# "WHAT COUNTS MOST: LNG TECHNOLOGY OR POLITICS AND P.R. HYPE"

By Robert G. Norton

## INTRODUCTION

LNG is simply natural gas condensed by refrigeration to a liquid at -260°F, a super cold or cryogenic liquid. As long as it is kept cold, it can be stored or transported like any other liquid. It is clear, colorless, odorless - in appearance not unlike club soda. Its density is about half that of gasoline and upon combustion it provides about half as much energy as gasoline.

Godfrey L. Cabot, founder of the parent corporation of Distrigas, saw the advantages of liquefying natural gas for transportation as a liquid to areas not served by pipelines and he obtained a patent from the U.S. Patent Office in 1915. However, it was many years before Dr. Cabot's idea became commercially significant. The development of the LNG industry took two distinct paths: one in the United States as a peakshaving gas supply and the other in Europe and Japan as a baseload gas supply. Let's look at the history and see what these terms mean.

## PEAKSHAVING LNG

In the early nineteen forties, the East Ohio Gas Company found its winter demand for natural gas was going to exceed the capacity of its pipeline supply and war time shortage of steel made an additional pipeline impractical. However, since there was ample unused transmission capacity during the summer, they modified Dr. Cabot's scheme and liquefied the readily available gas during eight warm months of the year, stored it as a liquid in heavily insulated tanks, then revaporized it and sent it into the Cleveland, Ohio, pipeline distribution system during those winter days when the peak demand exceeded the pipeline capacity to deliver. This extra available gas had allowed the company to "shave off the peaks" of their supply/demand curves and thus the name peakshaving gas. The Cleveland plant ceased operations for reasons I will describe later and it was not until the 1960's that peak shaving became important in the United States.

After the war and through the 1950's gas pipelines rapidly spread to the northeast from Texas and Louisiana to provide what seemed an insatiable demand with an inexhaustible supply. In reality, the supply proved to be limited and by mid 1960 there were not enough new gas reserves to justify construction of additional pipelines. The gas companies returned to LNG peakshaving technology to enable them to meet the winter demands that exceeded the pipeline capacity. There are now 61 liquefaction facilities in the United States with 71 large onsite tanks averaging 300,000 bbl and 22 remote satellite tanks

averaging 90,000 bbls supplied by truck from the liquefaction plants. In addition there are some 20 to 30 smaller shop fabricated satellite tanks. Peakshaving facilities are located where the local geology does not permit conventional underground storage in depleted gas fields, aquifer or salt domes.

## BASELOAD LNG

In the 1950's the technology for water transportation of LNG was being developed. The original work was also done in the U.S. with a plan to liquefy natural gas in Louisiana, then barge it up the Mississippi to Chicago where the "cold" of the LNG could be used for refrigeration in meat packing plants and the gas used in the city's gas distribution system. While this idea did not develop commercially it did lead to the ocean transport of LNG in 1959 from Lake Charles Louisiana to Canvey Island in London, England in a small modified tanker. This voyage proved the viability of LNG ocean transport thus opening up vast European and Japanese markets to gas supplies from remote areas such as Algeria, Abu Dhabi and Indonesia where gas was being flared during oil production or from gas fields with no pipeline market. Commercial shipments to England began in 1964 from Algeria and to Japan in 1969 from Alaska. These shipments, made year round, constituted the major or sole source of gas for these countries and was called the baseload gas supply. Over fifty LNG tankers are in service and over 5600 cargoes have been delivered.

As the gas business continued to grow, LNG peakshaving storage and vaporization facilities were added in the European countries and Japan while the United States has undertaken baseload LNG importation program. Baseload terminals at Cove Point, Maryland, and Savannah, Georgia, began operations in 1978, this year one will start up in Lake Charles, Louisiana, and construction of a fourth terminal is planned at Point Conception, California.

The Distrigas terminal at Boston is unique in being the only LNG import terminal that was built to serve a peakshaving market. The Cabot Corporation realized that there would be a liquefaction and storage capacity shortage in New England so Distrigas was formed to bring in LNG at competitive prices year round which allowed the tanks to be emptied and refilled more than once per year. The productivity of the New England peakshaving system was thus greatly enhanced.

## REAL AND PERCEIVED SAFETY

Back to the Cleveland LNG peakshaving plant I mentioned earlier. At that time the war was causing restrictions on quality of stainless steel available for cryogenic tank construction, and perhaps the designers did not fully understand the susceptibility of ordinary steels to brittle fracture at cryogenic temperatures. They built tanks of steel containing 3% nickel a material having fair resistance to brittle fracture at low temperatures-but not good enough. On October 20, 1945, one tank, the newest and largest of four, fractured spilling over a million gallons over the plant site and adjacent commercial and residential areas. Ignition occurred in seconds and the ensuing fire took the lives of 130 people and caused up to eight million dollars damage. Had the designers built dikes to contain

the entire contents of the tanks, the damage would have been limited to the plant. This experience put an end to LNG peakshaving for many years.

The Cleveland incident sensitized the LNG industry to safety considerations. Full advantage was taken of cryogenic technology developed by NASA. The National Fire Prevention Association (NFPA) prepared a Code, NFPA 59A, which has guided the design and operation of LNG facilities for years with an outstanding safety record. This code, regularly updated, was adopted by many state public utility regulators and by the Federal Office of Pipeline Safety Operations (OPSO) in 1972. Unsatisfied with regulations that were not 100% derived from government bureaucracies, OPSO set out to rewrite the regulations which were issued as an Advanced Notice of Proposed Rule Making in 1977. These proposed rules were so inane, incompetent and inconsistent that they were extensively revised and reissued in a Notice of Proposed Rulemaking in 1979. Although an improvement, these rules still imposed costly restrictions that would increase the cost of gas to the consumer without measurable improvement in safety. Extensive reviews and hearings finally resulted in issuance of the Final Rulemaking in 1980. These final rules offer little or no improvement in public safety over the 1979 version of the NFPA 59A Code despite thousands of man hours spent-or wasted-by government and industry representatives.

Also contributing to the perception of LNG as a highly dangerous material was a fire that killed 41 men in a Staten Island LNG tank that was being repaired. The tank had been empty and ventilated for nearly a year and evidence was presented in the ensuing investigation that the accident could have been duplicated even if the tank had been used for water storage! It was the insulation system that burned; there was no LNG present. Perhaps extended contact with LNG had increased the combustibility of the insulation but it was not necessary to produce the fire. Still the press and opposition speaks of the Staten Island "LNG tank explosion."

Further to the political and public image problems of LNG was the issuance in 1978 of a report "Liquefied Energy Gases" by the General Accounting Office (GAO). In recent years, the GAO does for Congress what the TV show "60 Minutes" does for the American public: they give exciting reports of their investigations which are quite convincing....unless you know something about the subject matter. (Yes, 60 Minutes did a special on LNG too!) This report was quoted widely by small but verbal opposition groups in an effort to promote prohibitive legislation or regulation.

For example, the California LNG project in nine years still does not have approval to begin construction and the costs incurred to date are six time to total investment in our LNG terminal built in 1971!

Organizations like BLAST (Bring Legal Action to Stop Tanks) were formed. Their colorful protests were seized upon and magnified by the media. This bad publicity combined with a series of mild comfortable winters left us in a vulnerable position. It was time to fight back, to bring our message to the politicians and decision makers and to change the momentum of public opinion.

Let's review where we were:

1. Environmental impact statements, which included risk analyses, showed LNG casualties for the public were of the same order of probability as lightning strikes. These studies received cross examination in sworn testimony and they held up.

2. The U.S. Coast Guard while deeming LNG a hazardous cargo, relegated it to nineteenth place in a ranking of hazardous cargoes. Design and operating constraints imposed by the Coast Guard included: double hulled ships inspected during construction, inspection of ship safety devices every time a ship enters a U.S. port, travel in port under Coast Guard escort with three to six tugs during daylight hours with good visibility and no other vessel traffic allowed 2 miles ahead or a mile astern. This has been described by some Coast Guardsmen as the safest marine operation in the U.S.

3. Attempts to detonate unconfined vapor clouds of methane in a research program at the Naval Weapons Center in China Lake, California, were unsuccessful. LNG spill tests on land and water confirmed mathematical models adding confidence to our risk analysis studies.

4. Propane and butane ranked by the Coast Guard as more hazardous than LNG moved in increasing quantities by ship and by truck and additional propane marine terminals went into service with little or no furor.

5. Gas supply projections increasingly pointed to LNG as necessary not only for peakshaving but for baseload in the late eighties and nineties.

6. Construction and permit delays added greatly to the cost of already expensive import terminals.

In summary, there was a developing gas demand and a decreasing domestic supply, a technology that could provide safe transport and storage, and risk analyses that showed LNG safer than alternate energy sources. Still we were bogged down by vocal oppositionists and impending regulations that could terminate the industry. Sound familiar? Yes, we seemed to be suffering the problems of the nuclear power industry, probably the only energy source that is safer than LNG but with an even worse public image and tied up in a more complex regulatory and media morass.

## POLITICAL AND PR OFFENSIVE

Distrigas determined to fight back and, for the first time in 96 years of Cabot Corporation's existence, a public relations (PR) man was put on the payroll and the government relations (GR) department was expanded.

Briefing sessions were held with every politician who would sit still and listen at city, state and federal levels. Distrigas teams made themselves available for individual or group briefing focusing on

executive mayors, energy department managers, and public safety heads as well as legislative bodies and individual legislators. Frequent appearances before the city council and the Board of Alderman convinced them that we were not afraid of public exposure and welcomed no-holds-barred question and answer sessions. The State legislative subcommittee on energy and two Congressional subcommittees held hearings where we were able to present our case. The effectiveness of these efforts became obvious when at the urging of New England Congressional members and State Leaders, the U.S. Department of Energy approved a new expanded LNG supply contract on New Years Eve 1978 just two hours before the contract would expire for lack of government approvals. Distrigas also worked actively with LNG industry groups such as the New England Gas Association (NEGA) and the American Gas Association (AGA), especially in the area of educating regulators to realities of LNG. A workable set of OPSO regulations mentioned earlier was a primary result of these joint efforts.

In the public relations area the tasks were divided into four programs: Research, Internal, Media and Community. Research programs consisted of public opinion polls, focus group interviews (almost like group therapy!) and in depth individual interviews with opinion makers. These provided a data base of attitudes, concerns, apprehensions understanding not only for LNG but other energy sources and other public issues. From this data base strategies were developed for the other programs.

Our Internal program involved PR/GR strategy meetings, professional communication training (TV and Press) for company spokesmen, establishing a library of video tapes, newsclips and photographs and setting up corporate information exchange network to pass accurate information quickly.

Media Programs included the traditional press conferences, press releases, and appearance on public service radio or TV programs. Regular visits or calls to T.V., radio and press in the Boston and Washington areas kept the reporters aware of our points of view so we could expect more balanced reporting. This program seems to be working since reporters usually call us if an LNG or energy question comes up. The advertising effort is fairly modest consisting of a series of four informational ads in the local papers that push the idea that Distrigas is a concerned member of the local community.

The Community Relations Programs included plant tours, public appearances at civic association meetings, scholarships, support of science fairs, and financial support of civic activities. A fallout benefit of these activities was the formation of firm personal friendships and personal active membership in community groups by several Distrigas individuals.

All of these efforts have been fruitful. Regular shipments of LNG have been arriving from Algeria. LNG has been hailed in the media for saving Massachusetts from the recent gas shortage "crisis". Distrigas views are actually sought out by the media and by political figures and even government regulators. This could not have happened without maximum individual effort. Sure, expertise in PR/GR was necessary to develop campaign strategy but engineers and

managers had to learn how to talk to hostile groups, accountants and planners talk at civic club luncheons, a plant superintendent volunteering to instruct regional firemen at any day or hour, a plant operator did a TV bit, officers crammed long hours to prepare for hearings and inquiries. Technology moved the ball all the way down the field but it finally required some political savvy and PR Hype to put it over the goal line.

EPILOGUE

At this writing, the El Paso Company has just announced that they are taking a $375 million dollar write-off of their LNG assets. The U.S. Department of Energy and the Algerian National Oil Company, SONATRACH, have been unable to agree on an LNG price for the multi-billion dollar project, and LNG shipments carried by El Paso to Cove Point and Savannah have been interrupted since April 1980. The politicians can't agree and business pays the price. Distrigas shipments continue but our contract is also up for renegotiation and it will require approval of both governments. Perhaps we must add diplomacy to our bag of tricks!