
UT Marine Science (incl. students)	135
TOTAL	7,217

2 Petroleum Bulk Storage Facilities

Major Recreation Facilities:	
Port Aransas Park	25,000/day/peak
8 Other Beach Access Sites	



Map by Jim Walker and Paul Robbins

Calhoun LNG, near Point Comfort and Port Lavaca, has one of the lower numbers of people at risk from an accident at its proposed facility. Residents within a 2-mile radius of harm are less than 600. There is one major employer in the radius of harm, ALCOA, and the LNG terminal facilities would be very near the Port of Point Comfort docks.

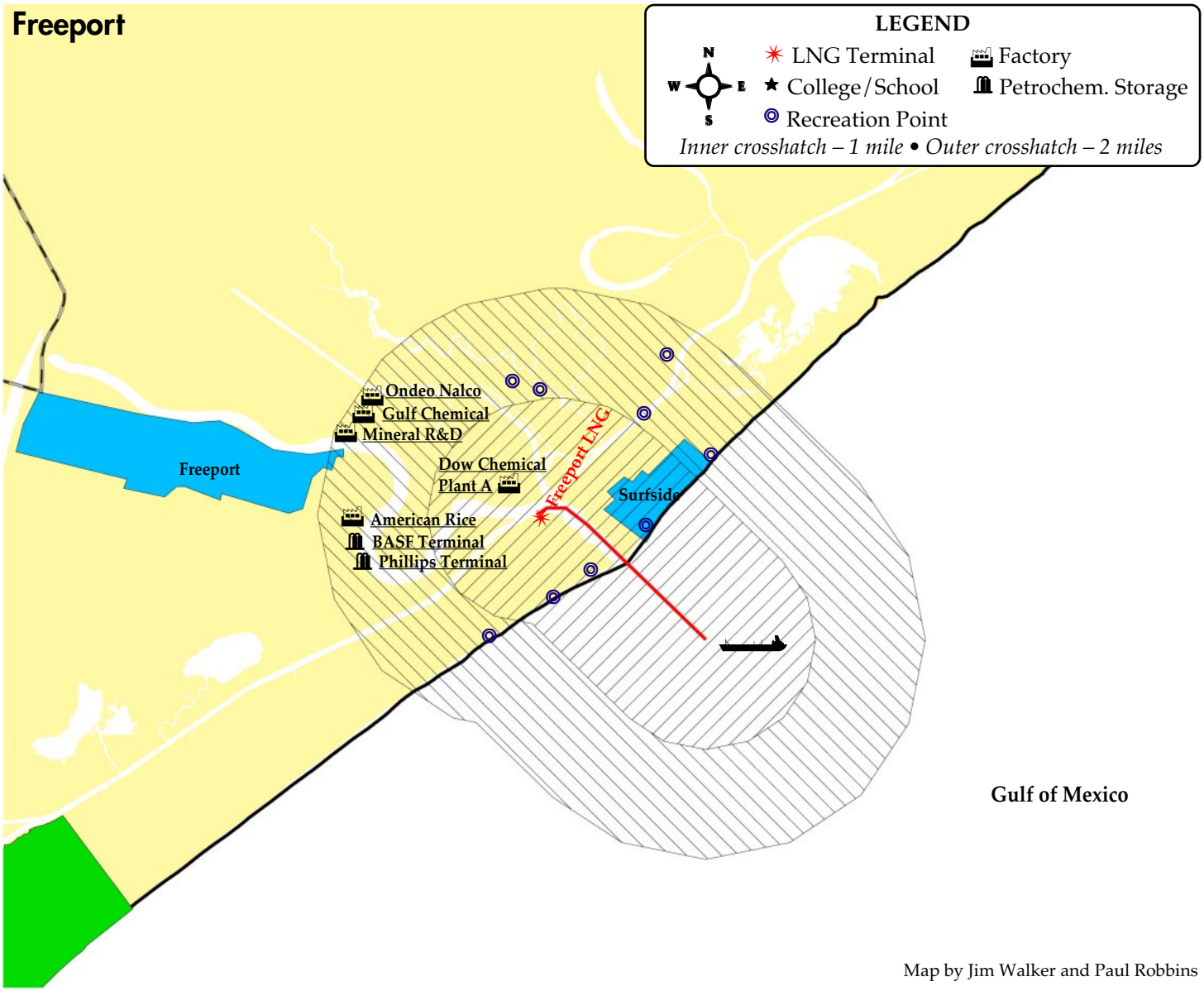
Much of the land bordering the tanker route is on the south side of Matagorda Bay in the "Magnolia Beach" area. While there are many tourists, there are no estimates of visitors.

Residents in 1-Mile Radius of Harm:	25
Residents in 2-Mile Radius of Harm:	565

Major Employers:

ALCOA	620

Major Recreation Facilities:
8 Beach Access Sites



Map by Jim Walker and Paul Robbins

Freeport LNG has already begun construction on the first LNG terminal in Texas. And the company sees so much potential that it plans to double the plant's capacity.

There are almost 700 residents within the two-miles radius of harm. But there are thousands of workers employed at the Port of Freeport. Just how many are within the radius of harm is difficult to say without a thorough study. Dow Chemical, for example, the largest employer in Brazoria County, cannot (or will not) say how many of their total employees work at the "Plant A" facility directly across from the terminal site.

At a minimum, there are about 500 workers at major employers near the terminal. But there are 8,090 workers at both large and small employers at the Port of Freeport, and most of them are probably within the two-mile radius of harm. Moreover, several of these plants, such as Dow, as well as storage facilities owned by BASF and Phillips, are themselves vulnerable to fire when exposed to high heat levels from an LNG accident.

There are also several recreation facilities, including Quintana Island beach and the beach at Surfside. Estimates of visitors on summer holidays are 5,000 and 10,000, respectively.

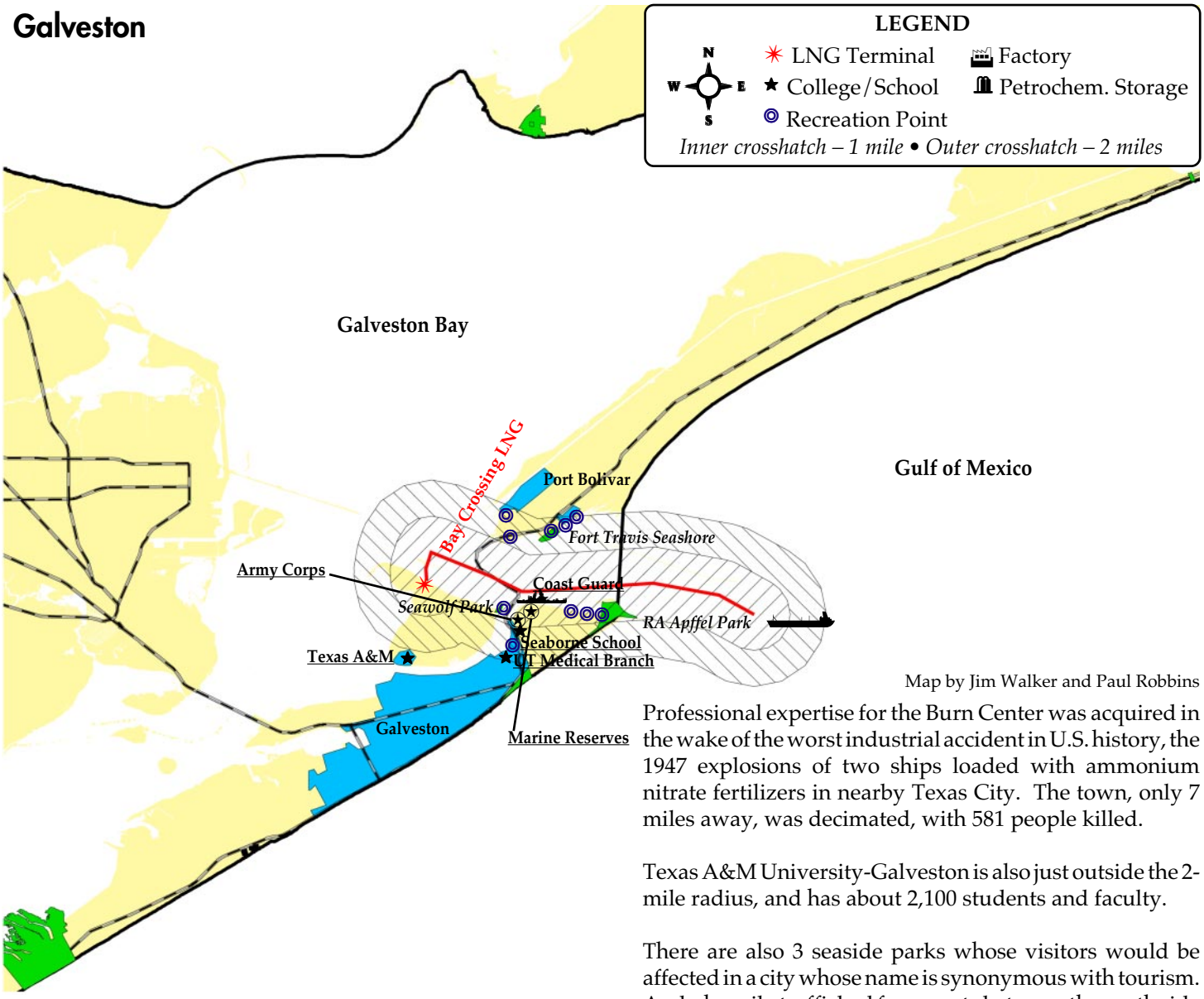
Residents in 1-Mile Radius of Harm:	387
Residents in 2-Mile Radius of Harm:	293

Major Employers:	
Minimum	
Gulf Chemical & Metallurgical	125
Ondeo Nalco Energy Services	48
American Rice	300
TOTAL	473
Maximum (includes all of Port Freeport)	8,090

2 Petroleum/Chemical Bulk Storage Facilities

Major Recreation Facilities:	
Quintana Island Beach	5,000/day/peak
Surfside Beach	10,000/day/peak
5 Other Beach Access Sites	

Galveston



Map by Jim Walker and Paul Robbins

Galveston has a proposed LNG terminal on Pelican Island, which is just across from its the harbor. Those in danger from a worst-case accident include almost 3,000 residents within the 2-mile radius of harm, which is less than Corpus Christi. But in some ways, a major accident in Galveston will cause more damage than any of the other proposed Texas ports.

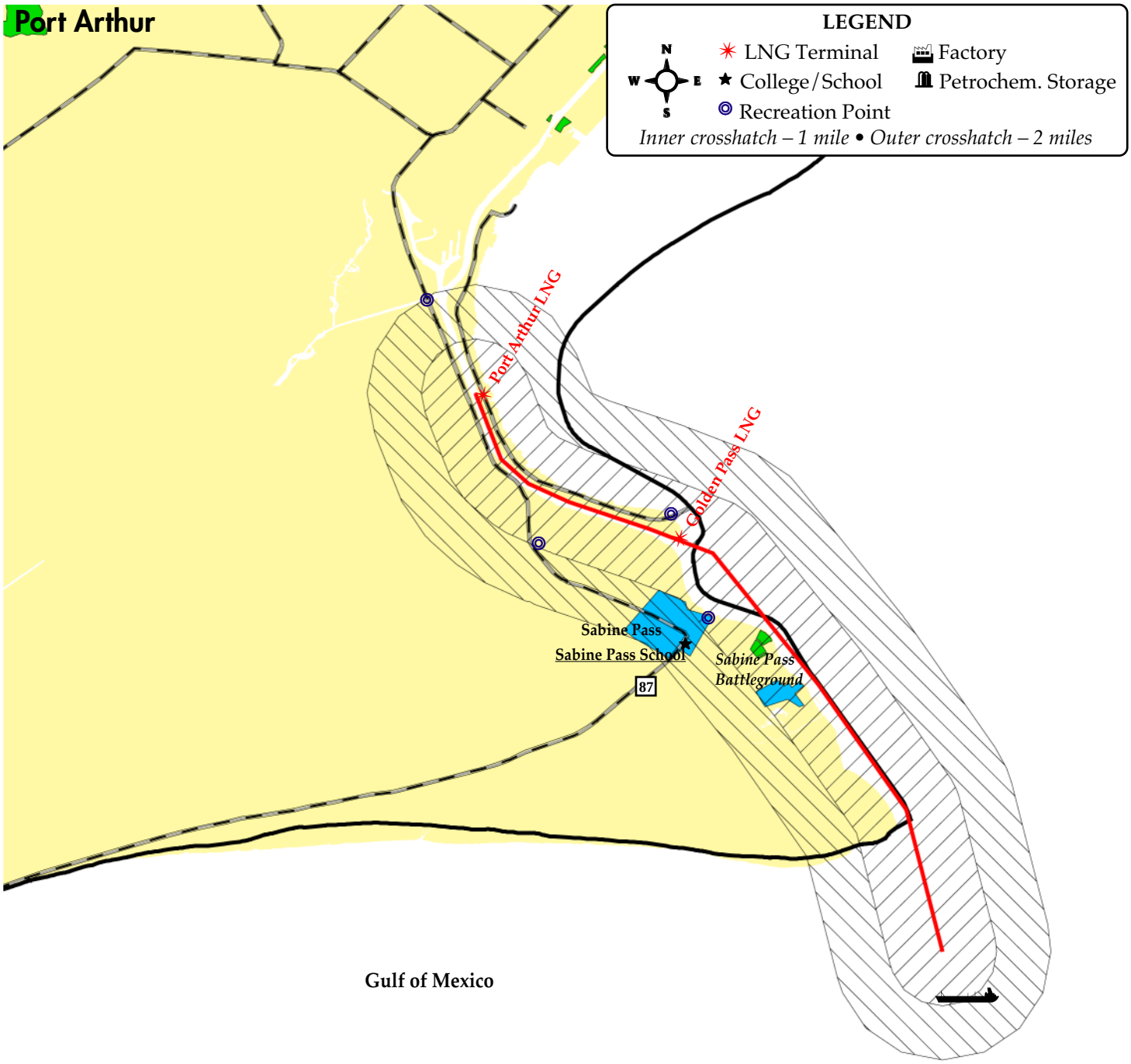
This is because most of the University of Texas Medical Branch, which includes 6 hospitals, is just outside the 2-mile radius as well. The radius researched in this article is conservative. As explained earlier, LNG tanker attacks can potentially be of danger 3 and 4 miles away from ground zero. The number of people in this complex includes over 14,000 faculty, students, and hospital staff, and about 3,000 daily patients. The complex includes one of the premier medical institutions in the country that treats fire victims, the Shriners Burn Center. This is the height of sardonic irony, in that the hospital complex that would be called on to treat an LNG disaster would be one.

Professional expertise for the Burn Center was acquired in the wake of the worst industrial accident in U.S. history, the 1947 explosions of two ships loaded with ammonium nitrate fertilizers in nearby Texas City. The town, only 7 miles away, was decimated, with 581 people killed.

Texas A&M University-Galveston is also just outside the 2-mile radius, and has about 2,100 students and faculty.

There are also 3 seaside parks whose visitors would be affected in a city whose name is synonymous with tourism. And a heavily trafficked ferry route between the north side of Galveston and Bolivar Peninsula has as many as 2,700 people at the ferry docks either using the ferry or waiting to use it.

Residents in 1-Mile Radius of Harm:	0
Residents in 2-Mile Radius of Harm:	2,877
Seaborne Challenge School	200
Major Employers:	
Army Corps of Engineers	350
Galveston Ferry	140
Marine Corps	70/peak
U.S. Coast Guard	470
TOTAL	1030
Major Recreation Facilities:	
Fort Travis Seashore	561/day/peak
Ra Apffel Park	9,200/day/peak
Seawolf Park	>400/day/average
7 Other Beach Access Sites	
Ferry	2,700 hour/peak



Map by Jim Walker and Paul Robbins

The two proposed LNG terminals in Jefferson County south of Port Arthur have the least potential to harm people of any of the sites proposed in Texas. The only major concentration of people is the small settlement of Sabine Pass that is now part of Port Arthur. There are numerous small businesses along the Sabine River, but none that could be identified as major employers. But it does contain a small public school. There are also 4 recreation points, including the Sabine Pass Battleground Museum.

The two LNG terminal sites are very close to a third proposed terminal just south and across the river in Louisiana near Sabine Pass.

Residents in 1-Mile Radius of Harm:	85
Residents in 2-Mile Radius of Harm:	446
Sabine Pass School	243

Major Employers:
None Identified

Major Recreation Facilities:

Sabine Pass Battleground	300/day /peak
3 Other Beach Access Sites	

CONTINUED FROM P. 8
double-hulled tanker or concrete storage terminal having the strength to withstand a deliberate airplane crash.

Only in Texas

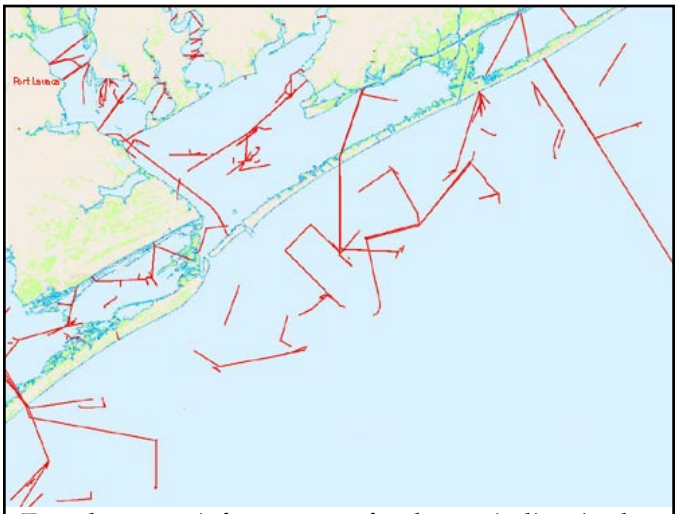
Not all critics of LNG are opposed to terminals *per se*. Some have advocated that the terminals be placed offshore, where in the event of an accident or terrorist attack, the facilities will be far away from communities and property. The technology for such facilities does exist and at least 2 are being built in the Gulf of Mexico.

One of these is already operating. Christened "the Energy Bridge," it uses an underwater buoy attached to a flexible pipe anchored to the sea bottom.**(1)** (See article.) It connects to an undersea gathering line that delivers gas to the mainland from offshore fields in the Gulf. The buoy is raised to the surface when tankers approach. Three specially modified LNG tankers will regasify their fuel onboard while in the ocean about 116 miles off the Louisiana Coast. This is a new use of a proven technology, and its promoters maintain that it is competitive with onshore terminals.

Texas has a vast infrastructure of undersea pipelines in place that could connect offshore LNG terminals to its coast. And there are several other proposals for offshore terminals that have been permitted or have applied for permits in the Gulf of Mexico. But conventional wisdom holds that they are generally more expensive than onshore terminals, the Bridge technology not withstanding.

What price do you pay for safety? Apparently, in Texas, not much.

Government officials at all levels have welcomed land-based terminals with open arms. State officials including Governor Rick Perry, Lt. Governor David Dewhurst, and Railroad Commissioner Victor Carrillo have all endorsed these projects.**(2)** Speaker of the U.S. House Tom DeLay was one of 4 members of Congress to sign a letter urging FERC to support the Freeport plant.**(3)** And under his leadership, the House passed a statement in 2004 calling for federal preemption of regulatory authority over LNG facilities.**(4)** City and county officials in all 5 Texas locales that have proposed terminals want the jobs and gas the plants provide.



Texas has a vast infrastructure of undersea pipelines in place that could connect offshore LNG terminals to its coast. This map shows pipelines near Matagorda Bay.

Not a legal description. For illustration purposes only.

Ironically, despite all this support, despite more plants proposed than in any other state in the country, LNG review in Texas is incredibly unorganized. There are several state agencies that must review each facility for compliance with regulations. The Texas Commission on Environmental Quality must screen for air quality; the Texas Railroad Commission must ensure pipeline safety for lines leading away from the terminal; the Land Commission must review for compatibility with the surrounding coastline. But there is no central coordination. There is not even centralized *promotion* of the terminals. In fact, a blue-ribbon commission appointed by the Governor, the Texas Energy Planning Council, specifically recommended the State *not* take on a regulatory role.**(5)**

This is a stark contrast to what has happened in much of the rest of the country, where opposition is pronounced and state review and coordination is jealously coveted.

LNG AROUND THE COUNTRY

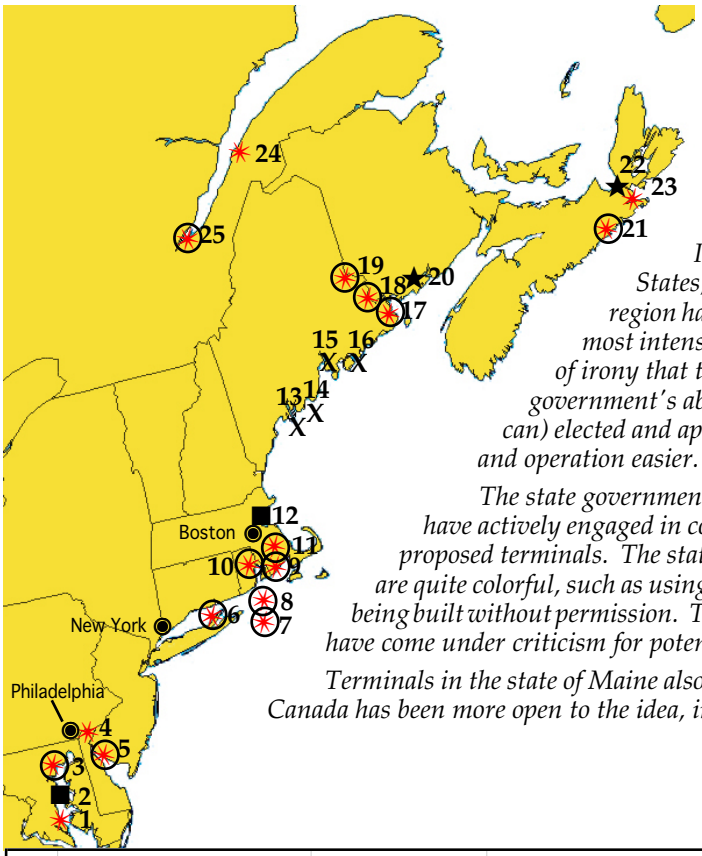
Unlike Texas, there are many people in other states that do not want LNG terminals and tankers for neighbors. And this despite a relatively good safety record thus far. Industry officials, in their more frustrating or sarcastic moments, call the attitude N.I.M.B.Y. (Not in My Backyard), C.A.V.E. (Citizens Against Virtually Everything) and B.A.N.A.N.A. (Build Absolutely Nothing Anywhere Near Anyone). But in contrast with the mindset of Texans, many people in other locales are afraid of "the big one" – a fire or explosion caused by a freak accident or terrorist attack that can kill large numbers of people. In the post-9/11 world, fears are heightened exponentially.

On the North American continent, at least 11 proposed terminals have been cancelled because of opposition from the public and local governments. And in at least 29 other locations that the *Directory* has reviewed, public opposition is apparent and often highly organized.

But the U.S. government, which acts through the Federal Energy Regulatory Commission (FERC), declared in March 2004 that it can preempt state and local governments on siting decisions. This was reinforced in Washington, D.C. in the summer of 2005 when Congress allowed FERC LNG siting preemption. In an ironic twist of politics, traditionally Democratic states are now clamoring for state's rights, while the Republican Administration and Congress are calling for federal control.

Below is a brief review of the status of LNG terminals and controversies around North America.

THE NORTHEAST
States' Rights



In the densely populated Northeastern and Mid-Atlantic United States, LNG has received a chilly reception (pun intended), even though the region has high gas costs and few indigenous conventional fuel resources. The most intense opposition has occurred in New England. There is more than a hint of irony that these typically "blue" (Democratic) states are challenging the federal government's ability to be the lead regulator on LNG projects, while "red" (Republican) elected and appointed officials are demanding federal preemption to make licensing and operation easier.

The state governments of Rhode Island and Massachusetts, as well as cities in the region, have actively engaged in court battles, rule challenges, and political brinksmanship to fend off 3 proposed terminals. The state of Delaware is not far behind them. Some of these legal maneuvers are quite colorful, such as using a state's ownership of shore bottoms to prevent piers and docks from being built without permission. Three offshore facilities are also on the drawing board, though even these have come under criticism for potential harm to fishing, recreation, and ecosytems.

Terminals in the state of Maine also have not fared well, with at least 4 proposals cancelled in 2004. But Canada has been more open to the idea, in part because some of its proposed sites are in industrial areas.

	Terminal	Max. Capacity Bil Cu.Ft/Day	Location	Developers	Status	Year Online	Estimated Cost (Mil $)
1	Cove Point LNG	1.0	Cove Point, MD	Dominion	Existing	Existing	NA
2	Cove Point Expansion	0.8	Cove Point, MD	Dominion	Approved	2008	NA
3	Sparrows Point	1.5	Baltimore, MD	AES Corporation	Proposal	2010	$400
4	Freedom Energy Center	0.6	Philadelphia, PA	Philadelphia Gas Works	Proposal	NA	$600
5	Crown Landing LNG	1.2	Logan Township, NJ	BP	Approved	2009	$500
6	Broadwater Energy	1.0	Offshore – LI Sound, NY	TransCanada/Shell	Pre-Filed	2010	$700
7	Neptune LNG	0.4	Offshore – Gloucester, MA	Tractebel LNG	Proposal	2009	($900)*
8	Northeast Gateway	0.8	Offshore – Gloucester, MA	Excelerate	Proposal	2007	($510)*
9	Weaver's Cove Energy	0.8	Fall River, MA	Poten & Partners/Hess LNG	Final EIS	>2007	$250
10	Providence LNG	0.5	Providence, RI	Keyspan/BG LNG	Final EIS	2005	$50**
11	Brayton Point LNG	0.7	Somerset, MA	Somerset LNG	Proposal	2008	$300
12	Distrigas of MA	1.0	Everett, MA	Tractebel/Suez LNG	Existing	Existing	NA
13	Hope Island LNG	NA	Hope Island, ME	TransCanada/ConocoPhillips	Cancelled	NA	NA
14	Fairwinds LNG	0.5	Harpswell, ME	TransCanada/ConocoPhillips	Cancelled	2009	$350
15	Unnamed Proposal	NA	Searsport ME	Undisclosed	Cancelled	NA	$350
16	Unnamed Proposal	NA	Gouldsboro, ME	Cianbro Corp.	Cancelled	NA	NA
17	Quoddy Bay	2.0	Pleasant Point, ME	Quoddy Bay, LLC	Proposal	2009	$500
18	Downeast LNG	0.5	Robbinston, ME	Kestrel Energy	Proposal	2010	$400
19	Calais LNG	1.0	Calais, ME	BP Consulting	Proposal	NA	$500
20	Canaport	1.0	St. John, NB, CAN	Irving Oil	Approved	2007	$750
21	Keltic LNG	1.0	Goldboro, NS, CAN	Keltic Petrochemicals	In Process	2007	NA
22	Bear Head LNG	1.0	Point Tupper, NS, CAN	Anadarko	Approved	2007	$500
23	Statia LNG	NA	Point Tupper, NS, CAN	Valero	Proposed	NA	NA
24	Gros Cacouna	0.5	Rivière-du-Loup, QC, CAN	TransCanada/PetroCanada	Proposed	2009	$660
25	Project Rabaska	0.5	Quebec City, QC, CAN	Gaz Met/Gaz de France	Proposed	2008	$700
Total LNG Supply		17.8				Total Cost	$6,920
Total U.S. Gas Consumption		60.3					

** Includes tankers with regasification* — *** Conversion of existing facility*

LNG in the Northeast

Maine seems an unlikely place for petrochemical facilities. But the state's coastline has several deepwater port sites that are easily navigated, and they are closer to LNG exporters than other U.S. ports. Much of the coast is sparsely populated, resulting in fewer opponents. And the Northeast is starved for its own indigenous fossil fuel supplies. So a number of LNG sites have been proposed.

One of the largest battles over the new wave of LNG plants in the U.S. recently took place in Harpswell, ME, a small fishing town of 4,700. Two energy giants, ConocoPhillips and TransCanada Pipelines Limited, formed a partnership to build an LNG port at an old Navy fuel depot that was owned by the town. The Selectmen (City Council) met privately and quietly with the developers to work out a lease arrangement, and then told the citizens they would hold a vote in 3 months time. With little notice and no ready money to fund an opposition campaign, some of the town's citizens began to question the plant.**(1)**

The plant promised jobs and $8 million a year in lease payments to the town's government. But it provoked fears that the town would lose its way of life. Fishing would have been adversely affected, scenic views replaced by an industrial landscape, and even more heavy industry might have located there, attracted by gas availability. And there was also the issue of security heightened by terrorism.

A group of local fishermen began using grassroots media techniques including Web sites, letters to the editor, and community access television shows. They attended numerous public meetings and often confronted the builders with uncomfortable or unanswered questions. They held an open house meeting for the community 6 weeks before the vote to try to persuade people.

The controversy was highly divisive and emotionally charged, and created long lasting distrust between neighbors and (former) friends. When the election was held in March 2004, a bomb threat was phoned in to scare people away from the town's only polling site. But the again'ers won by a 10% margin in the highest election turnout in the town's history.

Not two months later, in early May, after the Harpswell debacle, TransCanada tendered another proposal at Hope Island in Cumberland, ME. Again, the town governing body sprung it on the citizens without warning, and again, ordered a referendum on the issue, this time in only a month. Citizens in the area organized quickly to protest, and the LNG referendum was hastily cancelled. But as of June 2004, the gas corporation was looking for other Maine sites.**(2)**

Also during May, another Maine site was proposed and met with opposition and a citizen rejection at state-owned Sears Island near Searsport on Penobscot Bay. Though the vote was not legally binding, the state's Governor promised to abide by it.**(3)**

In September 2004, citizens in Gouldsboro, ME followed suit and drove off a proposed project sponsored by a Maine-owned construction firm.**(4)**

The only place in Maine where viable proposals were active as of 2006 was on Passamaquoddy Bay near Eastport, on the Canadian border. There are 3 terminal proposals on a 14-mile stretch of the Bay.

One is on an Indian reservation of the Passamaquoddy tribe. The tribe living on Point Pleasant has been negotiating with a Tulsa, Oklahoma-based partnership since August 2004 when a referendum granted the Tribal Council permission. But the decision was hardly unanimous, as members of the tribe who opposed to the plant protested that they were blindsided with only 3 weeks notice of the election, and that many members of the tribe were disqualified from voting because they were at work during the election or living off the reservation.

When the tribe began negotiating, alarm sprang up from organized citizens. The reservation is neighbors with towns in both the U.S. and Canada who have the same concerns expressed in these other towns about LNG's effect on the environment, safety, and the quality of life. The government of St. Andrews, New Brunswick (Canada) has sent a resolution of protest, and other towns followed.**(5)**

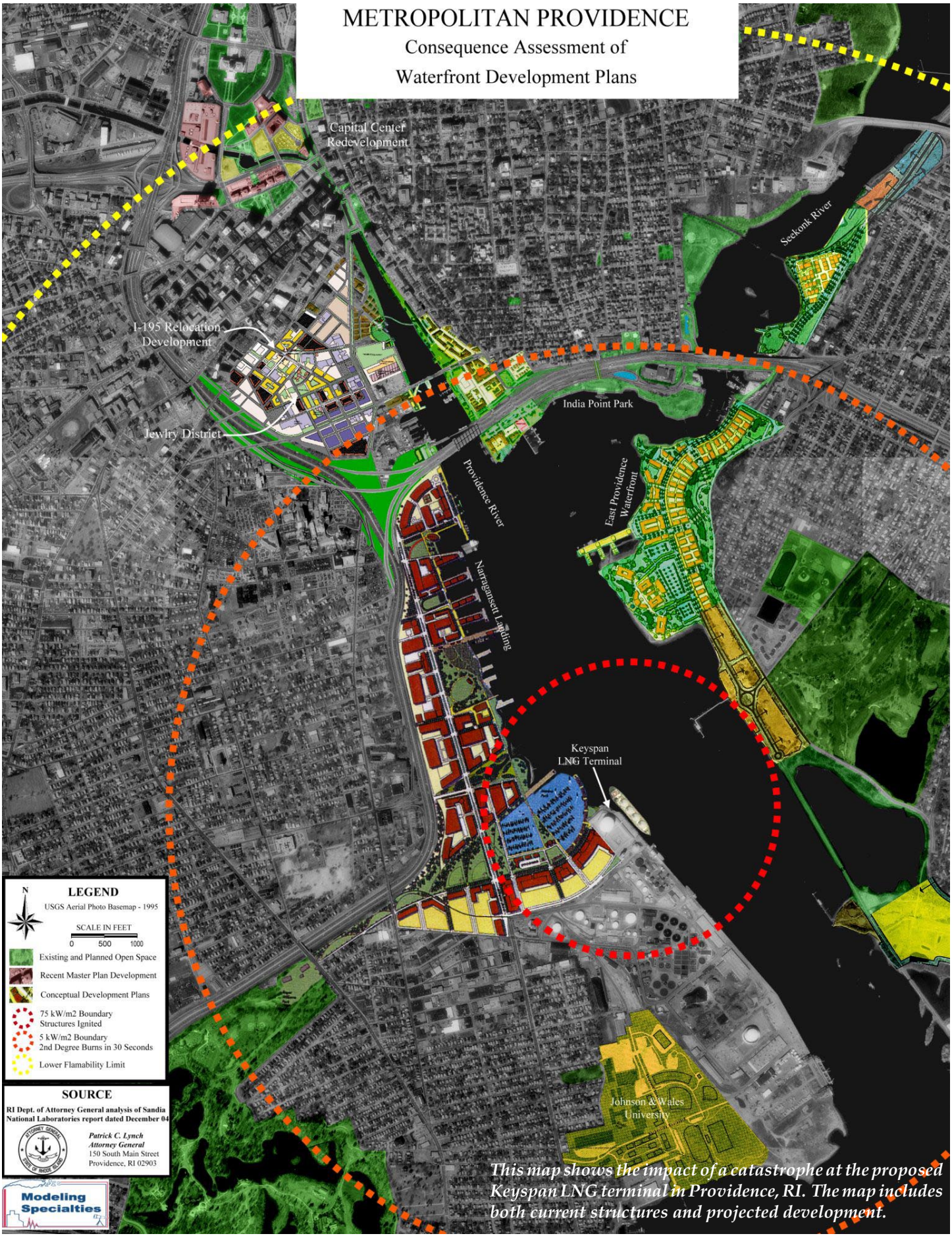
The opposition group to LNG terminals in the area, Save Passamaquoddy Bay, urged the town of Perry, ME, to use its veto power over the development. The town had sold the reservation some of the proposed land that would be used for the terminal in 1986, but attached a proviso that the town would have a voice in deciding if and how the land would be developed commercially. A March 2005 referendum in Perry ultimately prevented this land for use as an LNG terminal.**(6)**

At this point, the Tribal Council chose another site that was considered of religious and cultural significance to the tribe. This site was not approved by the tribe's 2004 referendum. The contract was approved by the Tribal Council on a 4 to 3 vote with the Council having only 15 minutes to review the contract language.**(7)** The Tribal Council failed to conduct environmental assessments, cultural impact assessments, and even failed to evaluate if the lease for the terminal was at fair market value.

In frustration, several members of the tribe have sued the Bureau of Indian Affairs who approved the lease for violating federal laws related to the deal.**(8)** The case will be heard in September of 2006.

Meanwhile, the small town of Perry has become melodramatic, as a valid recall petition has been filed against a pro-LNG town Selectman. The election is scheduled for November of 2006.**(9)**

Another proposal, known as Downeast LNG in Robbinston, received support in a referendum from its small host town of Robbinston by a 3 to 1 margin.**(10)** That 2 towns so close to each other would have such different perspectives is amazing. One of the reasons is that the Downeast proposal has been perceived as more transparent than its downstream rival.



This map shows the impact of a catastrophe at the proposed Keyspan LNG terminal in Providence, RI. The map includes both current structures and projected development.

A third terminal is proposed a few miles upstream of Robbinston near Red Rock. It will use private land owned by 2 state representatives, with the proposed terminal to be owned by the Passamaquoddy tribe. The Maine firm that was defeated at Gouldsboro has signed a contract to construct part of the facility.(11)

Activists opposing all 3 sites see the Robbinston vote as a setback, but remain undeterred in their efforts to stop all proposals. One of their strategies was commissioning an economic analysis to show how much it would cost the region to acquire the jobs an LNG terminal in the Bay would provide.(12) The study determined:

• $50 million would be needed to build an emergency communications network and up to $4.1 million a year for increased emergency services;

• a reduction in coastal property values on as much as $7.9 million;

• only 27 construction jobs and 8 permanent jobs created in the local community, since few in the region had the skills necessary to build or run such a facility. The report also alluded to jobs lost from tourism and fishing, but did not quantify this.

Activists plan to oppose the terminals during FERC licensing. But if all else fails, they will ultimately appeal to the Canadian federal government, which has announced its opposition.(13) This is critical since LNG tankers would have to traverse Canadian territorial waters, and their government's opposition could be a deal killer.

Contrasting this to Texas, where 3 LNG terminals were proposed in the Corpus Christi area near the industrial Gulf Coast, Maine itself uses precious little gas. The 3 proposed Maine terminals would provide 13 times what the state used in 2004.

The relatively small populations affected by the Maine proposals are no comparison to suggested sites farther south. Fall River, a working class town in Massachusetts, has been one of the most visible battlegrounds for LNG on the continent. Weaver's Cove Energy has proposed to build an LNG facility 24 miles up the Taunton River, on the border near Providence, RI. Terminal opponents assert that 45,000 people live within 3,600 feet of the tanker route, which also passes under four heavily trafficked bridges.(14)

At a Dec. 9, 2004 public hearing on the project, 300 people showed up to oppose the plant. It was just another example of the storm of protest the proposal has created since it was made public.(15)

Weaver's Cove is one of three proposed sites in the same proximity on the upper end of Narragansett Bay. Another is on the waterfront in the city of Providence. It is an expansion of a peak storage facility owned by KeySpan, a large gas utility in the region. This plant has also fostered opposition from various levels of government because the terminal and tanker route were in proximity to major population centers, including downtown Providence. About 2,600 residences, as well as 12 schools and 3 hospitals, were also within 1 mile of the proposed terminal.(16) In July 2005, FERC recommended rejection of the project, citing the lack of vacant land surrounding the site for an exclusion zone.(17) And yet another plant in Somerset, MA has been proposed, though its development has been delayed because of complications with the site.(18)

New Englanders are so alarmed by these proposals that the political pressure to stop them is enormous. Most politicians in Massachusetts and Rhode Island, from the local to the national level, have taken stands against these plants. Both Massachusetts' Democratic senators, Kennedy and Kerry, are working against the Weaver's Cove site, as is Massachusetts' Republican Governor (Mitt Romney).(19)

Rhode Island's Attorney General Patrick Lynch has laid into FERC and its former Chair, Pat Wood. In a November 2004 broadside, he questioned the safety of siting LNG ports in populated areas such as the facility slated for Providence. And he asked how FERC could be objective about site licensing after Wood publicly promised the gas industry that FERC would approve the terminals necessary to meet demand.(20) Woods has publicly agonized on the subject: "I just don't see that increase in demand being met any other way. I just wish we had about 10 more options, but there aren't."(21)

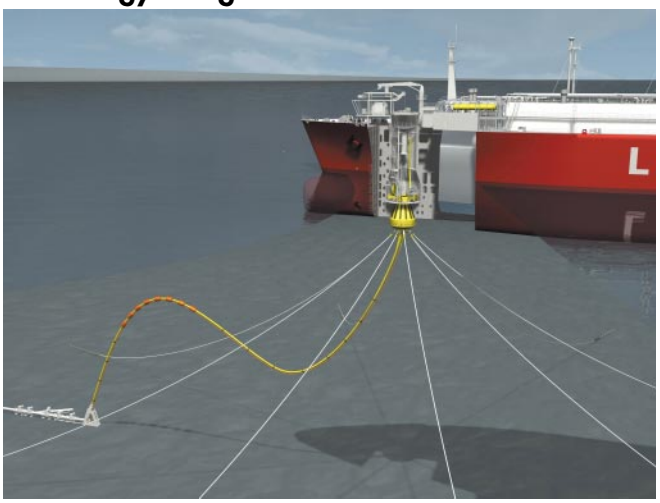
This opposition escalated into a "power meeting" on March 17, 2005, when top elected officials publicly confronted recently retired FERC Chairman Pat Wood. Rhode Island's Congressional delegation, Governor, Attorney General, and the Mayor of Providence expressed alarm to Wood about safety and economic concerns related to the proposed Keyspan terminal in Providence. Wood promised to look at alternatives to siting LNG terminals near large numbers of people, but did not think there were that many. "We have looked at alternatives," he conceded. "But for New England, it's a very short list."(22)

The Attorneys General of both Rhode Island and Massachusetts have petitioned the Dept. of Transportation to set up rulemaking to site LNG terminals in remote locations, a duty it has shirked since the law mandating this was passed in 1979. A parallel petition was also filed by the City of Fall River.(23) These parties have hinted that a court case might ensue if their requests were denied.(24)

The City of Fall River filed a petition with the U.S. Coast Guard asking for thermal exclusion (buffer) zones to be mandated for the LNG tankers they are charged with protecting, similar to exclusion zones around LNG terminals. The State of Rhode Island intervened in this proceeding and retained Richard Clarke, the nation's former anti-terrorism czar, to prepare expert testimony.(25)

In Clarke's May 2005 report, he stated that it would be

The Energy Bridge



Most critics of LNG acknowledge that offshore terminals are safer to the general public in the event of an accident or terrorist attack. But offshore terminals are considered more expensive and less convenient than land-based sites. However, a new innovation is changing this perception.**(1)**

For a decade, the oil industry has employed underwater buoys attached to a flexible pipe. It allows ships to collect oil from offshore wells for delivery to storage facilities and refineries. The technology has an impressive record of operating in the harsh environment of the North Sea in Europe, and has now been adapted for the delivery of LNG. But instead of collecting oil, the technology is modified to deliver natural gas from LNG tankers that undertake regasification onboard while at sea.

The first project to use this is the Gulf Gate Energy Bridge, owned by Excelerate Energy (The Woodlands, TX), located 116 miles south of the Louisiana coast. Energy Bridge consists of the same buoy and pipe system used in Europe. The project includes eight miles of undersea pipeline that connect it to undersea gathering lines for offshore wells in the Gulf of Mexico.

Because of the depletion of offshore wells and the lack of new discovery, these gathering lines are only running at 35% capacity. So to make the project even more economic, Excelerate is only paying a standby rate for the pipeline's use. This gives it the financial flexibility to buy spot market LNG, which is not typically done because of LNG's high capital costs.

The project not only promises safer delivery, but according to the company, it is competitive with conventional terminals. The tankers that supply the Bridge cost $190 million instead of $160 million because of the onboard regasification equipment. And it will take one extra expensive tanker to supply the site compared to a small land-based terminal. This is because regasification at sea is a 7-day process, whereas land-based terminals receive the liquid cargo in 1 day and store it for later regasification and dispatch.

But Bridge saves greatly on terminal costs. The Gulf Gate project costs only about $60 million compared to $600-800 million for a land-based facility. And the ships' crews double as the operators, whereas about 40-60 people must be employed in a terminal on land.

The technology has been criticized by a competitor as being unable to deliver gas on a reliable "baseload" schedule during inclement weather such as fog, gales and hurricanes, and (in the north) blizzards. Excelerate defends its technology as more reliable than a land-based terminal, stating that its seaworthy vessels can withstand all but the worst storms, and that large tankers are often prohibited from entering commercial harbors in severe weather or in the aftermath of hurricane damage.

On March 17, 2005, the Bridge began its operation. And the company has larger ambitions. It is already filing for a license to build a second terminal in New England, about 10 miles south of Gloucester, MA. The technology is so attractive that a competitor is making a similar proposal in the same area. Given the harsh opposition to various land-based sites in the Northeast, the Bridge technology may gain greater acceptance. A fourth Bridge technology proposal, again by another company, was suggested in early 2005 off the coast of Rosarito, Mexico.

Texas itself is an ideal candidate to use this technology. It has a vast infrastructure of offshore wells and undersea pipelines. But Bridge technology has not been considered to date, both because it is new and because most people on the Gulf Coast (that are aware of the issue) do not think onshore terminals are a safety problem.

The main environmental problem that Bridge has been criticized for is the use of sea water to regasify its cargo. Extracting heat from high-pressure sea water kills anything siphoned into the system's heat exchanger or impinged on its filters. This includes adult sea life, eggs, larvae, and plankton on which sea life feed. It effectively renders the seawater sterile, and given enough offshore terminals, could reduce fish catches. Energy Bridge is capable of using either this "open rack" technology or a "closed loop" system, which uses heat from natural gas itself for regasification. Its first Gulf system is a hybrid using both reheat systems, but Bridge could rely totally on the closed loop system if it chose to and allay these immediate concerns.

Though there will be a learning curve for operation as the first Energy Bridge is commissioned, the technology could well be a trendsetter for the gas industry. But from a larger environmental view, the problem is that the Energy Bridge may work too well. It will relieve immediate concerns of safety and terrorism at a reasonable (monetary) cost, while long-term problems such as the greenhouse effect, gas production in other countries with lax environmental laws, limited fossil fuel resources, and national security fester. Once again, the human lemmings are cheating their fate by procrastinating the long-term changes in energy use that need to be made.

impossible to defend the 58 miles of populated coastline in the Bay. He estimated in the event of a terrorist attack on an LNG tanker in a critical area, 3,000 people would die and 10,000 would suffer serious burns in just the first few minutes, while thousands of others would be killed or injured as the fire spread. The heat at the source would be so searing that firefighters would not be able to get near it. Emergency centers would be overwhelmed. Petroleum bulk storage and chemical tanks in the radius of harm would also be likely to explode or catch fire.**(26)** At the time this article went to press, the Coast Guard docket was ongoing.

In late June 2005, FERC approved the Weaver's Cove terminal. At the same time it turned down the Keyspan facility, the only application that it has ever rejected. While denying new terminals is not its habit, FERC cited a lack of buffer areas at Keyspan necessary for exclusion zones in the event of a fire. Both decisions are currently being appealed.**(27)**

On August 15, 2005, in a surprise move, the Naval Undersea Warfare Center joined other intervenors in the Weaver's Cove terminal in appealing FERC's decision. The Center asserted that it had only recently learned the impacts the tanker route would have on its ability to test technology and techniques in Narragansat Bay. This may significantly change the political support for the plant in Washington. While plant developers have complained that it is highly improbable such a highly publicized controversy would have escaped the Center's notice, the fact that a military institution is complaining about interference from LNG tankers will not be taken lightly.**(28)** Two other LNG terminal proposals have been severely damaged by U.S. military opposition.

Both Rhode Island and Massachusetts filed a challenge in federal appeals court in January of 2006 asking that the terminal's license be overturned. Part of the lawsuit alleges the U.S. Dept. of Transportation failed to enact remote siting guidelines required in 1979.

Both the states of Rhode Island and Massachusetts have sought their own laws to make it impossible for Weaver's Cove to operate. In July of 2006, Rhode Island enacted a prohibition against LNG tankers coming within hundreds of yards of restricted sites and hazards, including people, waterfront facilities and docks, hunting grounds or and commercial welding.**(29)** Massachusetts passed a similar law in the same month, and added language that required LNG tankers to have certain clearances for bridges that were impossible given current traffic infrastructure and tanker size.**(30)** The Massachusetts law was rejected by the Governor on technical grounds, but will probably be signed if revised. Both states are testing the limits of federal preemption of LNG siting, and these laws will probably be challenged in court.

Legal strategies may not be the only tactics used against this plant. For 2 years, the state of Rhode Island has denied a dredging permit to Weaver's Cove.**(31)** There is not was huge LNG tankers can procede to the terminal without dredging, and the energy company has claimed this delay is intentional. The State has replied that the company has not submitted proper permit applications.

Moving south of New England, two other terminals are proposed for the Delaware River: one in Logan Township, NJ, and the other in Philadelphia, PA. The Logan site, Crown Landing, is fiercely opposed. The number of critics in New Jersey are minimal. The plant is seen as economic development for the areas, the public's general tolerance of industry in the area is greater. (There are, for example, 3 Superfund hazardous waste sites already near the town.) But in Delaware, the public and its political leaders have overwhelmingly opposed the project because of its use of the river.**(32)**

Due to an archaic and arbitrary border devised before the Revolutionary War, Delaware controls virtually all of the bottomlands of the River up to the New Jersey shore. And since these are essential to site docks and piers needed for the terminal, Delaware must currently grant approval for use of the river bottom for the terminal to be built. This approval runs dead into a 1971 state law, the Coastal Zone Act, forbidding future petroleum bulk storage and heavy industry on the River. Of the public comments received by the State of Delaware's Dept. of Natural Resources and Environmental Control in January 2005, about 200 people or groups spoke against the project. Almost none spoke on its behalf.**(33)** Though many see the issue in regards to health and safety, others view it as protecting the state's sovereignty.

The state of Delaware ruled against the project on Feb. 3, 2005, with LNG proponents crying for federal preemption for LNG sitings.**(34)** Not to be outdone, the state of New Jersey has asked the U.S. Supreme Court to rule on the border issue. The Court accepted the case, but appointed a special master to get historical evidence, a process both sides expect to take years.**(35)**

And not far away, Philly Mayor John Street wants the City's gas utility to expand its LNG winter peak shaving facility with imported gas. He promotes the idea as a way to increase utility profits and create economic development. However sincere he may be toward these goals, he has also rationalized the "Freedom Energy Center" as a way to ensure energy independence with foreign fuel, which has critics rolling their eyes.**(36)**

The Mayor's hopes have been all but dashed by a rebellious City Council, who has passed a resolution rejecting the proposal because of concerns such as safety and vulnerability to terrorism.**(37)** Though non-binding in its present form, any contract regarding the terminal would ultimately have to be approved by them.

Given the general hostility in the region to onshore terminals, offshore terminals located far from populated areas are now being proposed. But these too have their critics. Opposition has emerged to the proposed Broadwater

LNG terminal 9 miles off the coast of New York near Long Island Sound and 11 miles from the Connecticut shore. Many LNG opponents and even some LNG advocates see offshore facilities as a socially and environmentally acceptable alternative to onshore sites. But in New York and Connecticut, opposition has even emerged to this type of facility. Concerns include: harm to the Sound's environment; restrictions on aviation, fishing and recreation in the area; that the terminal will become a magnet for future industrial development; and that it will also become a magnet for terrorism.(38)

Opposition from environmental groups, local residents, and lawmakers began almost immediately after the formal announcement to build the facility, which again lists TransCanada as a major cosponsor, this time partnering with Shell. And again, opponents are angered about FERC preemption over state regulatory authority.

In an interesting twist, former New York Mayor and 9/11 hero Rudolph Giuliani has been hired by Broadwater to manage the security assessment of the Long Island proposal.(39) He will use the assistance of former New York City Police Commissioner Bernard Kerik, George W. Bush's 2004 nominee for Homeland Security director until his questionable finances were exposed.

In June 2006, the government of Suffolk County proposed legislation that would ban LNG terminals in the sound.(40) Citing a 19th Century law that gives the county authority over navigation, the law's proponents claims the law overrides federal preemption of LNG siting.

At least two other offshore facilities are proposed. These are off the coast of Massachusetts.

Many thought it was too long in coming. Boston Mayor Thomas Menino wanted to know why all LNG ports could not be offshore so tankers could be eliminated from Boston Harbor, which is 6 miles downriver from the Everett LNG terminal.(32) The tankers are considered such an inviting terrorist target that the Everett facility was closed during the 2004 Democratic Convention.(41)

After 9/11, the City of Boston and other nearby cities actually sued to stop the existing LNG terminal in Everett, MA, from continuing to operate. They were concerned about the safety of the area's citizens from terrorist attacks on tankers. But they lost because they lacked legal standing.(43) Jay Fleming, Boston's Deputy Fire Chief, has worried aloud about an LNG fire. "I need to know if we should let the first row of buildings go and save the people in the second."(44)

But Mayor John Bell of Gloucester, MA, near the site of these two proposed offshore terminals, was of a different mind. He worried about the effect the facilities would have on fishing, both from their disruption of the environment and from restricted access to area fishermen on security grounds. He asked ''Do we need to give some of the most valuable fishing grounds up in order to accommodate speculative endeavors?" and called the projects part of a "gold rush."(45)

Another LNG proposal has sprung up in Baltimore harbor. Since it is relatively near residential neighborhood, it has galvanized widespread opposition that ascended to elected officials at the city, county, state, and national level, and include Maryland's Governor and members of Congress.

Local officials are so determined to prevent the plant that they have passed locally enacted laws to confront federal ones, and refused to offer the any cooperation. The County recently adopted a law banning LNG plants within 5 miles of a residential area, even though this would be headed toward a court fight against a national law granting FERC federal preemption of LNG siting.(46) The County also refused to allow the company proposing the terminal access to county land so it could do survey work necessary for site planning.(47)

The Ugly American (Part 1)

America's friends and neighbors to both the north and south also have an interest in building terminals to import LNG. But since most of these plants may serve the U.S., terminal proposals have drawn suspicion from those who believe their countries are being exploited by ugly Americans.

Patrick Wood, President Bush's former Chair of the Federal Energy Regulatory Commission, did not help dispel this perception when he gave a speech in Quebec in the summer of 2004. He stated that if LNG terminals were not built in the Northeastern U.S., the infrastructure could be built in Canada to provide the needs of both countries. His words were construed by some to mean that Canadians could take the safety risks that Americans refused.(48)

Canada has at least 8 LNG terminal proposals, 6 of them in Eastern Canada, and 2 on the Pacific shores of British Columbia. While not immune from opposition, several have been well received and at least 2 have been licensed by the government. Interestingly, at least 2 of the proposals have a Texas connection or owner.

The two proposals that were permitted as of early 2005 were Bear Head LNG, near the northeast tip of Nova Scotia,(49) and Irving Oil's Canaport facility 300 miles southwest near St. John, New Brunswick.(50) Construction of the Bear Head terminal has already begun, and both projects have an expected completion date in 2007. Both will provide much of their imports to the U.S. market.

The company that owned Bear Head LNG was purchased by Anadarko Petroleum of Houston three days after its site was approved. Anadarko has oil interests in both Qatar and Algeria, two of the world's leading LNG exporters.(51) Anadarko is also interested in sharing con-

struction costs for the Canaport terminal.(52)

Another project by Statia LNG is proposed within 10 miles of the Bear Head site. It is owned by Texas-based Valero. And Keltic Petrochemicals is proposing a facility that would include both an LNG terminal and plastics factory Goldboro, Nova Scotia about 60 miles southwest of the Bear Head site. This would include not only an LNG terminal, but a plastic factory as well. (Due to geography, Nova Scotia is actually closer to some LNG exporters than U.S. cities, shortening tanker trips – and costs, and is next to a large pipeline.)(53)

The Keltic site initially attracted opposition. In the fall of 2004, a group of fishermen began a petition asking for a full environmental review of the plant before the land necessary for its location is zoned.(54) Concerns are similar to other plants that have attracted protest: loss of harbor access and destruction of fishing areas, the unsightly views the plant would create, air and water pollution from a gas processing plant, and the loss of the way of life in the quiet burg.

But "progress" has marched on, as the company has won site approvals and claimed to have attained a supply of LNG. The area is economically depressed, and the prospect of hundreds of jobs in the local area for LNG imports and plastic manufacturing/shipping have been impossible to resist for the area's government officials. The local government is planning on rezoning waterfront land, and its plan's may include condemnation of adjacent areas to create a contiguous industrial zone with buffers from residential areas.(55)

There are at least two proposals in Quebec. One, near Quebec City, has suffered severely from opposition as the public or the elected representatives of several towns have rejected the idea outright. In the small town of Beaumont, citizens voted against the terminal by 72%.(56) Not to be spurned, the company has continued looking for other locations in the same general area. In the nearby town of Levis, local political leaders have also opposed the project.(57) But the two French Canadian companies promoting the terminal, Gaz Metro and Gaz de France, have continued their campaign. In January 2005, they suggested they may even buy the homes of nearby residents to allay safety concerns.58)

Down the St. Lawrence River at Gros Cacnouna Island, a proposed terminal enjoys greater public acceptance since it is near an industrial area.(59) One of the sponsors of this project, TransCanada, is the same company that has met with so much opposition in the Northeastern U.S. Ironically, this is a rival proposal to the one near Quebec City, and Gaz Metro's project is partially motivated as a way to break dependence from TransCanada's gas costs from Alberta. In this case, "independence" is achieved by foreign gas imports.(60)

In British Columbia, two withering industrial towns that are neighbors are competing for a regional LNG port. WestPac Terminals is planning a facility on an island that serves as a port and industrial park next to the town of Prince Rupert.(61) Galveston LNG (Calgary, not Texas), is attempting a terminal just 50 miles west at Kitimat.(62) These two towns (populations 15,000 and 10,000 respectively) have some of the highest rental vacancy rates in the province, in large part because of job layoffs in heavy industry. The rivals are also courting the terminal for a large pipeline to come through their ports that will transport synthetic oil made from Alberta's tar sands. The pipeline company hopes to bring 200,000 barrels of synfuel a day to the Pacific coast for export to China.(63)

LNG on the West Coast

By sheer force of numbers of people, the West Coast is a huge energy consumer. California alone has 12% of the country's population. And due to its chronic air pollution problems, it burns almost no coal; most of the coal that creates electricity for its use is done in neighboring states. The West Coast in general produces only 12% of the natural gas it uses. So LNG is a seriously considered alternative. But because of its dense population and environmental awareness, several proposed LNG terminals have not been well received.

In the latter half of 2002, the City of Vallejo wrestled with a proposed terminal and 900 MW power plant at the decommissioned Mare Island naval base. The port city is about 40 miles east of San Francisco on San Pablo Bay. LNG tankers would literally have had to enter the port by coming under the Golden Gate Bridge.

The project's sponsors, Bechtel and Shell, met with City officials for over a year before the proposal was made public.(1) But almost immediately, activists swarmed to the issue. They were concerned about safety, terrorism, aesthetics, conflicting views on reuse of the base, the potential for the terminal to become an industrial magnet, and the secrecy with which the proposal was crafted.(2) The controversy raged for 8 months while activists put grassroots pressure on the City Council through public hearings, petition drives, and hard questions posed to committees appointed by the Council to study the proposal.(3) One of the turning points in the struggle was the release of a safety study crafted by a proponent of LNG. The study posited that a worst-case scenario, a 9/11-type intentional aircraft collision, could cause 1st degree burns 4 miles away.(4)

As the public and the Council turned against the idea, the project sponsors withdrew gracefully in January 2003 rather than face a negative vote.(5)

Only 230 miles north, the City of Eureka, CA, also rejected an LNG proposal in March of 2004. The company hoped to build an LNG terminal and accompanying power plant supplied by it. But a packed and stormy public hearing where the majority of citizens protested the proposal, convinced Calpine, the sponsor, to abandon the idea.(6)

THE WEST COAST
Not So Fast

■ Existing LNG Terminal
Approved with Opposition
Proposed
X Cancelled Due to Opposition
Proposed With Opposition

There have been 16 LNG terminals proposed in the Pacific region of the U.S. Four have already been cancelled due to public outcry, and almost all of the others have some degree of opposition. This opposition even extends to offshore facilities far outside the range of what most experts consider to be harmful in worst-case accidents or deliberate attacks.

The most important terminal from a legal, political, and hazard perspective is the site at Long Beach. At least 85,000 people and 50,000 port and downtown workers live within 3 miles of the proposed terminal. Also, the ports of Long Beach and Los Angeles are located next to each other, and between the two, they process 45% of all the container freight in the U.S. In the event of a catastrophe, the economic damage would be enormous. The state government of California believes it has the authority to accept or reject the plant's license, but is locked in a legal battle with the Federal Energy Regulatory Commission over federal preemption.

Given the opposition to some of these plants, Mexico is considered an alternative for locating potential terminals that serve both countries. But this has fueled resentment from many of its citizens who see the terminals as an extended form of imperialism, where the U.S. takes advantage of cheap labor, lax environmental and safety regulations, and a reduced likelihood of earthquakes for sites to import its (imported) energy. Two proposed Mexican LNG ports have been cancelled thus far due to public concerns of safety and threats to tourism.

	Terminal	Max. Capacity Bil Cu.Ft/Day	Location	Developers	Status	Year Online	Estimated Cost (Mil $)
1	Skipanon LNG	1.0	Astoria, OR	Calpine	Proposal	2011	$500
2	Undisclosed	NA	Astoria, OR	Undisclosed	Proposal	NA	NA
3	Northern Star Nat. Gas	1.0	Bradwood, OR	Northern Star Natural Gas	Proposal	NA	$520
4	Port Westward LNG	0.7	St. Helens, OR	Port Westward LNG LLC	Proposal	NA	NA
5	Jordan Cove	0.1	Coos Bay, OR	Energy Projects Developmen	Proposal	2009	$150
6	Samoa Point Energy Cen.	1.0	Eureka, CA	Calpine	Cancelled	NA	$750
7	Mare Island LNG	NA	Vallejo, CA	Shell/Power–Bechtel	Cancelled	NA	$1,500
8	Sound Energy Solutions	0.7	Long Beach, CA	Mitsubishi/ConocoPhillips	Draft EIS	2008	$450
9	Clearwater Port	0.5	Offshore – Oxnard, CA	Crystal Energy	Draft EIS	2007	$300
10	Cabrillo Port	1.5	Offshore – Oxnard, CA	BHP Billiton	Final EIS	2008	$550
11	Unnamed Proposal	0.8	Offshore – Camp Pendleton	Chevron Texaco	Proposal	NA	NA
12	Tijuana Reg. Energy Cen.	1.0	Tijuana, Baja, MX	Marathon Oil/Pertamina	Cancelled	2006	$900
13	Term. GNL Mar Adentro	1.4	Offshore – Tijuana, MX	Chevron Texaco	In Process	2009	$650
14	Energy Costa Azul LNG	1.0	Ensenada, Baja, MX	Sempra/Shell	Approved	2008	$600
15	Rosarito Beach LNG	0.7	Rosarito, Baja, MX	ConocoPhillips/El Paso	Cancelled	NA	$450
16	Unnamed Proposal	NA	Offshore – Rosarito, MX	TAMMSA/Moss Maratime	Proposed	NA	55*
Total LNG Supply		9.4				Total Cost	$5,725
Total U.S. Gas Consumption		60.3					
		* Cost does not include tankers with regasification					

Over three quarters of the 77 speakers at the hearing were opposed for reasons not unlike those of other proposed sites: threats to fishing and scenic views; that the plant would be a safety hazard in the event of earthquakes or tidal waves; that it would become a magnet for terrorism; and that it would dampen recreational boating. The hearing was so long that it had to be extended for another day to allow 100 more people to speak. But the company decided it did not want to build in such an unfriendly environment.**(7)**

In the City of Long Beach, CA near Los Angeles, a huge confrontation has occurred over the terminal proposed by Sound Energy Solutions, a partnership between Mitsubishi and ConocoPhillips. The plant would be located in the second-most heavily trafficked container port in the United States; by one estimate, 42% of all container cargo moves through Long Beach or the adjacent Port of Los Angeles.**(8)** To opponents of the proposal, this means a terminal or its supply tankers would be the highest priority to an enemy wishing to disrupt the U.S. economy.

At least 85,000 people and 43,000 port and downtown

workers live or work within 3 miles of the site.(9) It is in the vicinity of 3 earthquake faults, 1,500 producing oil wells, 7 petroleum bulk storage terminals, and is in an area where ground subsidence is legendary.(10) Yet FERC continues to process the terminal's application; the Environmental Impact Statement for the site will be released in the spring of 2005.

Bry Myown, a spokesperson for the anti-terminal group Long Beach Citizens for Utility Reform, sees the issue as a test case: "If you can site a terminal with all the environmental problems and all the economic implications the Long Beach site has, then all other sites have a lower bar."(11) Or to paraphrase, 'if you can site this facility, you can license anything.'

There are also 3 proposed sites for offshore terminals in Southern California: Crystal Energy, BHP Billiton, and Chevron Texaco. While relatively safer than onshore sites, even these have come under criticism. To begin with, the BHP and Crystal terminals are near the scene of the Santa Barbara oil spill of 1969. This disaster left such bitter memories that many in the public do not want any type of petroleum facility in the area. Then there is opposition on safety grounds. The City Councils of both Oxnard and Malibu have both gone as record as opposing the Crystal Energy and BHP sites, even though they are respectively 11 and 14 miles off land.(12)

The Chevron Texaco proposal is the least likely of the four California proposals to be built, and has not been taken as seriously. Located in the San Diego area, it is opposed by environmentalists for its incursion into the last stretch of undeveloped coastline in the southern part of the state. It also has opposition from the U.S. Marine Corp, whose base at Camp Pendleton would be its host or neighbor.(13)

A wrinkle to the entire California situation is that these terminals may, in effect, be paid for through utility bills. A rate case decided by the California Public Utility Commission in September 2004 allowed the state's three largest utilities, San Diego Gas and Electric, SoCal Gas, and Pacific Gas & Electric, to cancel long-term contracts with domestic gas pipelines owned by El Paso Natural Gas and Transwestern Pipeline Company. The case left open the possibility that the infrastructure and long-term contracts would be committed to LNG. Opponents are livid, and believe the ratebasing of LNG is likely.(14)

Ratepayers for Affordable Clean Energy (RACE), a coalition of consumer, environmental, and safety activists, have alleged that the gas will become a sole source supply to Southern California from the Sempra LNG terminal in Baja, Mexico. (Sempra is also the parent company of San Diego Gas & Electric and SouCal Gas.) The activists contend Sempra gas will cost more than other gas contracts the utilities have, and they are challenging the PUCs ruling. These advocates fear that such massive expenditures will lock the state's consumers into long-term LNG gas contracts that will deter investment in conservation and renewable energy.(15)

Bill Powers, an engineer and activist who heads the Border Power Working Group, commented on the bewildering alliance between RACE and the pipeline industry. "This is the only time in history you will see Greenpeace, Public Citizen, Kinder Morgan, and El Paso Natural Gas on the same side."(16)

Despite fervid opposition, LNG has its fans in California. Among them a coalition, Californians for Clean Affordable and Safe Energy, which includes the state's Chamber of Commerce, the California Manufacturing and Industry Association, LNG terminal builders, and several organizations promoting large manufacturing and agricultural interests. They are funding a $1 million public relations campaign to sell the public on a liquid future. They feel that the state must plan ahead, and given the state's air pollution problems, natural gas is the cleanest conventional fuel to rely on.(17)

The campaign, which will be run by the PR firm Navigators (the same firm that helped elect Governor Arnold Schwarzenegger), will use focus groups, polling, and academic studies to craft its message for TV, print media, public events, speakers, and educational symposiums.(18) The Governor and his staff have been lobbied by LNG promoters, and several of his staff members have toured Oriental LNG facilities on a junket paid for by the LNG industry.(19)

Mike Murphy, the principal of Navigators, said the campaign would "change the face of LNG for the public" by reaching labor leaders, minority activists, environmentalists, and small business owners.(20)

Going north to Oregon, there are also 4 LNG plants proposed, but for a state with only 10% of the population of California. The most developed proposal is at Coos Bay on the Pacific Ocean. There are also 4 sites on the Columbia River: two near Warrenton (close to Astoria); at Bradwood, (about 28 miles from the Columbia's end; and at Port Westward near Clatskanie (38 miles east of the mouth of the river). These 5 sites, if built, would provide over twice the gas consumed by the entire states of Oregon and Washington. (No one can say they don't plan for the future.) As in other areas, promises of jobs for construction and operation have been made by the developers of these sites.

Opposition has emerged from several groups around these Oregon sites by those concerned about safety, environment, and the social effects LNG can have on the communities surrounding the River. Peter Huhtala, an activist opposed to the sites on the Columbia, worried that any of the Columbia proposals would adversely affect his small community. "You can have more security, but this damages the character of the community…" that has survived on fishing and tourism for over a century.(21) There is also concern that the publicly owned site in Warrenton, like so many others, was secretly leased without public process or competitive bids.(22)

However, even if none of these West Coast plants are approved, LNG will still come to the United States courtesy of our friends across the border. (And there's always Texas.)

The Ugly American (Part 2)

In Mexico, there are also terminal proposals. Despite the country's huge oil production, it is a net importer of gas because its production cannot keep pace with demand. Technically, Mexico's gas imports come from the U.S. But since the U.S. is itself a gas importing nation, most of Mexico's imported gas is made up by Canadian production.(23) But there have been 5 proposed terminals in Northern Mexico that might serve California in the Baja Peninsula just south of the state's border.

At least two of these have been cancelled due to opposition. While opposition has largely been based on safety and environmental grounds, there is also intense animosity on the part of some who feel that their country is being taken advantage of by their friends to the north.

Mexico has a history of protecting its oil wealth. It nationalized oil production in 1938, seizing assets from companies in 17 countries, most notably those in the U.S. To this day it is illegal for foreign companies to own oil production and infrastructure. Both major opposition parties have protested the LNG terminals as being a step toward tolerating foreign ownership.(24)

These critics also believe the U.S. is siting these facilities because of the country's lax safety and environmental laws, and that the terminals will be used to supply California and not the host country. Mexican terminals offer cheaper labor for construction and less environmental regulation. One politician commented "This is the machine room, and we are the shovelers of coal."(25) Critics have labeled the Mexican plants "Energy Maquiladoras," comparing them to the runaway industrial plants that moved to the country from the U.S. for cheap labor and lax environmental and worker-safety laws.(26)

After more than a year of planning, El Paso Natural Gas and ConocoPhillips dropped plans to build a plant near Rosarito in May 2002 in the face of opposition. This was despite the economic development the plant would bring, and the offer to paint the LNG tanks as works of art. There was great alarm that the terminal would hurt the economy, which was heavily dependent on tourism. And there were concerns that the terminal could exacerbate safety and environmental problems that already exist from nearby leaking oil storage facilities, powerlines, and a gas pipeline.(27)

Marathon Oil was planning an entire energy complex south of Tijuana, including an LNG terminal, a 400 MW gas-fired generation plant, a wastewater treatment facility to provide its cooling water, a 20-million gallon desalination plant, and a wildlife sanctuary. (The water plants were offered as an incentive to the public.)(28) But resistance built because the site was near a populated area and might deter tourism. Opposition was so strong that the Baja state government took the dramatic step of expropriating the site.(29)

But other projects may fare better. Shell and Sempra (owner and partial supplier of San Diego Gas & Electric and SoCal Gas) have a partnership to build a terminal in a more isolated area near Costa Azul, 60 miles south of the U.S. border. While the plant has been approved by the government, it has also been sued by activists alleging that the companies did not hold title to the site.(30)

And Chevron Texaco has been planning an offshore port 8 miles off the Baja coast, just 10 miles below the border. It will be on a platform 1,000 feet south of one of the Coronado Islands. Though not generally protested on safety grounds, environmentalists have criticized its effects on endangered migratory birds and the terminal's use of seawater to regasify the LNG, which will effectively kill all sea life near the equipment.(31)

The most recent proposal came in early 2005, when a company proposed an offshore facility similar to the Energy Bridge in the Gulf of Mexico (see "Energy Bridge" sidebar.) This would be 5 miles off the coast of Rosarito, and would regasify LNG aboard ships and feed it through an underwater pipeline.(32) So far, no opposition has occurred. But even given the safety buffer to the public, and no visible site footprint, the pattern on the West coast has not been very forgiving.

Mexico is also planning several LNG terminals farther south. But these are farther away from the border and not likely to be used for U.S. "exports."

LNG Down South

Two proposed terminals in the Mobile, Alabama vicinity were terminated because of public opposition. ExxonMobil had proposed a facility near a residential neighborhood 2 miles south of the city limits. Cheniere Energy also proposed a terminal in the area, located 1 mile south of the city's downtown area.

Initially the public favored LNG in their area, but a broad coalition of environmentalists, public safety advocates, businesses, and real estate interests formed to defeat the terminals.(1) Opposition groups such as Mobile Bay Watch demanded an independent safety study be done prior to approval. (The company opposed this, wanting the safety study to be part of the FERC permitting process.) Inescapable public pressure and demands were placed on every public official. At activists' urging, City councils around the region passed resolutions opposing the plant until this safety study was performed.(2)

Yard signs opposing the plant sprang up throughout the area, as neighborhoods were flyered repeatedly. Meetings

were arranged for an open exchange between residents and the company to answer concerns, which the company could never dispel.(3)

This opposition was magnified when the city's main newspaper, the *Mobil Register*, launched a series of articles revealing possible hazards. It was apparent from these articles that some of the material was leaked by whistleblowers, and these leaked materials included safety evaluations never made available to the public on LNG tanker hazards.(4) Several months after the campaign and articles began, poll-measured support for the terminals plummeted.(5)

Public concern provoked the interest of the state's Republican Governor, Bob Riley, who echoed demands that Exxon-Mobil fund an independent safety evaluation as a prerequisite to licensing. He and many others tried to influence the port authority agency, an autonomous board that had purview over the lease of the site. But when the board approved the site anyway, the Governor announced that he would not approve the use of bottomland near the port for piers and docks without the study.(6)

After about a year, the oil giant abandoned its proposed project in late October 2004, publicly citing greater community acceptance at other proposed locations, such as Texas.(7) The Cheniere site, which would potentially impact even more people, has also been effectively abandoned.(8)

In North Carolina, a proposed site on Radio Island near Morehead City near the middle of the state's coast was cancelled in July 2002 after united opposition from developers, environmentalists, former Senator Jesse Helms, and the U.S. Navy, which has extensive facilities that would have been threatened by an attack on the terminal or tankers.(10)

But in Pascagoula, MS, two sites are proposed at its port within a mile of each other. The Mississippi state Sierra Club has questioned the wisdom of siting the Pascagoula terminals near one of the country's largest oil refineries, a Navy base, and a major shipyard. If the refinery were damaged by a tanker attack, the organization speculates that national gasoline prices would skyrocket because of a supply shortage.(11)

But there is not nearly the attention and opposition to the issue that was sparked in Mobile. The state's Governor, Haley Barbour, is a former energy lobbyist, and 2 of the 5 County Commissioners are or were long-time employees of Chevron Texaco, one of the companies proposing the terminals.(12) According to Becky Gillette, State Co-Chair of the Sierra Club, the low education and income of the area has made it more difficult to galvanize people around the issue.(13)

In Louisiana, terminal proposals abound. If you add onshore and offshore facilities, there are 9, including 3 onshore (2 of which are approved) and 6 offshore. Most of the concern and opposition in the Gator State has centered around the economic harm to fisherman and tourism. At issue is the way LNG is regasified.

LNG is so cold that its exposure to air will turn it to vapor. Seawater has an even more powerful impact. The sea's heat can be used in an "open rack" heat exchanger to regasify LNG, saving energy and money. But the process effectively sterilizes seawater by: 1) killing impinged sealife on the intake filters; or 2) by rendering the water too cold for fish, shrimp, larvae, eggs, and even plankton that sea life feed upon to survive.(14) Environmentalists and fishermen have become allies to stop this process, and convert any LNG terminals that are permitted to "closed loop" systems that use gas itself to reheat the cargo.

Activists have called on Southern governors to influence these terminals to spare fisheries. Governors of littoral states have the power to veto deepwater ports off their coasts.(15) Activists have successfully lobbied for a non-binding resolution from the Louisiana Legislature calling on the U.S. Congress to give states more input on LNG siting issues such as open rack vaporization.(16)

This limited opposition has had some success. It persuaded Louisiana Governor Kathleen Blanco to veto the proposed Freeport McMoRan site until it switched to a closed loop system.(17) And the Compass Port offshore facility was cancelled after Alabama Governor Bob Riley vetoed it for the same reason.(18)

But with little or no opposition, 2 onshore facilities have been permitted, one in a sparsely populated area on the Sabine River that borders Texas, and one about 25 miles east near Hackberry, LA. A third one in this same vicinity was proposed in late 2004.

The Ugly American (Part 3)

There are also three proposed terminals in the Bahama Islands. Most of the imported fuel would be reexported to Florida through expensive undersea pipelines. The gas will be used by Florida Power & Light for electric generation.

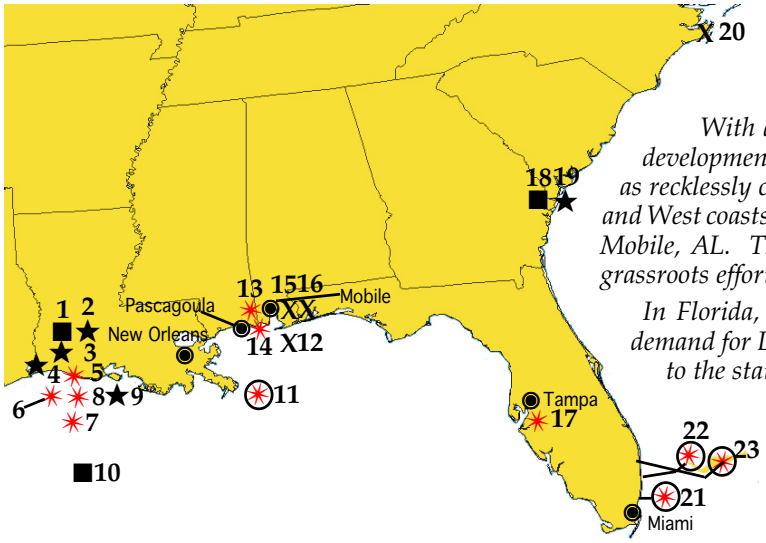
There was originally a proposal to develop a Florida-based terminal and spare much of this expense. But deepwater port sites in the Sunshine State were limited(18), and according to one source, any potential site would have been prohibitively expensive.(19)

The three Bahama options are:

1) High Rock LNG terminal on Grand Bahama Island, linked to Riviera, FL with the 128-mile, $350 million Seafarer underwater pipeline. Its main principals are El Paso Natural Gas and Florida Power & Light.

2) Ocean Express LNG, located on a 95-acre artificial

THE SOUTH
A Lot Like Texas



With a few exceptions, the rest of the South is as amicable to LNG development as Texas. Some proposals, such as 2 ports in Pascagoula, are as recklessly close to neighborhoods and industries as terminals on the East and West coasts. But the opposition is not apparent. Exceptions to this include Mobile, AL. The city's reputation for activism does not rival Berkeley, yet grassroots efforts fended off 2 proposals by multinational oil companies.

In Florida, a lack of deepwater ports and fear of opposition has created demand for LNG ports in the Bahamas, with expensive gas lines extending to the state.

There are a number of proposals offshore in the Gulf of Mexico. One of these, the Gulf Gateway Energy Bridge, is an innovative technology that gasifies LNG while the tanker is over 100 miles offshore and feeds it into existing pipelines that serve offshore wells. Since it may actually save money, this technology may set the trend.

	Terminal	Max. Capacity Bil Cu.Ft/Day	Location	Developers	Status	Year Online	Estimated Cost (Mil $)
1	Trunkline LNG	1.0	Lake Charles, LA	Southern Union	Existing	Existing	NA
2	Trunkline LNG	1.1	Lake Charles, LA	Southern Union	Approved	2006	NA
3	Cameron LNG	1.5	Hackberry, LA	Sempra Energy	Approved	2007	$700
4	Sabine Pass LNG	2.6	Sabine, LA	Cheniere LNG	Approved	2007	$750
5	Creole Trail LNG	3.3	Cameron, LA	Cheniere LNG	Prefiling	2009	$900
6	Pearl Crossing	2.8	Offshore 41 mi. South of LA	ExxonMobil	Draft EIS	2008	$600
7	Beacon Port	1.5	Offshore 56 mi. South of LA	ConocoPhillips	Proposed	2010	NA
8	Gulf Landing	1.0	Offshore 44 mi. South of LA	Shell	Prefiling	2008-9	$700
9	Port Pelican	1.6	Offshore 40 mi. South of LA	Chevron Texaco	Approved	2006	$800
10	Gulf Gateway En. Bridge	0.5	Offshore 116 mi. South of L	Excelerate	Existing	2005	$60 ($310)*
11	Main Pass Energy Hub	1.0	Offshore 18 mi. East of LA	McMoRan Exp.	Draft EIS	2007	$440
12	Compass Port	1.0	Offshore 11 mi. South of AL	ConocoPhillips	Draft EIS	2009	$500 – 800
13	Gulf LNG Energy	1.0	Pascagoula, MS	Gulf LNG Energy LLC	Proposed	2009	$450
14	Bayou Casotte Energy	1.3	Pascagoula, MS	ChevronTexaco	Proposed	NA	NA
15	Navy Homeport LNG	1.0	Mobile, AL	Exxon – Mobil	Cancelled	NA	$600
16	Pinto Island	NA	Mobile, AL	Cheniere LNG	Cancelled	NA	NA
17	Unnamed Proposal	0.2	Tampa, FL	BP	Cancelled	2007	NA
18	Southern LNG	0.7	Elba Island, GA	El Paso	Existing	Existing	NA
19	Southern LNG	0.5	Elba Island, GA	El Paso	Approved	2006	$150
20	Radio Island LNG	NA	Radio Island, NC	NA	Cancelled	NA	NA
21	Ocean Express	0.8	Offshore near Ocean Cay	AES	Approved**	2006	NA
22	Calypso	0.8	Bahamas	Tractebel	Approved**	NA	$600
23	High Rock LNG	0.5	Bahamas – Grand Bahama Is.	Seafarer/El Paso/FPL	Applied	2007	$650
Total LNG Supply		24.6				Total Cost	$7,550-7,850
Total U.S. Gas Consumption		60.3					
		* Includes tankers with regasification		** FERC Approval of pipeline, not terminal			

island port called Ocean Cay (20 miles south of Bimini and 65 miles east of Miami), linked to Broward County, FL, with a new 54-mile underwater pipeline that connects to existing underwater Florida lines. It is championed by AES, a multinational, Fortune 500 energy corporation.

3) Calypso LNG, owned by international energy firm Tractebel is also proposed on Grand Bahama Island at Freeport, linked to Port Everglades, FL, with a 90-mile pipeline. The Calypso proposal is considered the least probable because of its proposed location, and it has thrown its lot in with El Paso as a partner in its project.

These proposals are politically as well as financially expensive. On the Florida side, there have been protests from neighbors adjacent to where the proposed pipelines would be located who fear for their safety.**(20)** And environmentalists are highly critical of the harm that undersea lines will cause to the state's coral reefs, a source of biological diversity, not to mention a tourist attraction and source of food. The project developers are promising to drill pipelines *under* the reefs in order to preserve them, adding greatly to the expense.**(21)**

In the Bahamas, LNG is also source of contention. There is no great amount of industry on the islands that need an LNG supply, and the region is not known for its blustery winter days. Virtually all of the product will be reexported to the U.S. While some see the terminals as a new source of revenue, others believe they are dangerous and may cause

harm to the environment and tourism.

The country's Prime Minister, Perry Christie, said in January 2005 that he was excited about the possibilities for economic development.(22) But Loftus Roker, a former Minster of National Security, was extremely wary. Referring to the pipeline, he stated "It's a dangerous thing and everyone agrees with that. Florida doesn't want it, but they will be the chief beneficiary of what is produced by this LNG pipeline."(23)

Also against the proposed terminals is the country's Ambassador to the Environment Keod Smith, who worried about the harm they would cause with no laws in place to regulate them.(24)

* * * * * * *

Some people may think this continental tour of LNG sites is too rambling and unfocused. But these critics are missing the two larger points. First, the new energy situation that our country has entered mandates huge, controversial infrastructure sited near populated or environmentally sensitive areas. When you add up all the LNG sites, coal mines, coal and synfuel plants, power lines, and nuclear plants, a considerable number of people will have something in their backyard – or front one. The second point is that federal agencies are taking extreme measures like federal preemption, ignoring popular local opinion, and even bending written laws to make sure these projects are built.

Some people reading this might also think the idea of dozens of LNG terminals in the U.S. is an exaggeration. Industry officials themselves acknowledge that only 7-10 will be built. But that is in the near term. As demand for imported natural gas grows, so will the number of ports. There is little precedent for retiring unused LNG licenses, and no precedent for mandating LNG site retirement. FERC, which licenses onshore terminals, has an extension process for licensees to delay construction. In one case, a company constructing a pipeline asked for an extension 5 times in 10 years.(1) The U.S. Coast Guard and the U.S. Maritime Commission, which license offshore ports, also have no technical time limits on how long a terminal license can be deferred.(2)

While certain things in a terminal's application for licensing might need to be updated, most of these applicants have very deep pockets. "Freezing" these sites by paying the real estate taxes or site leases is relatively easy. So a community that thought it had avoided a terminal and its attendant problems may yet see it built.

Possession is 9/10ths of the Law

One of the more interesting things about the two proposed Exxon-Mobil LNG ports near Port Arthur and Corpus Christi, TX, is that their gas will come directly from Qatar, a tiny nation on the Arabian Peninsula. This is literally on the other side of the world from Texas. Normally, fuel trading prefers the shortest routes. Since tankers are enormously expensive, it would be more logical to transport gas from a country that has quicker travel times, such as Trinidad or Algeria. But the company has a 25-year contract for huge amounts of gas – 26 Trillion Cubic Feet (enough to provide the entire gas needs of the U.S. for over a year).(1)

In a joint venture with the Qatari government, Exxon Mobil will build some of the largest tankers and chilling stations in the world, allowing economies of scale that will override the longer distances. But it will make the supply more vulnerable to military adventures and terrorist intrigues in the region.

An aspect of LNG imports that has largely escaped attention is national security, both military and economic. The U.S. is going from an oil importing nation to an oil *and gas* importing nation. And natural gas, which has been almost entirely provided by suppliers on the North American continent, will now come from overseas in ever increasing amounts. Natural gas is integral for heat and water heat in residential and commercial buildings, as fuel and feedstock for industry, and as a preferred fuel in electric power plants because of its relatively low emissions of air pollution.

Since the late 1970s, the U.S. all but phased out its use of oil in electric generation due to its supply vulnerability and price.(2) But now, LNG imports will begin to bring these vulnerabilities back.

Of the world's 11 nations that exported LNG in 2005, the U.S. has a military presence in at least 4 of them(3), and has the largest naval fleet in the world to guard sea traffic. Qatar, in fact, is home to the headquarters of U.S. Central Command, which directs military operations in Petrolistan (the Middle East and Central Asia).

Almost as precarious, LNG will be subject to the manipulation of world commodity markets. In April of 2005, the government of Trinidad hosted the 5th annual meeting of the Gas Exporting Countries Forum, a group of present and future gas exporting nations including Qatar, Iran, and Nigeria.(4) Just as the Organization for Petroleum Export Countries (OPEC) has affected world oil prices by joining as a cartel, it is not hard to visualize the same thing happening with natural gas. And since U.S. domestic gas production has been deregulated since 1979, U.S. producers will seek the world price, despite pangs of patriotism.

This vulnerability seems lost on the developers of LNG terminals in Texas. The *Directory* interviewed representatives of all 8 proposed facilities. Most of the spokespersons appeared surprised at the question.

Bob Davis, with ExxonMobil, which will obtain its LNG from Qatar, said the country is an attractive partner because of its political stability and adherence to Western contractual law.(5) While this may be technically true , it is due to substantial military expenditures of money and troops. Up until the Iraq war in 2003, there were about

28,000 U.S. troops stationed in the Middle East. There were about 130,000 troops in November 2004.(6)

Both Jeff Hannig of Ingleside LNG and Rafael Garcia with the Calhoun LNG project believe that diversity of supply from these various countries will inure the company to price rises and political upheavals.(7) Bill Henry of Freeport LNG believes joining the LNG trade is just another part of the world economy.(8)

Jennifer Andrews of Sempra stated that diversification from other countries will actually make security better and prices lower by not making the U.S. dependent on any one country. The example she gave, however, was strained, as she described how California received 25% of its gas from Canada, and a diversity of world supplies would make the U.S. less vulnerable to this long-time peaceful neighbor and trading partner.(9)

Neil Geary of BP-Amoco said that while his company owns a large solar energy manufacturing concern, it is not yet economically feasible to get large percentages of energy from renewables. "Natural gas is a transition fuel to the renewable age."(10)

Yet for all these companies' optimism and disregard, low prices and political stability are not what history has shown for oil supplies. As such, LNG may be a transition fuel to a more complicated and dangerous world than we already have.

This precarious security issue translates into financial vulnerability of colossal proportions. By 2025, 2/3 of the predicted increase in U.S. gas demand is predicted to be supplied by LNG. This amounts to 6.4 Trillion Cubic Feet, more than the energy value of current Mid-East oil imports.(11) If war, internal revolution, labor strikes, or other unpredicted supply interruptions occur, it will wreak havoc on the world economy.

A good example of what can happen is the weather-related shortage that briefly occurred after Hurricane Ivan. The peak spot market for natural gas rose by 60% to $10 per Million BTUs from a *temporary* shortage. The amount of supply lost from Ivan is equal to 1 large domestic LNG terminal.(12) Further, the price of gas in these terminals is totally deregulated in the marketplace, all but assuring the highest prices in the wake of a supply cut-off. And this will not only affect natural gas prices, but electricity as well, as 24% of natural gas in the U.S. is used for electric generation.(13)

New Rules

As in any new trend in our litigious society, rules for LNG are not well established, and those that do exist are pushed to their limits. Several legal or procedural rules are being crafted and fought over.

1. The most curious one is over the value of swampland. In at least 2 states where LNG terminals are proposed, the governments have used their powers that govern the bottom of their shorelines to fend off the developers. Since you can't build these massive facilities without piers and docks, this technicality is actually a deal killer. (I guess you could use helicopters to lift 1,000-foot long vessels, but it's kind of a stretch.)

In Alabama, Governor Bob Riley withheld the state's bottomlands from ExxonMobil until it produced a safety study, which was one reason the company looked elsewhere for site.(1) In Delaware, the state is trying to use its authority over the bottomlands of the Delaware River as a way to stop the Crown Landing terminal in Logan Township, NJ.(2) In March of 2005, the state of Rhode Island was also preparing to use the same argument to challenge the Keyspan facility in Providence, maintaining that the terminal had not complied with the state law that requires a license to build docks on its bottomland.(3)

2. Whether federal agencies have themselves violated the law by not creating the rules on remote siting that they were obliged to implement is another outstanding matter.

In 1979, Congressman Edward Markey (D-MA) authored a bill for siting of LNG terminals, stating that LNG sites should be located in remote areas away from large human populations. The rules themselves should have been promulgated by the Dept. of Transportation, and administered by the Federal Power Commission. This agency was superseded by the Federal Energy Regulatory Commission.

Since no new LNG terminals had been sought for over 20 years, FERC did not have much need to craft rules. But when a deluge of recent applications began, the agency changed the intent of the law, allowing terminals to create "exclusion zones" or buffers to protect populations in a worst-case accident. These zones are quite different than the isolated areas that were originally discussed in the statute, and allow terminals to be sited in deep water commercial ports near populated areas.

In Sept. 2004, the state Attorneys General of Rhode Island and Massachusetts filed petitions with the Dept. of Transportation demanding these remote siting rules be promulgated.(4) The City of Fall River, MA, the proposed home of the Weaver's Cove terminal, has filed a separate but apparently coordinated petition asking for the same thing. There were blatant threats of a lawsuit against the Dept. if such rules were not forthcoming.

3. Another law/rule being sought is protective zones around LNG tankers. Even though FERC has not followed the intent of the law to site LNG terminals in remote areas, it has demanded 'thermal exclusion zones" around various parts of the terminals to protect the (off-site) public from fire hazards. But it holds no jurisdiction over tankers; this is the purview of the U.S. Coast Guard. While the Coast Guard protects LNG tankers on water, it has never

established exclusion zones to guard the public from an LNG fire.

An attorney representing Fall River, MA petitioned the Coast Guard for such a rule, and the Attorney General of the State of Rhode Island asked for and received additional time in the case to prepare testimony.**(6)** The State hired Richard Clarke, the former anti-terrorism czar who shut down Boston Harbor to LNG tankers after the 9/11 attacks, to manage of team of experts to carry out an independent threat assessment. The testimony, released May 2005, predicted massive casualties from an attack.

Depending on the ruling, the rule could add greatly to the cost of LNG terminals, and even make some sites, proposed and existing, geographically impossible to navigate without transgressing the zone's borders. How important this is to the industry can be seen by the number and types of intervenors in the case. Of 22 comments that had made in the Coast Guard docket as of early March, 19 were part of or sided with the LNG industry.**(7)**

4. In March 2005, the State of Rhode Island was preparing to challenge FERC's management of its licensing review of environment and safety for LNG terminal applicants. According the Asst. Attorney General Paul Roberti, FERC has done a deficient job of reviewing the safety and environmental impacts of proposed terminals, and is not complying with its administrative duties under the National Environmental Protection Act. He felt FERC was going through the motions by reviewing plants in a perfunctory way, while violating the spirit and intent of the law to address environmental concerns.**(8)**

Roberti commented "We have a seriously dysfunctional licensing program as it relates to LNG terminals in a post 9/11 environment, and it needs to be looked at by Congress."

5. In yet another example how confusing laws are regulating the growing LNG trend, environmentalists are suing the government over the temperature of seawater.

In May 2005, environmentalists filed a petition with the 5th Circuit Court of Federal Appeals alleging that the proposed Gulf Landing offshore LNG terminal violated the federal Deepwater Port Act by not evaluating safe alternatives for sealife.**(9)** The activists contend that the "open rack" LNG vaporizers that employ seawater to reheat tanker cargoes will be injurious to ocean dwellers. The process effectively "sterilizes" seawater by chilling it beyond the tolerance most sealife can tolerate or impinging sealife on the screens of the large water intake manifolds. It kills not only adults, but eggs and larvae, as well as plankton on which sealife feed. The plantiffs believe "closed loop" systems that use heat from natural gas to revaporize LNG creates the least environmental damage, and are suing the U.S. Maritime Administration, the agency that approved Gulf Landing, because they did not require this.

The agency agrees that harm can occur from open rack systems, but does not think it is substantial enough to warrant the increased operation expense to terminal owners.

6. Meanwhile FERC has not been taking challenges to its authority lying down. In addition to preparing for court challenges, it has gone directly to Congress to ask for legislation that will remove obstacles it might be challenged on in the future, and to guarantee federal preemption by the agency. In January 2005, FERC officials attending a symposium hosted by the U.S. Senate asked for this lead authority, and to also allow FERC to use eminent domain to ensure land for an LNG facility. Though the agency has not yet been granted this franchise, Congress voted to allow FERC to preempt states in determining sites for LNG terminals in the summer of 2005.**(10)**

If FERC gets the eminent domain legislation in LNG disputes that it asked the Senate for, it will change the situation considerably. States will lose authority to protect their shoreline. More importantly, the entire issue of federal condemnation sets further precedents for energy infrastructure that the federal government may deem necessary. FERC maintains it already has condemnation power over gas pipelines and hydroelectric facilities, but many types of energy infrastructure, such as power plants, powerlines, coal mines, refineries, and gas and oil wells, are still not within its eminent domain powers.

All these cases show a clear trend of local and state governments using clever and unexpected legal strategies to defend their sovereignty and perceived safety against a federal government that will not be denied its role in the new world of energy supply.

The Price of the Bottom Line

In a recent conversation I had about LNG with a renewable energy advocate, I remarked that the natural gas industry was planning to spend $100 billion by 2010 to create the new infrastructure the U.S. would require to make use of LNG. She was aghast, asking why the industry would not make such an investment in renewable energy. I replied, rather dryly, "Because they're in the gas business."

If you get past all the safety concerns, the environmental impacts, the soldiers the U.S. will put in harms way to guard the fuel, and the politics of siting a facility, LNG has to lower costs to stabilize domestic industrial jobs and make domestic utility rates more affordable.

The importation of a sizable share of U.S. natural gas consumption from abroad is nothing less than a sea change in the American energy industry. If prices can be stabilized at reasonable rates, the U.S. can continue to enjoy low cost products, provide energy and chemical industry employment, and provide more affordable power to homes and businesses. And natural gas is the cleanest conventional fuel.

But our country will become dependent on the world market to determine the price. If oil is any indication, this could mean wild price swings. And national security will become even more perilous, as the U.S. begins importing a substantial percentage of its gas. There will be an increased effort on the part of the U.S. government to defend its access to this vulnerable but essential supply convoy.

Other side effects of the LNG trend may be to dampen the development of both domestic natural gas supplies and renewable energy. If the cost of natural gas stabilizes at a relatively low price, LNG becomes the benchmark, the "price to beat" for competing energy sources. Concerns and hidden costs for national security, environmental damage, and even domestic employment from gas production and solar energy manufacturing could be swallowed by the complacency of lowered gas prices. And this is despite the fact that these lower prices could be relatively temporary and subject to international conflicts and whims.

With 8 proposed onshore LNG terminals, Texas may lead the way in this new era of energy supplies. But it is not at all certain where it will lead to. And whether or not you want to follow, you may have relatively few choices.

Footnotes

Introduction

1 Dwyer, Michael, "A prized energy source, or potent terror target? Push to build LNG terminals is under fire," *Christian Science Monitor,* April 06, 2004. On the Web at http://www.csmonitor.com/2004/0406/p01s01-uspo.html

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