

# A Tale of Two Pipes

*By Barrie Woods*

Every so often I receive a letter in the mail from Mobil, the well-known international fuel company. Rather than marketing the latest petrol deal, this one is headed up “Living and working near the Lyttelton to Woolston Fuel Pipeline”. The letter goes on to give ‘safety information about the pipeline for families, businesses and the community’. I’ve received these letters on a regular basis ever since I have lived in Heathcote, and I have often thought I should find out more about the pipeline, just for interest’s sake. So, I started doing some digging, though not with a shovel as that’s something the letter gives strong warnings against. Fortunately, my tools for this exercise were a little less risky.



One of the first things I discovered is that there are two separate pipelines in Heathcote: one for oil/petroleum products (which is the one my letter was about), and the other for LPG. They follow different routes and were built at different times, but they both culminate at depots in Chapmans Road.

I was surprised to learn how old the oil pipeline is. It was first proposed back in 1951 and began carrying its first oil in 1956, so it’s just slightly older than me. The proposal for the pipeline was made by Vacuum Oil Proprietary Ltd, an American company with international interests founded in 1866. Vacuum Oil would go on to become the global fuel entity we know today as Mobil (full name ExxonMobil since the merger with Exxon).

Vacuum Oil requested permission from the Lyttelton Borough Council to ‘run a main from

the company’s depot in Godley Quay, up Voelas Road and thence up the hillside to the borough boundary at the hilltop.’ The proposal added that electric power for pumps of 50 to 100 horsepower would be required from the borough.

At the same time a separate request was made to the Heathcote County Council for the section from the hilltop to the distribution installation in Woolston (also known as the Heathcote farm property). The route had been carefully chosen to avoid, as far as possible, unnecessary obstruction on public or private property.

The project was planned by the Vacuum Oil Company’s engineers and overseen by the parent company in New York. It would utilise heavy grade pipe and would incorporate many of the latest developments including ‘accurate and sensitive meters, instruments, control and particularly safety equipment’. The report stated that ‘special telephonic communication equipment will be installed at each end of the line to maintain instant contact, and specially trained operators will be on duty at all times while the pipeline is used for transferring the product’.

Getting approval for a project such as this was relatively easy in 1951 compared to the hoops required to be negotiated today. There were some objections by nearby residents concerned about safety, and possible increases in their insurance rates. Cr F Barrett of the Lyttelton Borough Council voiced concerns that the pipes might break, and the Mayor, Mr F G Briggs, advised that although two thirds of the residents in the area had signed a petition against the pipeline, the council could not stop it being constructed. It could only dictate conditions governing the construction. The outcome can be summed up by the words of Cr

L Shuker, who said, “No matter what this council does, that pipeline will eventually go over the hill. You can’t stop progress. You might as well grant permission.” On the Heathcote side the school committee raised an objection to the pipeline going through school property, but the proposal was otherwise unchallenged, and the County Council gave its approval without much ado.



*An inquisitive visitor explores the pipeline over the hill. Photo by Jen Saunders*

The need for the pipeline was to address the increasing need for fuel oils in Canterbury, which had to be either transported by rail through the tunnel, or trucked across Evans Pass. This was inefficient due to multiple handlings and did not provide sufficient capacity to meet the anticipated growth. When approved it was noted that this would be the first installation of its type in New Zealand and

Australia, though similar projects were common in the United States.

The pipeline was constructed with little fuss or bother, following a 7km route across the hill more or less adjacent to the Bridle Path, then alongside the railway line to the depot in Chapmans Road, by the intersection of Cumnor Terrace (where the big tanks are). If you walk the Bridle Path you will be able to see the pipeline, and maybe even stand atop it. You’ll also see the advisory signs alongside the cycleway/expressway, but the pipe is underground in that section. The total cost of the project amounted to £100,000.

By March 1956 the line was ready for testing and was pressurised to 2,000 psi for a period of two days and two nights with no leaks detected. It was designed to withstand pressures of up to 7000 psi, but operating pressures were much lower, in the region of 600 psi. A specialist engineer came from the USA to oversee the testing. He commented that New Zealand must be a grand place to sell oil as he had never before seen so many oil leaks on city pavements!



*The tank farm in Chapmans Road.*

The first fuel flowed in the new pipeline on 19 March 1956 at a rate of up to 20,000 gallons (~75,000 litres) per hour. Almost 70 years later the same pipeline is still in use. It conveys petrol, diesel and other fuels on a regular basis. Some fuel, such as jet fuel, is still transported by road, but the bulk of our petrol and diesel comes over the hill via the pipe.

In April of 1968 it was discovered that somebody had drilled a hole in the pipe and inserted a tap to steal fuel. Though there were suspicions a Heathcote local may have been responsible, there is no record of the thief ever being caught, nor of how much fuel was stolen. I note that Mobil's latest letter contains a short section on preventing pipeline product theft, so it must still be a concern today.

In the late 1970s the world suffered an 'oil crisis' as a result of conflict in Iran. Prices skyrocketed, increasing by a factor of around seven for crude on the international market. Retail prices rose rapidly in New Zealand and there was a severe shortage of supply. The government attempted to reduce demand by introducing 'carless days' whereby vehicle owners would not use their car for one day each week. Open road speed limits were reduced to 80 km/hr and petrol sales were banned on weekends. Realising the country's vulnerability to international oil supplies, the government looked to alternative fuels, such as compressed natural gas (CNG) and liquid petroleum gas (LPG).

Around the same time the Christchurch Gas Works closed. The old and tired plant relied on coal, was highly polluting and was located right in the centre of the city. Coal gas was definitely not a 'cool' gas by any stretch of a greenie imagination! There was also environmental pressure on industry to move away from coal for energy, and likewise large buildings such as hospitals, office blocks and schools were encouraged to shift to cleaner fuels for heating. For Christchurch and the wider Canterbury area, the solution was to be found in LPG, which would provide a clean energy source for industry, commercial buildings and for transport. (CNG was fairly much limited to the North Island.) People of my generation will remember LPG conversions for cars, which were popular for several years. Blue Star Taxis were

early adopters and converted their fleet of Holdens to run on LPG.

The government actively promoted LPG as a clean fuel, setting the price to be around 70% that of petrol. There was a problem however – there was little to no infrastructure to distribute LPG, and the demand far exceeded supply capabilities, particularly as industries were forced away from using oil and coal. This was a crisis problem that needed addressing with urgency and is where the second pipeline through Heathcote enters the picture.

New Zealand's LPG was sourced from the Maui and Kupe gas fields near New Plymouth in Taranaki, and to a lesser extent from Australia. The only viable means of transporting it to the South Island in sufficient quantity was by sea. Initially this was in transportable tanks, each holding 10 tonnes, which would then be transferred onto trucks for distribution from the ports: Lyttelton in the case of Canterbury. Trucking the LPG tanks was inefficient and could not meet demand by a very large margin. It was anticipated that demand would exceed 10,000 tonnes per year, equating to around 2,000 truck movements between the port and city and back again. The trucks would either need to come via Evans Pass, and through Sumner, or otherwise use the tunnel. However, for safety reasons that tunnel would need to be closed to other traffic whenever an LPG shipment travelled through. Furthermore, there were insufficient tanks, ships and trucks available.

A company called Liquigas was set up in 1981 to handle LPG distribution throughout the country. It was a consortium partly owned by the government (Petrocorp had a 25% shareholding) along with other energy industry shareholders. Liquigas commissioned the construction of a \$16 million tanker ship, the Tarihiko, to transport LPG around the major New Zealand ports, one of which was to be Lyttelton. The Tarihiko was built in Scotland and

could carry 1,000 tonnes of LPG in three pressurized tanks.

It was anticipated that the Tarihiko would offload LPG at Lyttelton on a regular schedule approximately once a month. There was a problem however in that there was insufficient spare land to safely build an LPG storage depot in Lyttelton, and furthermore the locals wanted no part in having large quantities of such a dangerous liquid stored nearby. In 1980 Liquigas came up with a unique proposal: an LPG pipeline across the hills to Hillsborough, no doubt inspired by the oil pipeline already operating very successfully for several years.

Three possible routes were considered for the LPG pipeline: one alongside the existing oil pipeline, another routed through the ventilation shaft of the road tunnel (ruled out as being too high a safety risk, as was the rail tunnel), or a new route up across the hills from Cass Bay, then down the spur between Horotane and Avoca Valleys. This latter route was chosen as it involved less disruption to existing services and traversed only sparsely populated residential areas. It was somewhat unique in that a portion of the pipeline was to run under the seabed from Naval Point, across Corsair Bay and Cass Bay, to the spur separating Cass and Rapaki Bays. The project would also involve building two tunnels, one 100m long between Naval Point and Magazine Bay, and the other 230m long between magazine Bay and Corsair Bay. Unlike the oil pipeline, the LPG pipe would run underground for its entire length.

If there was resistance to the oil pipeline in the 1950s, it was nothing compared to the furore created by the proposed LPG pipeline. Lyttelton and Cass Bay residents banded together to oppose the scheme, and the Lyttelton Environmental Protection Society was formed to make a formal objection. The Lyttelton Borough Council undertook a survey of residents and 94% of respondents were opposed. Surprisingly there appears to have

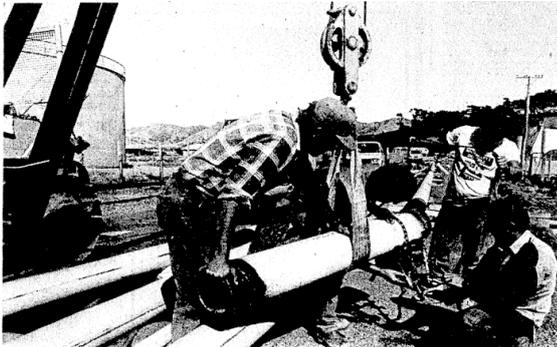
been less resistance from our side of the hill, either from Heathcote or the wider Christchurch area, though concerns were raised about the safety of having a large quantity of pressurised gas stored at Chapmans Road.

Due to the strong opposition from Lyttelton, the government decided to set up a Commission of Inquiry to explore the issue and make a recommendation. The Lyttelton Borough Council decided to spearhead the fight against the scheme and held a public appeal to raise funds so as to be 'properly represented' at a forthcoming inquiry. It took until June 1982 for the Commission of Inquiry to begin meeting and it would take six months for all submissions to be heard and considered. The Lyttelton Harbour Board (now the Lyttelton Port Company), though having concerns for safety, was also worried about possibly losing valuable business to Timaru, which would be the nearest alternative port. Alternative proposals were suggested, such as building a dedicated LPG terminal at Quail Island, away from the populated part of Lyttelton, or even an offshore mooring in Pegasus Bay, with a pipeline to land near Bottle Lake Forest.

In the end the National government of the day held the important cards and argued the project was essential for the development of Canterbury, where unemployment was running high and industry suffering from high energy prices. This pressure led to the commission recommending, in December 1982, that the pipeline scheme be approved, albeit with a number of quite stringent conditions to address safety concerns.

After a prolonged approval process, tenders were finally called on 8 April 1983 for the construction of a 250mm welded steel pipeline. However the project was further stifled with a slow start due to union pressure around wages, which were at the time restrained by a government wage freeze. Work was scheduled

to start in October but did not commence until December.



*Work under way on the LPG pipeline at Lyttelton, 1983.*

Once under way, work progressed quite rapidly, and in May 1984 the first two sections of the pipeline were ready for testing. The pipes were filled with water and pressurised to 15,400 Kilopascals (~2250 psi) and monitored for 24 hours. It would take until September for the rest of the work to be completed, including the \$16 million storage depot at Chapmans Road, with the official opening being held on 26 September 1984.

The design of the Chapmans Road depot needs mention as it was unique at the time. It consists of four sets of five underground tanks holding a total of 2000 tonnes of LPG (100 tonnes per tank). Each set of five tanks is covered by a mound of sand and then topped off with gravel.



*An aerial view of the LPG depot in Chapmans Road showing the gravel topped mounds covering the tanks.*

This design is intended to control temperature and also reduce the risk of fire or explosion in the event of a leakage.



*The LPG depot on Chapmans Road.*

Reliance on LPG for automobiles turned out to be relatively short-lived, though it filled an important place in alternative fuels during the years of petroleum shortage. Although LPG is a relatively clean fossil fuel, the emphasis on energy production has moved to renewables, especially over the last two decades. LPG prices have increased significantly in recent years too and it is no longer as competitive in the energy market as it once was. Unfortunately, this has forced some industries to return to oil as a viable and affordable energy source.

Despite the changes, the LPG pipeline continues to carry gas between Lyttelton and Christchurch today. LPG's primary uses are now in home heating, water heating, and cooking, especially in commercial kitchens. And let's not forget the 9Kg LPG bottle for our backyard barbecues.

*Sources for this article include:*

*Papers Past*

*Mobil NZ*

*Liquigas*

*Christchurch City Council*

*Christchurch City Libraries*

*Digital NZ*