Appendix B

Brochure Titled "Liquefied Natural Gas"

[see Section 2.2.1, 148.105(b)(1)]

This publication is one of a range published by Shell Gas & Power External Affairs. These include:

Taking Gas and Power Further (Overview)

Gas Pipelines

Shell Middle Distillate Synthesis (SMDS) Process

LNG Receiving Terminals

Power Generation

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Liquefied Natural Gas

Taking Gas and Power Further

Shell Gas & Power

LIQUID NATURAL GAS

When cooled to -160 degrees Celsius, natural gas becomes a clear, colourless and intensely cold liquid. Where it is impractical or uneconomic to use pipelines, large volumes of natural gas can be moved from distant reserves to market in this liquid form. Shell pioneered the development of the Liquefied Natural Gas (LNG) industry and continues to play a leading role.

LNG infrastructure

Shell companies are partners in, and advisers to 6 operating LNG plants and are playing similar roles in several new developments or expansions. In each of these projects, Shell companies have taken prominent roles in the various aspects of LNG project development. This includes providing technical and commercial services, the structuring of joint ventures to enhance acceptability by customers and financiers, provision of experienced international staff to assist local employees, transfer of skills to local personnel, LNG market development and identification of viable customers, large project management and project financing. Shell can also provide a full shipping operation and management service for LNG transportation.

Frost on LNG pipelines

SHELL'S COST AND TECHNOLOGY LEADERSHIP

Shell was first involved in LNG technology development more than 40 years ago, and its first large-scale commercial plant was designed for Brunei Darussalam in 1969. The Brunei liquefaction plant, which started operation in 1972, was the first such plant in Asia and Shell has provided operating support throughout its history. Other plants have followed and Shell now provides operational support to 6 plants in 5 countries, representing nearly 40% of worldwide capacity. This huge reservoir of operational experience enables Shell to offer unparalleled expertise to governments and private partners seeking to establish LNG export facilities to commercialise their gas reserves.

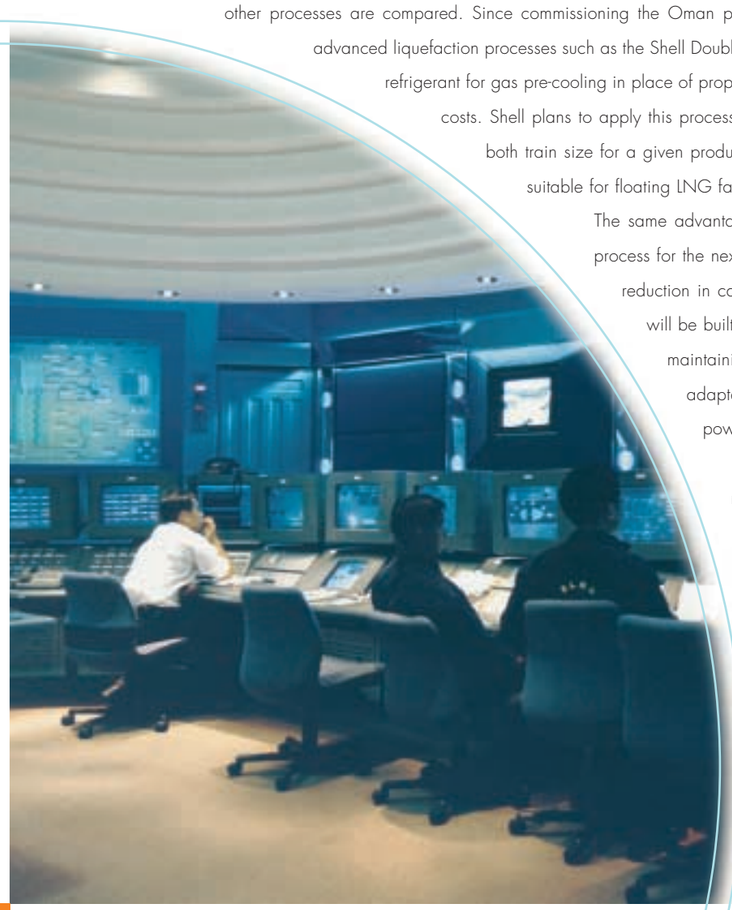
An essential requirement for success in developing a new export plant is cost competitiveness and Shell's leading position in this regard was reconfirmed at the beginning of 2000 with the start up of the Oman LNG facility. Benchmarking of LNG plants has established that the specific cost of LNG produced by the Oman plant is some 20% lower than other plants on a comparable basis.

The liquefaction technology applied in the Shell designs from Brunei through to the Oman plant is of the Propane/Mixed Refrigerant type and this is the industry standard for safety, reliability and efficiency against which other processes are compared. Since commissioning the Oman plant design in 1995, Shell has made further improvements using advanced liquefaction processes such as the Shell Double Mixed Refrigerant (DMR) Process. This process, which uses mixed refrigerant for gas pre-cooling in place of propane pre-cooling, yields additional process flexibility whilst reducing costs. Shell plans to apply this process in the next greenfield LNG project. As the DMR process reduces both train size for a given production and equipment inventory, Shell sees this process as the most suitable for floating LNG facilities where space requirements are of increased importance.

The same advantages of reduced equipment inventory are available from the DMR process for the next generation of Shell onshore LNG plants. This will result in a step reduction in capital cost, and implementation time. Single train greenfield plants will be built with similar specific costs to the previous two train facilities, whilst maintaining the same high levels of integrity and reliability. Designs can be adapted to take advantage of existing site facilities, such as electrical power grids and refineries.

Shell now has a portfolio of designs available to cover a wide range of feedgas qualities and annual production volumes from 0.5 million tonnes to over 4 million tonnes, giving lower specific costs and lower greenhouse gas emissions than any other commercial designs available.

Oman LNG plant by night



Brunei LNG plant control room

SAFETY AND RELIABILITY

Safety and reliability are two essential characteristics of the LNG industry that have enabled it to grow successfully. Detailed research and effective application of its results by Shell have ensured that the steady improvement in cost effectiveness of liquefaction plants has entailed no sacrifice in the very high standards of operational safety needed. Practices developed and adopted by Shell have become the safety norms for the industry.

Combustion Research Laboratory at Shell Research and Technology Centre, Thornton, one of the leading centres for modelling hazards in oil and gas installations and predicting the consequences

LNG TERMINALS

Export terminals for LNG are an integral part of a liquefaction complex and receive detailed attention during the LNG plant design phase to ensure cost effectiveness. Shell has recently made advances on site development issues, with reduced separation distances, and improved concepts for the storage tanks and loading facilities. These have all contributed to reduced capital requirements whilst maintaining a high safety standard.

At the other end of the shipping chain are the import and regasification terminals, mostly owned by the LNG customers, where costs are equally important. The most significant impact on cost for a new terminal is likely to come from selecting the best possible location. Marine and meteorological conditions as well as factors such as proximity to markets and sources of power can all strongly influence cost. Here, Shell's extensive experience can be applied to offer the terminal company a highly cost effective design.

New import terminals often start with a low throughput of LNG and this requires a combination of low initial cost with expansion potential as the business grows. Shell has recently developed new ways of meeting these requirements, including the use of floating facilities, either for continuous use or for interruptible gas supply with on-board ship regasification facilities. Such developments can assist the introduction of LNG into new markets.

LNG vessel mooring to load at North West Shelf LNG plant Australia

EXPORTS FROM OMAN

The export of the first LNG cargo from the Sultanate of Oman in April 2000 was the culmination of a remarkable development. Whilst the Government of Oman had been interested in the potential for gas exports in the 1980s, it was not until 1991 that sufficient gas reserves were identified to carry out a feasibility study into LNG exports. The Government was assisted by Shell's extensive experience in developing LNG projects in the formation of a joint venture company, Oman LNG, with Shell (now 30%) and other companies. This joint venture company, with commercial and technical support from Shell, has responsibility for the liquefaction and marketing of the gas, whilst the upstream company, Petroleum Development Oman (34% Shell) has responsibility for developing the gas fields and delivering the gas to the liquefaction plant. The time taken from discovery of the gas reserves in 1991 to the production of LNG less than 9 years later, is amongst the fastest achieved by any LNG export project.

Storage tanks and jetty,
LNG plant Oman

The LNG carrier Hanjin Sur prepares to leave Oman LNG's Qalhat Terminal with the first cargo bound for Korea, April 2000

The liquefaction plant is located near Sur in the south east corner of the Arabian peninsula and has brought a large number of valuable direct and indirect employment opportunities to the Omani people in that area. The initial development is a two-train plant with gas turbine drivers and seawater cooling. It has a capacity of 6.6 mtpa. The main customer for Oman's LNG is Korea Gas Company, which is responsible for the transportation to Korea. The other main customers are the Osaka Gas Corporation in Japan and Dabhol Power Company in India. This sale to Dabhol, starting in 2002, will represent the first LNG to be imported into India, where it will be used for power generation.

LIQUEFACTION IN BRUNEI DARUSSALAM

Shell developed the first multi-train liquefaction plant to supply gas into Asian markets, and this plant came on stream in 1972 in the Sultanate of Brunei. Driven by the need for cleaner air and for diversification from crude oil, three of the largest Japanese utilities, Tokyo Electric, Tokyo Gas and Osaka Gas committed to long term purchases of LNG from Brunei. In 1993 the same Japanese buyers agreed to extend the contract for a further 20 years, demonstrating their very high level of confidence in the Brunei project companies, Brunei Shell Petroleum (50% Shell), which produces the feed gas, Brunei LNG (25% Shell), which liquefies the gas, and Brunei Shell Tankers (50% Shell), the shipping company. In addition to Japan, BLNG now supplies LNG on a long term basis to Korea Gas.

Brunei LNG plant

The Shell designed plant comprises 5 trains producing over 6 mtpa LNG using steam turbine main drivers. Although located on the north Borneo coast at Lumut, the plant makes use of available river water in a recycled, fresh water cooling system. Shell was also involved in the design of the original seven LNG carriers, each having a capacity of 75,000 cubic metres, which incorporate membrane containment systems. This fleet has been managed and operated by Shell under a policy of evergreen ship maintenance, which has enabled the ships to continue safely and reliably transporting nearly 4,000 LNG cargoes over the past 27 years. A new Moss-type tanker of 135,000 cubic metres capacity is under construction at Nagasaki, Japan and will enter service in 2002 to handle new additional sales volumes.

LNG loading arms at Brunei LNG plant

THE GROWTH OF MALAYSIAN LNG

Building on the experience gained from the Brunei project development, Shell, together with the Malaysian national oil company, Petronas, and Mitsubishi, formed Malaysia LNG (Shell 15%) in 1978. The company secured 20-year supply contracts with the Japanese utilities Tokyo Electric and Tokyo Gas for a total of 6 mtpa and the first deliveries were made on schedule in 1983. Shell, together with upstream partner Carigali, supplies the natural gas to MLNG under a production sharing contract with Petronas. Shell supplies manpower and technical support to MLNG, as well as to Malaysia's fleet of LNG carriers. The gas fields are located in the offshore Central Luconia Basin, in about 100m water depth, and gas is piped to the onshore plant at Bintulu in the state of Sarawak. The MLNG plant, using steam turbines and seawater cooling, has three process trains each with a capacity of 2 mtpa. This is approximately double the initial capacity of trains built in Brunei. In subsequent years, the capacity of the plant was gradually raised through efficiency improvement to exceed 8 mtpa.

Malaysia LNG storage tanks

LNG export terminal, Malaysia

Exports of LNG from Malaysia were doubled in 1995 with the addition of three liquefaction trains owned by Malaysia LNG Dua (Shell 15%) taking the combined capacity to over 16 mtpa. A further expansion is underway with the construction of two more trains owned by Malaysia LNG Tiga (Shell 15%) On start-up in 2003, Bintulu will be the largest LNG complex in the world, with a capacity of around 24 mtpa. All the expansion trains since 1995 make use of gas turbines in place of steam. With the additional trains, MLNG broadened its portfolio of customers to include Korea, Taiwan, other Japanese utilities and, in the future, India. Bintulu has developed into a large hydrocarbon processing centre, covering not only crude oil exports and the LNG facilities but also the world's first commercial plant of its type producing middle distillates from gas using Shell's Middle Distillate Synthesis (SMDS) technology, as well as a urea fertiliser plant, a power plant, and other gas-based enterprises.

AUSTRALIA

Australia has large reserves of gas off the north-western coast, from which it started exporting LNG in 1989. Shell is one of the partners in the unincorporated North West Shelf joint venture (Shell 16.7%). Another of the partners, Woodside Petroleum (Shell 34.3%) is the appointed operator. Shell is also technical advisor to Woodside Energy.

The LNG facilities are located at Withnell Bay on the Burrup Peninsula and comprise three trains, with a total capacity of 7.5 mtpa of LNG. The plant uses gas turbines and air-cooling. The site also includes facilities to stabilise condensate, produce Liquefied Petroleum Gas (LPG) and supply gas to the local market. Wet gas is supplied to the facilities from two offshore platforms and the Cossack Pioneer FPSO.

The North West Shelf joint venture has a 20 year sales agreement with 8 Japanese utilities and delivers its LNG to Japan in a fleet of 8 carriers, each with 135,000 cubic metres capacity.

North West Shelf LNG facilities on the Burrup Peninsula, Australia

Shell is also a partner in other ventures to exploit the gas reserves of Gorgon and other fields nearby.

In 1999, Shell and Woodside Petroleum formed an alliance to rationalise their respective roles in developing further opportunities for LNG exports. Under the terms of the alliance, Woodside leads the technical activities, whilst Shell leads the commercial activities.

In the same year, Australia LNG was formed to take over the LNG marketing responsibilities of the gas resource holders in Australia for all Asian markets outside Japan. This helped focus marketing effort for the expansion of Australia's export of LNG for the growing number of potential customers.

Further substantial gas reserves located off the North Australian coast are being considered for domestic use in the Darwin area but are also considered suitable for export as LNG, for which a floating LNG plant, using Shell technology, may be commercially attractive.

LNG tanker moored at North West Shelf LNG facilities

NIGERIA

With its huge reserves of onshore natural gas and the urgent need to turn flared gas into revenue earning exports, Nigeria had been seeking to establish an LNG export project for many years. Shell was at the forefront of many of these attempts, finally leading to success in October 1999 when the joint venture company Nigeria LNG Ltd (Shell 25.6%) exported its first cargo of LNG to Europe. With Shell as technical adviser, Nigeria LNG has established a two train plant with a capacity of 5.9 mtpa at Bonny in south west Nigeria. The plant design is based on gas turbine drivers and water cooling, and the LNG is delivered to customers in Italy, France, Spain, Turkey, and Portugal using a fleet of large LNG carriers owned by NLNG and its shipping subsidiary Bonny Gas Transport (BGT).

Even before the LNG started flowing from the first two trains, Nigeria LNG committed to expand the project with a third train. Gas supplied to the plant from both onshore and offshore fields will contribute towards the phasing out of gas flaring by 2008. Output from this train has been sold to existing customers in the Iberian peninsula under long term contracts, with deliveries commencing late in 2002.

Strong gas demand in Europe and the USA, and the opening up of new gas markets in South America, are encouraging signs that will help Nigeria to continue its expansion of LNG exports. A further two train expansion of the facilities is currently under review.

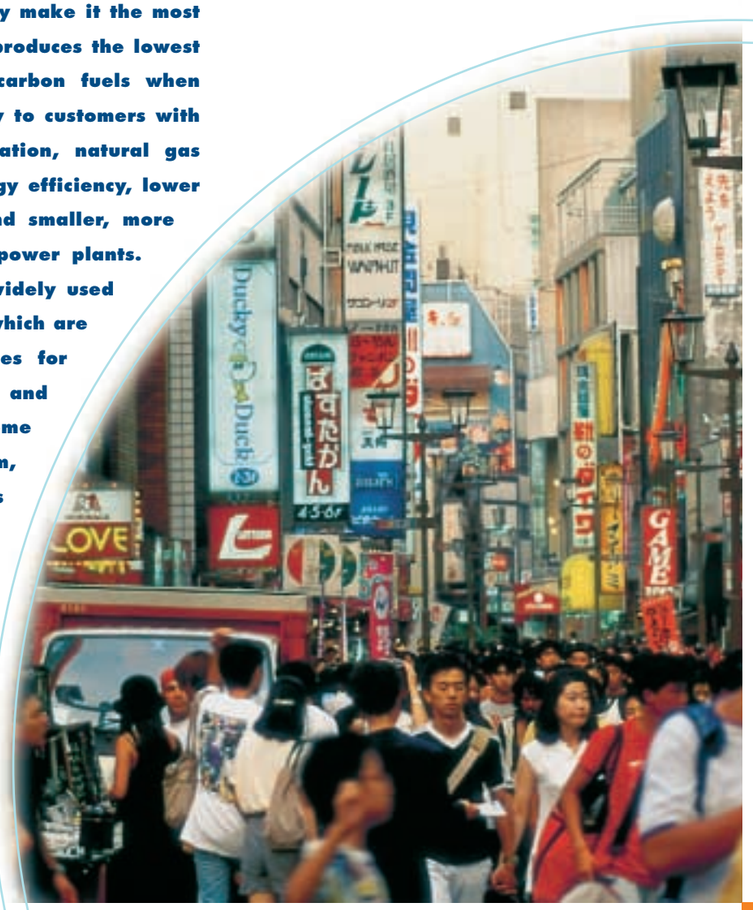
Flatbed tanker LNG Lagos

Joint venture LNG plant located at Bonny Island, Nigeria

LNG MARKET DEVELOPMENT

The properties of natural gas, which generally make it the most desirable fuel, are well known. Natural gas produces the lowest amount of greenhouse gases of the hydrocarbon fuels when burned. Buried pipelines distribute gas easily to customers with low environmental impact. In power generation, natural gas brings the additional benefits of higher energy efficiency, lower equipment capital and maintenance costs and smaller, more flexible and more environmentally friendly power plants. For these reasons natural gas is already a widely used fuel in many developed countries. Countries which are unable to take supplies of gas by pipelines for geographical reasons, such as Japan, Korea and Taiwan import gas in liquefied form. Some countries such as the USA, France, Belgium, Spain and Turkey import gas both in pipelines and as LNG, partly to increase energy security. As energy demand grows in these countries, and as other sources of energy become less attractive for environmental concerns, the market for LNG continues to expand.

However the relatively low energy density of natural gas makes it more expensive to transport over long distances than either coal or petroleum products, whether transportation is by pipeline or as LNG. This provides a challenge to LNG project developers seeking to introduce or to supplement gas supplies in industrialising countries, where the need for improved air quality is often most urgent. Replacing coal or oil products with natural gas requires the gas to be economically competitive at "the burner tip". This is often achieved by establishing gas fired power plants as the first stage of development, followed by distribution of gas to industry and to residential customers.



The demand for energy grows continuously

Countries where new LNG imports are now planned include India, China and Brazil. In India, an LNG import terminal is under construction at Dabhol, south of Mumbai. This terminal will import LNG from Oman starting in 2002, to be used initially for power generation. There are plans for additional imports at this terminal, which will allow gas to be supplied to other users in Maharashtra state.

In 2000, Shell reached agreement with the Government of the State of Gujarat in India for the development of an all-weather, multi-cargo port at Hazira. The port includes an LNG import facility, which is planned to start up in mid-2002 and is designed to have an initial capacity of 5 million metric tonnes, expandable to 10 million tonnes.

In China, Shell has expressed a strong interest in being part of plans for an LNG import terminal in Guangdong. This development, which Shell initiated and has been supporting for several years, is part of the current 5 year State Development Plan.

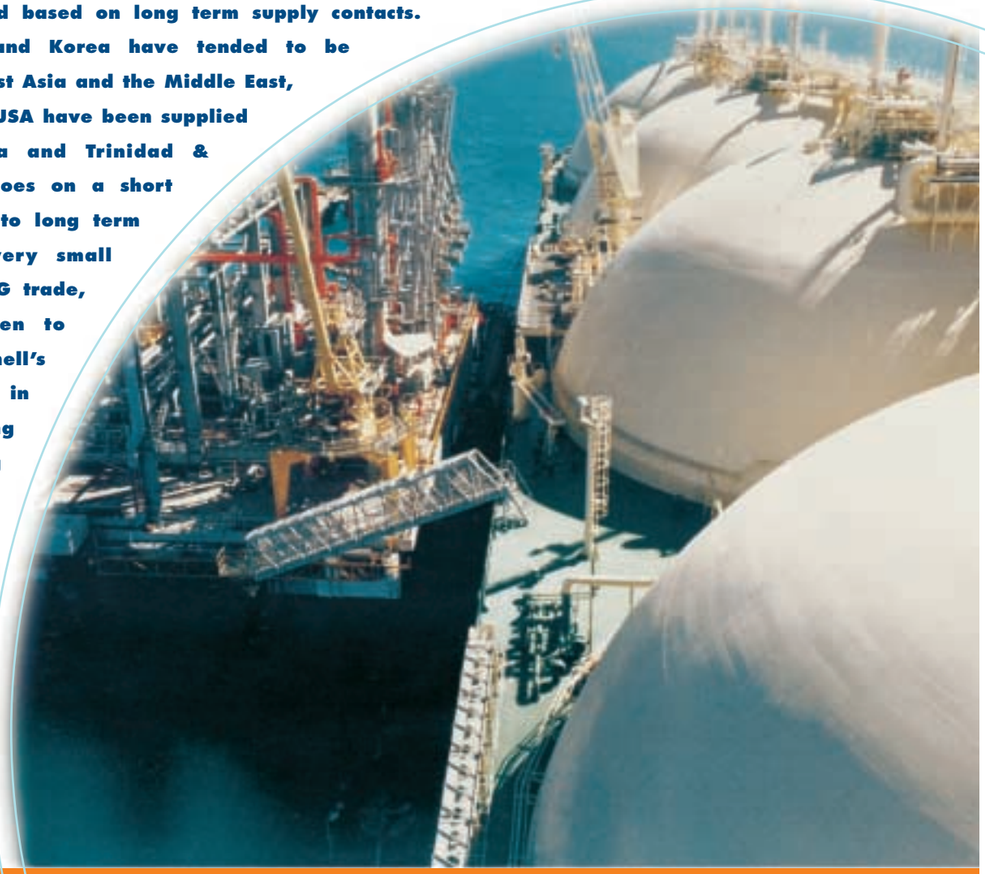
Since the world's reserves of natural gas are plentiful, perhaps even more abundant than oil, the pace of LNG business development will be determined by the needs of its customers. The very high level of capital required to establish all the component parts of a new LNG chain from wellhead to customer, has meant that the business has so far been supported by long term (20 years) agreements between importers and producers. As the number of customers increases, and as gas markets liberalise, suppliers and customers are working to find new commercial arrangements that meet their respective requirements.

InterGen's natural gas fired CCGT at Rocksavage, United Kingdom

GLOBAL LNG

Transporting gas as LNG remains relatively expensive and regionally focused, and based on long term supply contacts. Customers in Japan and Korea have tended to be supplied from south east Asia and the Middle East, whilst Europe and the USA have been supplied from Algeria, Nigeria and Trinidad & Tobago. Sales of cargoes on a short term basis, unrelated to long term deals, represent a very small proportion of total LNG trade, and have mostly been to the USA and Europe. Shell's worldwide experience in LNG - and its long standing oil trading experience - is helping to bring some new and complex deals to fruition.

Examples of this have been purchases by Coral Energy, Shell Gas & Power's affiliate in the United States, of cargoes of LNG from Malaysia, Australia, Nigeria and Oman.



LNG tanker loading at North West Shelf, Australia

Traditionally LNG ships have been dedicated to projects, but in some of these deals cooperation between the Shell joint ventures involved has enabled the shipping to be provided by optimising capacity between their fleets.

Although such inter-regional LNG trading is likely to remain a small part of the global business, the diversity and flexibility of the US gas market offers the possibility of new forms of LNG business in the Atlantic basin. Access to LNG shipping capacity will be critical in developing new LNG markets and upstream projects. Shell has committed to a number of LNG ships to support its Global LNG business.

Shell continues to seek new opportunities to work with host governments and commercial partners with the aim of bringing additional gas reserves to market. For customers that wish to purchase LNG for the first time and need to establish new import facilities, financial considerations often lead to a preference for LNG produced by expanding an existing liquefaction plant. However the expected growth in gas demand over the next decade provides opportunities for additional countries to join the existing group of LNG producers.

In the Russian far east, on the island of Sakhalin, Shell is a partner in the Sakhalin 2 oil and gas development. Oil production commenced in 1999 based on offshore loading for 6 months a year. It is planned to develop a 9.2 mtpa LNG export facility located at the southern end of Sakhalin island for start up in 2006, to supply the growing gas markets in East Asia.

Coral Energy, L.P. Coral's trading floor in North America, where physical energy products can be bought and sold

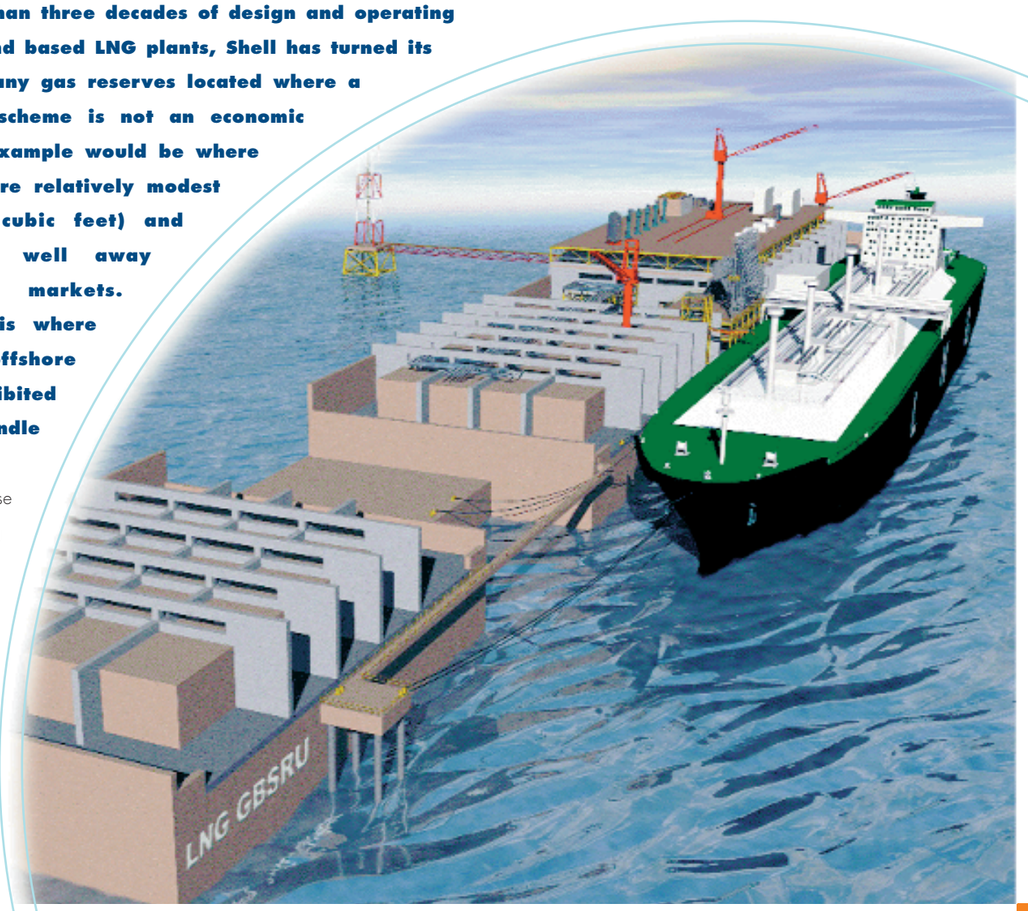
In Venezuela, Shell has joined with the State company, PDVSA Gas, and others to develop a 4 million tonnes per year export facility based on reserves of non-associated gas from the north of Paria. The project is undertaking various feasibility studies with the aim of commencing exports of LNG in 2005. Deliveries are expected to be focused on the USA and the Caribbean.

FLOATING LNG

Building on more than three decades of design and operating experience with land based LNG plants, Shell has turned its attention to the many gas reserves located where a conventional LNG scheme is not an economic option. A typical example would be where the gas reserves are relatively modest (1 to 5 trillion cubic feet) and located offshore, well away from potential markets. Another example is where development of offshore oil reserves is inhibited by the need to handle associated gas.

One answer to these problems is the Floating LNG Concept. For non-associated offshore gas this concept incorporates the replacement of three elements of a conventional LNG scheme, namely the production platform, the pipeline to bring gas ashore and all the onshore facilities for liquefaction and loading. Instead, using sub-sea production, the offshore gas is produced directly to a barge moored above the gas field, with the barge supporting a compact liquefaction plant and storage facility. LNG is then loaded directly onto LNG tankers moored alongside the barge. The whole facility is known as an LNG Floating Production, Storage and Off-loading unit (FPSO). Associated gas can also be treated in this way, though depending upon the amount of gas to be processed, the FPSO may be either a stand-alone plant for LNG or an integrated facility for both oil and gas handling.

Economic competitiveness of a Floating LNG facility depends upon achieving high energy efficiency and economies of scale. These two requirements are met by Shell's newly developed Double Mixed Refrigerant process. By eliminating both platform and onshore plant and by optimising the layout of the barge mounted equipment, the LNG FPSO maintains the same high level of safety and reliability as conventional LNG schemes.



Offshore LNG Terminal on a gravity base structure

EXPLANATORY NOTE

This brochure reviews elements of the natural gas and power related businesses of the Royal Dutch/Shell Group of Companies (Shell). It describes the energy solutions that Shell offers to our customers, co-venturers and the communities with whom we work. Shell has five core business sectors, encompassing:

Exploration and Production the discovery, pipeline transportation and extraction of oil and gas from offshore or onshore reserves.

Gas & Power the processing, transportation, marketing and trading of natural gas and power.

Oil Products the refining of crude oil and marketing of refined products, transportation and trading.

Chemicals the manufacturing of petrochemicals and other chemical products and their marketing.

Renewables the development of renewable energy technologies and their implementation.

These business sectors operate globally and are supported by Shell service companies in London and The Hague, and Shell's research laboratories. Shell's global presence, local knowledge and worldwide pool of expertise and skilled people are available to meet our customers' needs in gas and power.

SHELL'S BUSINESS PRINCIPLES

Shell Companies operate under a code of conduct called the Statement of General Business Principles. These principles govern the way we operate and provide, for our employees and for the outside world, an ethical framework which is both mandatory and transparent. This statement has been a public document for the last 20 years.

The Group publishes 'The Shell Report' which provides information on its economic, environmental and social performances set out against the Group's Business Principles.