

HISTORY OF THE DUNEDIN GASWORKS

P.G. PETCHEY
DUNEDIN GASWORKS MUSEUM TRUST

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Peter Petchey
Southern Archæology Ltd.
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In the mid-nineteenth century New Zealand was a very long way from the rest of the world. Dunedin had been established in 1848, with the arrival of the *Philip Laing* and the *John Wickcliffe* bearing the first settlers, although the Maori, whalers and surveyors has been here earlier. The town grew only slowly at first, much of the city as we now know it being only swamp, tidal flats or unbroken hillside, with the unsurfaced roads becoming quagmires in the winter. The greatest single impetus that Dunedin received was the discovery of gold in Central Otago in 1861; a discovery that soon made the town the predominant commercial centre in New Zealand.

In the early 1860s, Dunedin's only lighting after dark was by candle or oil lamps. Gas lighting had been introduced in London in 1812, and had made its first commercial appearance in the Southern Hemisphere in Sydney in 1841 when the Australian Gas-Light Company started production.¹ It was the former engineer of the City of Melbourne Gas & Coke Company, Stephen Stamp Hutchison, who came to Dunedin and promoted the idea of gas lighting here in the early 1860s.

The Dunedin Gas Light and Coke Company was formed in May 1862 (with Stephen Hutchison as Engineer) with the intention of erecting a small gasworks to supply some fifty street lamps, permission being gained from the Town Board to lay mains in the streets. However, as this was the time of the Gold Rush, Dunedin was growing rapidly. It was soon realised that a larger works than initially planned would be required, and two acres of land fronting Anderson's Bay Road in South Dunedin was leased.²

Stephen Hutchison was sent to Melbourne to purchase gas-making plant which had become available there, this being quicker and easier than shipping it from England. The only item which had to be manufactured to order was the gasholder, which Hutchison ordered before returning home. Of particular note was the distinctive circular wrought iron roof of the retort house which was manufactured in Scotland and bought cheaply by Hutchison when its delivery to the Melbourne Gas Company was delayed. This roof appears prominently in O'Brien's watercolour of the works, although it was never finished as O'Brien shows it, only half its length ever being erected. The components of the unused section sat at the works for some years,³ before presumably being scrapped.

The main works consisted of the retort house, the condensers, the purifying house, the gasholder and the governor. The retort house had masonry walls with a cast iron roof and housed fifteen horizontal retorts in five beds, which could produce 35,000 cubic feet of gas per day. The atmospheric condensers were mounted on a raised masonry base, and had a capacity of 80,000 cubic feet of gas per day. The four purifiers were housed in a large shed, and had a similar capacity to the condensers. The gasholder was 60 feet in diameter and 20 feet deep, and had a capacity of 57,000 cubic feet. It was supported by five cast-iron columns, which were surmounted by

¹Broomham 1987:9

²ODT 28/5/1863:6

³Blair 1870

ornamental latticework. The governor, which controlled the flow of gas out into the town mains, was initially mounted in the open.⁴

A contract was negotiated with the Town Board to light 150 street lamps for a period of seven years at a cost of £17/10/- per lamp per year, plus any additional lamps as necessary. The Board was to be responsible for the erection of the lamps, the standards being designed by the Town Board's engineer, John Millar.⁵ Millar's pride in his design led him to allow the standards to be displayed in Melbourne where they were manufactured, which delayed their erection in Dunedin. Thus although gas was first ignited at the works in May 1863, the first street lights were not lit until 3 September. The Company was eventually awarded compensation of £907 for its loss of earnings.⁶

The price for private consumers was fixed at 25 shillings per 1,000 cubic feet, which was a high price ensuring that many people kept their oil lamps. There were also soon complaints about both the pressure and quality of the gas supplied, the mains often becoming exhausted at their extremities. In May 1869 a public meeting elected a committee to seek a reduction in the price of gas, in response to which the Council adopted a resolution moved by Councillor Fish that the existing monopoly of supply was a great evil and that the service should be taken over by the Corporation.⁷

The Council commissioned a report on the situation and the existing works from the engineer A.K. Smith of Melbourne, which was presented in August. He was highly critical of both the existing plant and the network of mains that supplied the town. Rather than purchase the works as they stood, he recommended that the Corporation should build its own works on a site at the end of St. Andrew Street, at an estimated cost of £14,894.⁸ Copies of Smith's plans for this proposed works are still held in the DCC Archives.

Within Council feelings were at times running high concerning the gas question. The new lessee of the gasworks, J.W. Hutchison,⁹ had prepared a report of his own to counter Smith's report, but the Council declined to receive either it or his subsequent letter of protest.¹⁰ Stephen Hutchison upon meeting Councillor Fish in the street called him a "damned low blackguard" and threatened him with a thrashing, with the result that Hutchison was bound over to keep the peace in the Magistrate's Court. However on December 6 1869, the Mayor reported to Council that he had written to J.W. Hutchison enquiring as to what rates for Council and public supply he would accept a new contract. This caused an uproar, particularly from Fish who strongly attacked the mayor's actions, and the Council refused to hear Hutchison's reply deciding instead to call for tenders for a new works.¹¹

⁴ODT 28/5/1863:6

⁵McDonald 1965:64

⁶McDonald 1965:64

⁷McDonald 1965:123

⁸McDonald 1965:125

⁹The brother of Stephen Hutchison

¹⁰McDonald 1965:124

¹¹McDonald 1965:124

However the lowest tender received was from A.K. Smith for the sum of £19,270, which was considerably in excess of his original estimates of £14,894.¹² As the existing works would eventually have to be bought out anyway, the Gas Committee recommended that they be immediately purchased, at an assessed total value of £22,000. The Council rejected this, and held a plebiscite in May 1870 to gauge the ratepayers' opinions. The results of this ruled out purchase, and favoured the negotiation of a new contract with Hutchison. In response the Council called for tenders for street lighting, with Hutchison gaining the contract.

In September 1871 the works were offered for sale at auction, but for some reason the Council did not bid, the operation instead being sold to a group represented by H.A. Hankey for £17,800.¹³ The price of gas to private consumers was reduced to 15/- per 1,000 cubic feet, but Hankey initially rejected a Council proposal for a new contract for £8 per lamp for street lighting and 12/6 for private consumers. The Council then reverted briefly to the idea of building its own works until Hankey eventually gave in to their terms.¹⁴

When Hankey's supply contract was due to expire in 1875, the topic of Council ownership of the works again arose. The Council commissioned a survey of the gasworks from H. Curtis, which strongly criticised the existing plant. He recommended the construction of an entirely new works, although utilizing the existing reticulation network. However, the Council decided to purchase the existing works, at a total cost of £49,400, ownership passing to the Corporation on 1 January 1876.¹⁵

For several years after the Council acquisition of the works it was run at a loss, blame being directed at the management by a number of Councillors. The manager, E. Genever and a number of employees were given notice of dismissal, and an independent report was commissioned into the running of the works. Genever was presented with a £200 bonus for the loss of his position, but was asked to continue at the works until the report was finished. However, when the report was completed, it found that "considerable care and judgement had been exercised" in the management of the works.¹⁶ Despite this, Genever's dismissal was confirmed in February 1879, apparently because he had made enemies of some of the councillors. However, when the position was advertised, Genever applied and was selected!¹⁷

A number of improvements were long overdue at the works, and in the early 1880s a reconstruction programme was undertaken, the Council spending some £50,000 on renovations and modifications. A new retort house was built together with a new gasholder. The cast-iron legs of this holder still survive on the Gasworks site, embossed with their manufacturer's name; the Horseley Co. Ltd., of Staffordshire. It

¹²McDonald 1965:125

¹³McDonald 1965:126

¹⁴McDonald 1965:126

¹⁵McDonald 1965:143

¹⁶McDonald 1965:143

¹⁷McDonald 1965:144

is possible that the surviving Gasworks Chimney also dates from this period of reconstruction, although this is far from certain.

In 1881 Stephen Hutchison built a new private gasworks in Caversham, making supply agreements with the boroughs of Caversham, Mornington, Roslyn and Maori Hill, although the latter cancelled its contract when there was a delay in laying the mains. However, in the borough of South Dunedin there was a good deal of disagreement within the Borough Council as to whether the city supply or Hutchison's supply should be used. The Mayor, Joseph Osmond, preferred the city supply and forced through a resolution accepting the city contract on 21 May 1883. His opposition organised a number of meetings, and requisitioned a special Council meeting on May 30 to receive petitions and to expunge the reference of the acceptance of the City's tender from the minutes. The Mayor ruled that these requests were not in order and left the room, whereupon those remaining continued with the election of a chairman and the appointment of a member of the public to act as Town Clerk. At the next Council meeting, the Mayor got the minutes of the May 21 meeting confirmed, and cancelled those of the irregular meeting, scrawling a large cross over them. A lively fracas ensued, the council table being overturned and papers scattered. A ratepayer and two councillors were later admonished in the police court for an assault on the Mayor.¹⁸ South Dunedin was eventually supplied by the city gasworks.

Hutchison's Caversham gasworks finally passed into the hands of the city gas department in 1907, at a total cost of £15,112. Only the gasholder and mains network were utilised, the buildings simply being used for storage. They were later leased out, and most were finally demolished during the construction of the Southern Motorway, only the Governor House surviving.

It was during the 1870s that attention began to turn to gas as a method of heating and cooking as well as lighting. The 1861 edition of Mrs Beeton's *Household Hints* had commented that "gas cooking can scarcely now be considered a novelty,"¹⁹ although she was commenting on the British situation. The *Otago Witness* in 1876 reported that "gas cooking stoves have lately got into use at Ballarat, Victoria," observing that they would probably become more popular as the cost of gas declined.²⁰ In 1882 the Gas Supply Committee recommended that a discount should be allowed on gas used for cooking in Dunedin to encourage consumption, and in 1884 a trial of gas stoves was held in the Town Hall.²¹

By the end of the century, the gasworks had for many years been profitable, providing an annual surplus that was used as a subsidy to the general municipal account. There was some criticism that this prevented a proper maintenance and renewal programme at the works, and the gas engineer, H.B. Courtis, recommended that a new Carburetted Water Gas plant should be installed.²² However, this was also

¹⁸McDonald 1965:145

¹⁹Broomham 1987:69

²⁰Otago Witness 11/11/1876:3

²¹ODT 19/9/1882; ODT 3/11/1884

²²McDonald 1965:273

the time of increasing competition from electricity, particularly for lighting. One councillor stated that he would vote against any extension of the present works "as it was only a matter of time before the streets would be lighted with electricity and to make repairs and alterations to an old-fashioned and obsolete works was a mistake."²³

Nevertheless, the installation of the Carburetted Water gas Plant went ahead, which involved the construction of new buildings to house the generator and purifiers and the erection of a new gasholder. It was completed by May 1901, at a total cost of £11,712/19/4, nearly double the original estimates. The unit had a production capacity of 150,000 cubic feet of gas per day.²⁴ It ran well, but on March 31 1903, a leaking valve in the Purifier House allowed gas to escape, which was then ignited by an open flame in the meter house. The resultant explosion destroyed the Purifier House and damaged a number of neighbouring properties, but miraculously no-one was killed.²⁵

In 1904 a report on the gasworks was commissioned from C. Suggate, the engineer at the Auckland Gasworks. He recommended a number of improvements, at an estimated cost of £80,000. After two ratepayer polls, the Council decided to carry out some of these improvements. Robert English, the Gas Engineer of the Christchurch Gas Works, was employed as a consulting engineer and supplied plans and specifications for a new retort house.²⁶ As Pollard²⁷ has observed, the design provided by English was identical to that of the retort house at the Christchurch Gas Works, so the enterprising gas engineer got paid twice for the same work. The first foundation pile was driven in February 1907,²⁸ and the new retort house was operating from June 21 1909, a formal opening being held a week later.²⁹ A new gasholder was also erected, the total cost of the new plant coming to £53,000. In 1910 the new retort house was extended, a portion of the old retort house being pulled down to make room.³⁰

The new gasholder suffered from fractured bottom plates due to the unstable nature of the soil at the works site, and in 1915 was dismantled and re-erected at a site on Wilkie Road, where it still stands.³¹

During the First World War, coal supplies came under the control of the Munitions Board, which severely restricted the amount available to the gasworks. Prices also rose for Australian coals due to the dearth of shipping available. The Carburetted Water Gas Plant became particularly useful during this period, as it was run on coke and could take the place of one bed of coal retorts. Coal shortages continued to plague

²³ODT 19/6/1899

²⁴ODT 24/8/1899; 2/5/1901

²⁵ODT 1/4/1903

²⁶DCC 1906/07

²⁷Pollard 1987

²⁸DCC 1906/07

²⁹McDonald 1965:273

³⁰DCC 1910/11

³¹McDonald 1965:346; DCC 1914/15:41

the works until July 1921, causing occasional restrictions in street lighting services and limitations on the public sale of coke.³²

In 1924 several reports were presented to the Gas Committee by the Gas Engineer, John Hungerford, regarding the necessity of extending the capacity of the gasworks due to the increasing demand for gas. By this time, vertical retorts had largely replaced horizontal retorts in most modern gasworks, the main drawback being their heavier weight which was an important consideration at the unstable Dunedin site. Tenders were called at the end of 1925 for the supply and installation of a new plant, the lowest received being from West's Gas Improvement Co. Ltd., of Manchester, England. In addition, new purifiers, exhausters and a new booster were ordered, to upgrade the treatment and pumping system.

The new Glover-West Vertical Retort House was officially inaugurated on September 7 1928, the total cost of the installation having come to £94,306.³³ The Bryan Donkin Booster and the small Waller Exhauster which form part of the present Gasworks Museum complex were both installed as part of this redevelopment.

In 1925 new Gas Regulations were introduced, which provided for the appointment of gas referees, gas examiners and gas inspectors. The Council was also required to declare the calorific value of the gas that it intended to supply, which it set at 500 BThU³⁴ per cubic foot. The declared value was lowered to 475 BThU in 1947 and 450 BThU in 1960, largely due to the quality of coals available.³⁵

During the 1930s the gas department began to suffer seriously from the competition from electricity, and the price of gas was reduced several times and a gas appliance sales campaign undertaken to promote gas consumption.³⁶ The Depression in the early 1930s also caused a drop off in demand for gas, gas appliances and coke.³⁷

The outbreak of the Second World War affected the Gas Department in a number of ways. The gasholders and a number of other buildings were painted as an Air Raid Precaution, and a valve was installed to protect the carbonizing plant in the event of damage to part of the system.³⁸ Shortages of materials and appropriately skilled labour delayed the relining of several of the vertical retort beds, affecting production capabilities slightly. Some 34 gasworks employees left the works for active service, several being taken as prisoners of war.³⁹ Towards the end of the war coal shortages also began to affect the works, with gas pressures needing to be reduced on occasion to economise on consumption.⁴⁰

³²DCC 1919/20; 1921/22

³³DCC 1928/29

³⁴British Thermal Units; 1 BThU=the amount of heat required to raise one pound of water through 1° F.

³⁵DCC 1924/25; 1947/48; 1960/61

³⁶DCC1933/34

³⁷DCC 1931/32

³⁸DCC 1939/40

³⁹DCC1945/46

⁴⁰DCC 1943/44

The Gas Department showrooms in the basement of the Town Hall were converted to air raid shelters, and the gas showroom was combined with the electricity showroom on Princes Street in 1941.⁴¹ This combination of rivals in a single location was particularly ironic as the previous year the Gas Department had been dealt a blow with the Government's decision not to install any further gas appliances in new state houses.⁴² A sales campaign was started in May 1940, offering generous trade-ins on old gas stoves and fires, in an attempt to boost consumption, and to avoid losing customers to electricity.⁴³

After the Second War gas consumption improved, largely as a result of increased industrial use. However, the price of gas was subsidised by the Government both as part of a general stabilisation of prices and in the interests of the coal industry. When this subsidy was removed in 1950 it caused a sharp increase in price, its replacement in 1951 being heavily offset by a significant rise in rail freight charges.⁴⁴ A coal miners' strike combined with flooding on the West Coast in 1951 caused severe coal shortages, which required the introduction of gas rationing in Dunedin. Between April and July the supply of gas was shut off at the works for periods each day, resulting in a reduction in consumption of some 60%.⁴⁵

It was to lessen the works dependence on coal supply that a new Water Gas Plant was ordered in 1949.⁴⁶ Two units of Humphrey-Glasgow automatically operated carburetted water gas plant were ordered from Messrs. Humphrey-Glasgow of London, at a cost of £18,750, plus £3,520 for the building to house the plant. Each section had the capacity to produce 550,000 cubic feet of gas per day, the first unit being put into operation in September 1952 and the second the following month.⁴⁷

Throughout the 1950s the amount of gas consumed continued to increase, although the actual number of consumers declined. This was accounted for by the increased use of gas for space heating, while numerous small old premises were being demolished. By the late 1950s it was obvious that yet another expansion of the work's capacity would be required, and tenders were called for a new vertical retort house, the contract being won by Woodall-Duckham (Australasia) Pty., Ltd.⁴⁸ Work on this installation was delayed somewhat by import licence problems, but the plant commenced gas production in February 1962.⁴⁹ It had the capability to produce 1,700,000 cubic feet of gas per day. While the new retort house was under construction it had been necessary to reset one bed of the old horizontal retorts to provide extra gas making capacity for the winter of 1961, but with the new retorts in

⁴¹DCC 1941/42

⁴²DCC 1940/41

⁴³DCC 1940/41

⁴⁴McDonald 1965:391

⁴⁵DCC 1951/52

⁴⁶McDonald 1965:391

⁴⁷DCC1949/50; 1952/53

⁴⁸DCC 1959/60

⁴⁹DCC 1961/62

production the horizontal beds were removed and the old retort house converted into a store for heavy materials.⁵⁰

However, despite the capabilities of the new plant, it became evident during the winter of 1962 that yet more production capacity was required. On this occasion it was decided to make a complete break from the traditional coal carbonisation method of gas manufacture, and install an oil gasification (or oil reforming) plant of a type that was increasingly being used overseas. Oil gasification had a number of advantages over coal carbonisation, in particular it was a very clean process without the tar and coke by-product disposal problem. Messrs. N.J. Hurl Ltd. obtained the contract for installing two P3 Reforming Plants, each capable of producing 500,000 cubic feet of gas per day. The feedstock was a light flash distillate of petroleum, to be supplied by B.P. (N.Z.) Ltd.⁵¹ Once again import licence problems delayed construction, but both units were operating by April 1964, a third similar unit being installed in 1966.⁵² The value of these plants at the time was illustrated when the Strongman Mine disaster in January 1967 severely upset coal supplies for the vertical retort house.

Such was the success of the oil gasification plants was that the end of coal carbonisation was planned, a market study by Prof. T.K. Cowan of the University of Otago recommending that "the present long-term plan for gas production be based on an ultimate change to reforming methods."⁵³ By 1969 the Gas Committee was reporting that an end to coal carbonisation appeared inevitable within four to five years, due to both the closure of mines and the lack of essential replacement parts for the carbonisation plant. The Minister of Mines forecasted that "unless some revolutionary new process is developed, the generation of gas from coal would not continue beyond the life of present installations."⁵⁴

While maintenance continued on the nearly new Woodall-Duckham Vertical Retort House, the planned relining due in 1973 was cancelled due to the expected complete change over to oil gasification. In August 1971 the Carburetted Water Gas Plant was converted to light flash distillate enrichment,⁵⁵ and in June 1973 the Council approved the tender of Messrs. Woodall-Duckham Ltd. for the supply of two M.S. (Micro-Simplex) Reforming Plants, each capable of producing 1,500,000 cubic feet of gas per day. The final withdrawal of the coal carbonisation plant was planned for March 1976, when the changeover to oil gasification would be complete.⁵⁶

Then the bubble burst. In October 1973, before installation of the new M.S. plant was finished, the Arab Oil Crisis broke. Almost overnight the price of light flash distillate skyrocketed, and the economics of oil gasification disappeared. At the same time, demand for gas, tar and coke all increased, and the decision was made to continue the operation of the coal carbonisation plant, although the oil gasification

⁵⁰DCC 1962/63

⁵¹DCC 1962/63

⁵²DCC 1966/67

⁵³DCC 1968/69

⁵⁴DCC 1968/69

⁵⁵DCC 1971/72

⁵⁶DCC 1973/74

units would still be essential for peak loading. Consequently, work was resumed on the relining of the vertical retort beds.

Meanwhile, other parts of the gasworks were quietly ageing. The No. 2 gasholder which had been erected in 1881 was by 1978 some 17 inches out of level, due to the unstable soil at the site, although it still operated smoothly. The Kensington gasholder, which had been moved from the gasworks site in 1915 due to a similar problem, was also showing its age. As a result of an inspection in 1975, its operating height was restricted to 73 feet, and it was anticipated that it would require complete replacement in the early 1980s.⁵⁷ An application for a \$1.5 million loan was made to the Local Authorities Loans Board in 1978 for this replacement, but approval from the Ministry of Energy was deferred pending the outcome of a study on the future of manufactured gas. In the meantime the height of the holder was restricted to 70 feet and later 60 feet in 1979.⁵⁸ In 1980 major repairs were carried out to the girder framing and the middle lift, and as a result of ever declining gas consumption, it was decided in 1981 to rebuild the holder at a projected cost of \$1 million rather than replace it at a projected cost of \$3 million.⁵⁹ The carburetted water gas plant was also causing problems, as the grit arrestors were no longer working effectively and complaints were being received about the dust nuisance. Consequently it was taken out of production in August 1978, and was demolished in 1982 to make way for a new LPG cylinder filling station.⁶⁰

The 1970s were also a time of considerable labour difficulties, the gas engineer in his annual reports often commenting on the situation. There was a very high turnover of staff, particularly in the coal gas plant, where working conditions were hot and often unpleasant. A particularly unpopular job was the clinkering of the producer furnaces, this task needing to be performed daily. The gas engineer, W.E. Whitney, commented in 1976 that "the labour problems on the coal carbonising plant became very serious, largely due to high labour turnover, frequent absenteeism and the generally bad attitude of the younger workers."⁶¹ In August 1978 the first ever strike at the works took place, lasting from the 16th to the 21st. All the coal beds were idle with the entire city load being supplied by the M.S. Plant.⁶²

During the early 1980s gas demand was dropping steadily, particularly in the industrial sector, a major loss being when the Gregg's factory was converted to electricity.⁶³ It was also recognised that the coal plant, which was supplying the base load, was reaching the end of its life. It was estimated that it would run until 1990, when it would require \$4 million in repairs.⁶⁴ This expenditure could not be justified with the level of gas consumption at the time, so a search for alternative feedstocks was on. Proposals included the piping of methane from the Southland Ohai coalfield,

⁵⁷DCC 1975/76

⁵⁸DCC 1978/79

⁵⁹DCC 1980/81

⁶⁰DCC 1978/79; ODT 2/12/1983

⁶¹DCC 1975/76

⁶²DCC 1978/79

⁶³ODT 1/12/1983

⁶⁴ODT 11/12/1985

reforming a mixture of LPD and naptha, and using an LPG/air mixture. The cost of the originally-specified light flash distillate feedstock for the reforming plants was still excessive, and effectively still ruled out this option.

The DCC Gas Department had been appointed the main Otago agents for the supply of bottled LPG in the late 1940s by Bottled gas Ltd. of Wellington (later Rockgas).⁶⁵ A new bulk LPG installation was installed near the docks in 1983 to receive tanker shipments, and a new filling station built at the gasworks. Several of the Gas Departments vehicles were converted to run on the gas to promote its use, the petrol price rises in 1984 after the devaluation of the NZ dollar causing a rush of conversions.⁶⁶ The first proposals to convert the gasworks to an LPG feedstock were made in 1983, when the bulk supply became available.

In July 1986 the DCC Trading Committee voted unanimously to convert to the reforming of LPG for the supply of town gas.⁶⁷ The MS plant was converted for the LPG feedstock at a cost of \$750,000, and in June 1987 the old coal carbonising plant was finally closed down.⁶⁸ The P3 reforming units were then run until all of the light flash distillate stocks were used, and then they too were shut down.

The new LPG feedstock, once reformed in the modified MS plant, had very similar properties to town gas, although it had far less odour. The dangers of this were graphically illustrated when in June 1987 two students died in a Cannington Road flat due to an accidental gas leak after the old gas meter had been disconnected.⁶⁹ A supply of odourant was immediately procured and added to the town gas supply.

For a brief time between 1987 and 1989 the Gas and Electricity Departments of the Dunedin City Council were merged, this arrangement coming to an end with Government legislation to separate the two power rivals nationwide. A restructuring programme was undertaken to ensure the survival and economic feasibility of the new gas enterprise, "Citigas," with a particular emphasis on maintaining the inner city reticulated supply to a number of valuable commercial customers. This resulted in two major changes to the gas supply in Dunedin. The reformed LPG supply was replaced in October 1990 by tempered LPG (TLP)⁷⁰ produced by a fully automatic plant; and the mains network was drastically reduced from some 200 miles to 70 miles of pipe. Underground reticulation was retained for the central city area, while domestic customers in outer areas were either converted to LPG cylinders or to electricity.⁷¹ The old MS plant, the last main unit from the old gasworks as it existed prior to 1987, was scrapped in 1990.

The TLP system continued in use for a number of years, but the cost of LPG was affecting the economies of gas supply, the operation only just breaking even. A

⁶⁵LPG Filling Station promotional pamphlet, DCC Gas Dept. 1983

⁶⁶ODT 8/8/1984

⁶⁷ODT 23/7/1986

⁶⁸DCC Trading Committee Reports 21/1/1988; Star Midweek 24/6/1987

⁶⁹ODT 13/10/1987

⁷⁰An LPG/air mixture, at a 25%:75% mix

⁷¹Citigas (n.d.); D. Peebles, pers. comm.

paper delivered in December 1993 recommended the closure of the network because of this cost; however, at the same meeting the issue of Landfill Gas (LFG) from the Green Island landfill was raised.^{72 73}

LFG is produced naturally in a landfill as material such as wood, paper and food decomposes. The gas consists of 45% carbon dioxide and 55% methane, together with a small amount of hydrogen sulphide which creates the unpleasant smell. The effective use of LFG had been proven overseas, and the gas had a number of known advantages; it was a renewable resource, was cheaper to produce than TLP, and it was environmentally friendly.

An extraction network consisting of 22 km of pipe was laid within the landfill site, connected to a new treatment plant which removed the carbon dioxide and hydrogen sulphide within the gas. A main was laid to the Hillside Road depot, where a new tempering plant was constructed. By April 1996 most of the work was finished, and the first LFG was fed into the town reticulation system on 13 May.⁷⁴ As tempered LFG burns in almost exactly the same manner as TLP, there was no need to modify any existing gas appliances that were in use.

The Green Island LFG plant is expected to continue production until 2025. At present Citigas supplies about 80,000 gigajoules to between 400 and 500 customers.⁷⁵ This equates to a production of about 168 million cubic feet of gas; only a half of what the works were producing in the early 1980s.

⁷²D. Peebles, pers. comm.

⁷³ Note that since this history was written in 1997, the situation has changed considerably. The Green Island LFG operation failed, and a settlement was reached between the City and the engineering company involved.

⁷⁴Citigas (n.d.)

⁷⁵Citigas (n.d.)

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