ENGINEERS AUSTRALIA

ENGINERING HERITAGE AUSTRALIA

HERITAGE RECOGNITION PROGRAMME

Nomination Document for

THE LONGREACH POWER HOUSE MUSEUM

Longreach
Central-west Queensland
July 2012

Appendix A Heritage Award Nomination Form

The Administrator
Engineering Heritage Australia
Engineers Australia
Engineering House
11 National Circuit
BARTON ACT 2600

Name of work: The Longreach Power House Museum ....

The above-mentioned work is nominated to be awarded an

Engineering Heritage Marker.

Location, including address and map grid reference if a fixed work: ....

12 Swan St Longreach Qld 4730...

....

Owner (name & address): Longreach Regional Council...

PO Box 472 Longreach Qld 4732..

The owner has been advised of this nomination .

General Agreement by email from Mr John Roworth, Director of Infrastructure, Longreach Regional Council has been obtained, and a formal Letter from the Council is awaited.

Access to site: Public access is available to the whole Museum complex during hours as determined by the owner, or otherwise arranged...

....

Nominating Body: Engineering Heritage Australia-Queensland ....

....Andrew Barnes

Chair –Engineering Heritage Australia-Queensland

Date: 16 July 2012

Heritage Assessment

Basic Data.

Item Name:	**Longreach Power House Museum**
Other/Former names:	**Longreach Power House**
Location / Address:	**12 Swan Street Longreach Queensland 4730**
Suburb/Nearest Town:	**Longreach**
Local Government Area:	**Longreach Regional Council**
State:	**Queensland**
Owner:	**Longreach Regional Council**
Current Use:	**Museum**
Former Use:	**Power Generation**
Designer and Builder:	**Initial design by Longreach Shire Council. Later design by The State Electricity Commission of Queensland. Built by various builders and plant erectors.**
Year Started:	**1921**
Year Completed:	**1973**
Physical Description:	**Excellent. None of the generating plant is operational. Various components have been opened to allow inspection by visitors. Interactive signage is in place as are safety barriers and appropriate warning signage.**
Modifications / Dates:	**The plant has been replaced at various times due to obsolescence and the demands for larger, more efficient generating plant. More recently, generating plant was installed in 1948, 1953, 1957, 1960, 1964, 1966, 1968, 1970, 1971, and 1973.**
Heritage Listings:	**None**

ASSESSMENT of SIGNIFICANCE.

Current Use.

The Museum complex is open to the public during the tourist season (late autumn, winter and early spring) months.

The complex consists of the engine room containing 8 engines with their direct coupled generators and switchboards, the Gas Producer Annexe containing 2 coal burning gas producers and a railway locomotive with a coal wagon depicting how coal was delivered from the Blair Athol coal field to the power station. Also there is a Social History Hall, a power pole display, the old town swimming pool built in 1921, a "Battler's Cottage" depicting living conditions in western Queensland c.1935 – 1955, and the Artesian Bore drilled in 1897, the first guaranteed source of water for the town.

Former Use, Year Generation Commenced.

The power station, now owned and operated by the Longreach Shire Council, commenced generating electricity in December 1921. The site was chosen for its proximity to the Artesian Bore which provided the cooling water for the engines and gas producers. The first engines were of Ruston and Hornsby manufacture, fuelled with gas produced in Commonwealth charcoal fired gas producers. The D.C. generators were driven with flat belts. The plant had a capacity of approximately 134 kW. The cost of the generating plant and the building was in excess of ₤19,000 ($38,000). At this early stage the power station provided employment for those operating the plant and those cutting timber and producing charcoal for the gas plant. None of this original plant survives.

Designer.

The designer of the power station is unknown.

Construction of the timber framed corrugated iron clad building measuring 30 metres by 40 metres commenced in April 1921 and was carried out by Edwards, Martin Ltd. at a cost of ₤695 ($1390).

Physical Description.

The power station is as it has always been, a timber framed corrugated iron clad building. The building today contains the generating plant installed since 1948 and used until de-commissioned in 1985. This plant was either purchased new from the manufacturer or purchased from other power stations which were being closed down due to interconnection with the State Grid.

The generating plant on display consists of 1 National Dual Fuel Engine and Generator 300 kW, 3 x Crossley Premier Spark Ignition Gas Engines and Generators 650 kW each, 1 x National Oil Engine and Generator 125 kW, 1 x English Electric Oil Engine and Generator 750 kW, (ex Bundaberg and Cairns), 1 x English Electric Oil Engine 400 kW (ex Gladstone, Rockhampton and Emerald), 1 x Mirrlees Oil Engine and Generator 750 kW (ex Cairns), 1 x Mirrlees Oil Engine and Generator 750 kW (ex Atherton and Mackay). The gas producer annexe contains 2 coal burning gas producers which superseded the earlier charcoal gas producers. Further detail is in Attachment 2.

Modifications.
The building has been extended from time to time as additional and larger generating plant was installed following the conversion to A.C. generation in 1956.
Two coal burning gas producers were initially installed in 1952 due to difficulties in obtaining suitable timber and manpower to produce charcoal to meet the increasing needs of the power station. Manufactured in Victoria, these gas producers did not initially perform satisfactorily and required modification. They became fully operational in 1954 and eventually Longreach had 4 of these gas producers, 2 of which have been removed, leaving the original 2 producers.
As a result of the development work carried out in Longreach this type of gas plant was adopted for use in Barcaldine, Blackall, and Clermont.
The coal gas plant became uneconomic to operate and was closed down in 1971 when sufficient oil engine plant to meet the demand had been installed.
Historical Notes.
Longreach Power Station was a large regional power station supplying energy to the town of Longreach, and later to the towns of Ilfracombe, Muttaburra and Isisford.
In 1966 the Central Western Regional Electricity Board was formed and Longreach became one of the two power stations supplying energy to an area of 114,000 sq.km in western Queensland which included the above mentioned towns together with Barcaldine, Blackall, Tambo, Jericho, Alpha and a rural network.
Generation at Longreach ceased in September1985 when the area was connected to the State Grid System.
The generating plant was auctioned for removal. The successful contractor had difficulties in moving the plant and sought the assistance of the Council. Officers of the Council including the Chairman, Sir James Walker convinced Councillors that the contractor should be “bought out” and so the Museum came into existence.
Summary.
This type of power station was instrumental in the development of large areas of the State. Gas and oil fired internal combustion plant was used to initiate the supply of electric energy in towns, including Bundaberg, Toowoomba, Kingaroy, Dalby, Roma, Charleville, Clermont, Emerald to name a few.
Longreach is significant in that it is the <u>sole remaining</u> power station of this type in Queensland and is largely in the condition in which it operated at the time of decommissioning.
These power stations were a source of employment for engine drivers and gas plant firemen required to operate the plant 24 hours per day, maintenance staff including the training of apprentices, day labour for cleaning duties etc. and supervisory staff.

REFERENCES and ATTACHMENTS.

References.

1. "Power and Progress" A short history of the power station at Longreach 1921 – 1998. Compiled by Elaine Britton and Gary Deakin.

2. "Switched-On Queensland" Dr. Jan King.

3. "Use of Blair Athol Coal in Double Zone Gas Producers" by H. Horton and A .F. West".

Attachments.

1. Timeline

2. Generating Plant Records

3. Images

4. "USE OF BLAIR ATHOL COAL IN DOUBLE ZONE GAS PRODUCERS"

   (PAPER C6 INSTITUTE OF FUEL SYMPOSIUM 1959)

5. Longreach Leader article May 1960

6. E-Mail from Longreach Regional Council

7. Letter from EHAQ to Longreach Regional Council

LONGREACH POWER STATION TIMELINE **Attachment 1.**

1921 Commenced D.C. generation using gas engines with gas from charcoal gas producers. Flat belt drive from engines to generators.

1938 Installed capacity 195 kW. Maximum Demand 110kW. 647 consumers.

1950 (Approx) Conversion to A.C.

1951 First coal burning gas producers installed.

1954 Coal burning gas producers operational after teething problems and modifications.

1964/65 Approx. Transmission lines constructed from Longreach to Muttaburra, Ilfracombe and Isisford.

1966 Regional Electricity Board formed with generation centralised in Longreach and Barcaldine.

1971 The gas plant de-commissioned due to the high cost of generation, compared with the cost of Diesel generation.

1973 Longreach and Barcaldine interconnected. Longreach 2 shift operation.

1986 Interconnection with State Grid. Longreach on stand-by.

1988 Longreach de-commissioned.

1994 Powerhouse Museum (Longreach Shire Council) opened.

Longreach Power Station operated on the same site from 1921 TO 1988.

Longreach is the only internal combustion (gas, diesel and dual fuel) power station in Queensland remaining virtually intact. The engines, generators (with one exception) and two gas producers were the first of their type installed.
Longreach was the largest producer gas power station in the Southern Hemisphere. At the peak of the use of gas, four gas producers each with a capacity of 60 therms per hour were installed, using coal from Blair Athol.

The Crossley-Premier representative at the time of commissioning of the first engine in 1960 stated that the Crossley-Premier gas engines were, , the “biggest engines of their kind in Australia". (Attachment 5)

The generating plant installed at Longreach includes plant previously used at Bundaberg, Gladstone, Rockhampton, Mackay, Cairns and Atherton.

This power station is typical of the larger power station in western Queensland in the period 1920 – 1985 when interconnection with State Grid took place. These power stations were a major source of employment, creating employment for engine drivers, gas producer firemen, and maintenance staff both electrical and mechanical.

LONGREACH POWER STATION **GENERATING PLANT RECORDS** **Attachment 2**

Make of Engine	Model No.	Engine No.	Year Made	Fuel	H.P.	R.P.M	Make of Alternator	Alt. No.	Year Made	Voltage	Output k.W.	Remarks
English Electric	7SL	1H1619	1948	Oil	1220	375	English Electric	IT2992/2	1948	6600	750	ex Cairns 1971
National	F2APX8	78121	1957	Gas/ Oil	500	500	GEC	ESP 1159/1	1957	6600	300	
Crossley Premier	N8	148924	1960	Gas	933	214	GEC	ESP 2173/1	1960	6600	650	
English Electric	8SK	1H1754	1946	Oil	535	600	English Electric	00413	1946	415	400	ex Gladstone, R,ton, Emerald.
Crossley Premier	N8	148930	1964	Gas	933	214	GEC	ESP 2921/1	1964	6600	650	
Crossley Premier	N8	148931	1966	Gas	933	214	GEC	ESP 3458/1	1966	6600	650	
Mirrlees	HFS8	38883	1949	Oil	1070	375	Brush	45232	1949	6600	750	ex Cairns 1968
Mirrlees	HFBS8	38881	1949	Oil	1070	375	Brush	73581	1949	6600	750	ex Atherton, Mackay1971
National	RA7	59422	1948	Oil	280	600	ASEA	2973697	1958	415	125	

LONGREACH POWER HOUSE MUSEUM IMAGES **Attachment 3**

Museum from Swan Street

M … kW

C … 650kW

En …

Na …

6.(… nels

E … kW.

Coal Gas Producer manufactured by Major Furnace and Combustion Engineers, Melbourne.

PAPER C6 PREPRINT

USE OF BLAIR ATHOL COAL IN DOUBLE ZONE GAS PRODUCERS

By

H. Horton A.M.I. Mech. E and A.F. West A.M.I.E (Aust.) .

(State Electricity Commission of Queensland)

________Double Zone gas producers that supply gas for electricity generation in some Queensland towns are described. Some unusual modifications to improve the producers are described and comparative costs are given.

INTRODUCTION

The producers described in the paper are in use at Longreach, Blackall, Barcaldine and Clermont in Central Queensland are of interest in that they have been designed for the specific purpose of supplying gas for engines generating electricity for the towns concerned and that they produce no tar.

These towns were originally supplied by gas engines running on gas produced by burning wood or charcoal. The increasing cost and scarcity of these fuels made a change imperative. Steam plants could not be used on account of scarcity and quality of the water available. The use of oil engines was a possible alternative but would have been costly as it would have meant scrapping the existing plant. In addition the cost of oil in these localities is very high. Investigation showed that it was cheaper from both operation and capital costs to burn Blair Athol coal in producers if this was at all possible.

The "classic" up-draft producer which uses a tuyere for the introduction of air at the bottom makes tar and although this can be removed, difficulty is found in disposing of it. In fact we know from experience it is a costly liability. In addition the installation of elaborate electrostatic precipitators which are needed to remove the tar is costly as also is the labour associated with this type of plant.

A study of certain of the older text books on producer gas published at the turn of the century when the development of gas power was at its zenith showed that double zone producers had been used successfully and fulfilled our requirements. It was accordingly decided to revive this type of plant. Producers of this type admit air at the top and bottom and the gas the off-take is halfway down the shaft. The volatiles are distilled out in the upper zone which operates as a down draft producer and the resulting coke burns in the lower zone which operates as an up-draft producer.

Thus there are two fires, one in the upper zone and the other in the lower zone. The volatiles are taken off through the fire of the upper zone which has a sufficient temperature to crack the tars. As the gas leaves the producer at a high temperature, suitable recuperative devices follow to produce cool clean gas.

A specification was prepared setting out the lines of the plant desired and a contract was let for two producers each having a capacity of 60 therms per hour. The contract provided for the supply two producers of the suction type and arranged for the automatic feed of the coal by ratchet driven drums, admission of air to the bottom zone by means of an ash protected tuyere and revolving ash pans intergeared with the coal feed and a plough to remove the ash. The scrubbers were of the Feldt type followed by an aspiration fan and a cyclone to remove any entrained water. The gas pressure to the engines was controlled by a suitable governor. A blast preheater was provided between the producer and the scrubber.

It was originally intended to feed back exhaust gas from the engines to act as the endothermic medium. Suitable instruments were provided to enable gas flows and pressure differences at the various parts of the plant to be observed.

When the plant was set to work reasonably good results were obtained but the capacity was below that expected. As it was found that the ashing gear gave trouble, that the protection of the tuyere was not satisfactory and that the quality of the gas was not as good as desired, it was decided to make certain alterations. These entailed modification of the profile of the interior to prevent accumulation of ash and additional access for on-load cleaning, the abandonment of the tuyere for the bottom air inlet and of the rotary ash pan, and the installation of an evaporator to provide steam as the endothermic medium together with blast heating.

It is these modifications, which constituting as they do a marked deviation from normal practice are of special interest and they will be described in some detail.

PRODUCER

The shell is of conventional construction of welded steel lined with brick. It is not water jacketed as the water is mineralised and difficulty with scale was feared; in fact it was initially desired to avoid the use of water if at all possible because of this difficulty. A typical arrangement and cross section is shown in figures 1 and 2.

Coal feed is by means of a rotary ratchet driven drum the rate of rotation of which is controlled by means of a “feeler bar”. This device is lifted and lowered at regular intervals and measures the height of the coal in the producer. The stroke of the bar controls a shield over which the driving ratchet passes and hence controls the rate of rotation of the coal drum and thus the rate of coal feed. This arrangement is shown in Figure 3. In this manner variations of load are automatically compensated for. The device has been completely successful and has not given trouble at any time.

It will be noted that this method of coal feed is a departure from the more usual double bell. Whereas in theory it might be thought that the double bell would give a better seal than the double drum, in practice no difficulty has been found due to leakage. In addition, the feed being a continuous dribble of coal, maintains stable conditions in the producer which is conducive to the constant gas quality so necessary in electricity generation.
The double bell intermittent feed gives surges of volatiles and varying gas quality which is detrimental to the governing of the engines installed at the stations. We have experience of a producer with double bell feeding and are quite convinced that the ratchet driven rotary feed is much the better method. We also have experience with rotary feeders working on the "on-off" principal instead of continuously and here again have found that the producers do not work as well as those which have the dribble feed obtained with the ratchet drive.
The grate adopted is based upon a design which is successfully used on locomotives and is of the rocking type. It consists of a series of radial sections each of which is made with a central rib with interlocking fingers on either side and is shown in fig. 4 and 5. The ash is discharged into a water sealed pan from which it is manually extracted as necessary. The grates are made from a heat resisting cast iron and since their installation no difficulties have been found. Suitable sight holes, by means of which the condition of the fire may be observed and such poking as is needed may be carried out, are also provided. With full load a complete rock every four hours is sufficient in practice and the depth of the ash is not critical as is the case with the tuyere. Maintenance of this type of grate is very small and the grate bars which have been at work for 7.5 years are still in an almost as new condition.

The hot gas passes from the producer to the blast preheater which heats the air temperature saturated to a blast temperature of 140 deg.F. this being the optimum for the top zone only. Thus the bottom zone is supplied with air at atmospheric value as any higher temperature, while it increases the hydrogen content of the gas, also increases the CO_2 which offsets the calorific value of the additional hydrogen.
The hot blast to the upper zone gives a rapid breakup of the volatiles and this is important from the view of gas cleanliness. There is little difficulty with clinker, so that unless very dry coal is received vapour is not admitted to the upper zone.

The amount of work done in each zone is determined by the amount of blast admitted. This is set to give optimum cleanliness over the working range having regard to the capacity of each zone. The settings are adjusted by slide plates in the blast pipes.

SCRUBBING PLANT

After leaving the evaporator and blast heater the gas passes to the scrubber which it enters at the bottom and leaves at the top. The scrubber shown in Fig, 6 contains a number of plates and pipes which are so arranged as to maintain a constant level of water on each plate. A central shaft passes vertically down the scrubber, and over each plate is a special form of centrifugal pump impellor which gives a radial curtain of water through the gas must pass.
Water is introduced at the top and passes out at the bottom. Suitable hand holes are provided for access and cleaning as may be required. These scrubbers have been very successful and require little attention.

The gas is aspirated from the scrubber by a fan and after passing through a cyclone to remove any entrained water is delivered through a pressure regulator to the engines.

OPERATION OF THE PLANT

It should be emphasised at this point that the producer is a "suction" type of plant and that the whole of it is operated at below atmospheric pressure except just after the fan delivery and that the pressure governor after the fan is arranged to give a slight reduced pressure in the gas mains. This is done for safety reasons as the gas is very toxic.

The blast ratio settings are made once and for all at the time of commissioning the plant, and after that require little attention.

An automatic coal handling system from the coal storage in the receiving hopper to the feed hopper over each rotary coal feed drum has been installed, the conveyor being controlled by "bin eyes" in each feed hopper. The conveyor is of the Redler type.

The only attention required in the day to day operation of the plant is poking and ashing the grate every two to four hours and the periodic removal and disposal of the ash.

In the smaller stations no additional labour has been found necessary, the shift driver carrying out the work as part of his duties.

In the larger stations one man is employed on this work during the day only and in addition handles the coal to and from storage etc

No tar is made. The main difficulty is that the cracking of the volatiles takes place in a zone of oxygen deficiency and as a result some of the carbon which is released at the cracking zone is not burnt out and appears in the gas in a fine form of lamp black, possibly of molecular dimensions. This fine carbon smells a little of benzol and is difficult to wet. Although a good proportion is removed by the scrubbers a small amount gets through them and in due course builds up in the engines.

It also finds its way into the lubricating oil and more frequent oil changes are required than would be the case with an oil engine. Our main subsequent efforts have been devoted to ascertaining how much of this carbon is in the gas and how to remove it.

Coal sizing is important. A regular even grade of three-quarter inch nuts is desirable and fortunately we have been able to arrange for a suitable supply. An uneven grading or too many fines causes uneven resistance and channelling in the producer and consequent uneven gas quality.

PARTICULAR PROBLEMS ENCOUNTERED

Since these plants went into service we have encountered a few problems peculiar to this type of producer and this particular application. As has been stated this has been related to the cleanliness of the gas.

The method of testing the gas is based upon that used for testing car type producers during the war.

Briefly the method involves drawing a continuous sample of gas through a filter paper by means of an exhauster and measuring its volume by means of an ordinary gas meter. The filter paper is dried and weighed before and after collecting a sample. As a result it has been possible to compare the performance of the plants under a variety of loads and settings.

As has been stated the ratio of the blast to the top and bottom zones is an important factor in making clean gas. There is a slight drift in the blast ratio from low to high loads with fixed plate settings and in consequence in our last specification we requested that provision be made to control automatically this ratio over the whole range of loads.

The carbon impurity in the gas is such that the resistance through any filter medium which would catch it would be far too high. The makers of electrostatic precipitators were requested to submit proposals but all refused and stated their apparatus was not suitable for arresting lamp black.

Attempts were made to remove the impurity by passing the gas over an oily surface but these were unsuccessful. It was then decided to install a centrifugal gas washer in addition to the normal scrubber. This made an improvement as shown by the following tabulation:-

Impurity before scrubber – raw gas	10.25 grams per 1,000 cubic feet.
After scrubber	7.91 grams.
After washer – final gas	2.7 grams.

Another problem, not specifically related to the producer burning coal but to all types of producer currently if use is that of engine design and governing. In the early days of power production with gas engines, D.C. was in vogue and the engines were of the open type and ran at a slow revolution rate. Variation of speed within fairly wide limits could be tolerated and the lubricating oil was not recirculated.

To-day we are operating high speed enclosed type engines with forced feed lubrication. In addition we are generating A.C. so that speeds must be correct at all times. One of the conditions which must be met is that of constant gas quality and quick response to changing loads, especially with a rising load. It has already been emphasised that for this reason a dribble coal feed is preferred in order to maintain gas quality and it has also been found that in some cases it is necessary to vent and burn to waste a certain amount of gas so as to ensure that there is always a sufficient fire to enable load to be picked up rapidly. In addition owing to the recirculation of the lubricating oil in the engines gas purity has become important, influencing as it does the time between oil changes.

PERFORMANCE

The coal used is obtained from Blair Athol and has the following analysis:-

Moisture	9.1%
Volatiles	25.6%
Fixed Carbon	56.3%
Ash	9.0%
Gross calorific value	11,490 BTU/lb.

Tests on the producers show efficiencies of 72% with gas having a calorific value of 122 BTU/cub.ft. and having the following typical analysis :-

CO_2	4.85%
O_2	0.45%
H_2	12.8%
CO	25.25%
CH_4	0.9%
N_2	55.85%

The volume of gas produced was measured by pitot tubes in accordance with the A.S.M.E. fan test code, a diagrammatic arrangement of the set up being shown in Fig. 6. The analysis of the gas was made by the Government Analyst and the calorific value determined from this analysis.

In regular operation the coal consumption is about 2.0 lb. Per unit generated, giving an overall efficiency from coal to electricity of about 15% which covers operation at all loads under commercial conditions. This compares very well with steam stations of similar capacity and of similar capital costs. It is of interest to note that oil engined stations under similar conditions show an overall efficiency of about 22%.

When compared with oil engine stations the gas engine also has a good showing as the following figures will demonstrate:

Basis of comparison: Oil 30 pounds / ton Coal 5.5 pounds / ton

Oil average consumption per kWh 0.7 lb.

Coal consumption per kWh 2.0 lb.

Fuel cost per kWh - oil 2.26 pence coal 1.2 pence

The installed cost of oil engine plant is about 90 pounds per kW and that of a gas engine plant about 190 pounds per kW. The labour costs are about equal as are the maintenance costs. Allowing 10% per annum for capital charges these amount to about 0.56 pence per unit in the case of oil and 1.14 pence in the case of gas these being based on a load factor of about 50%. Thus the comparative costs are:-

Oil 2.26 + 0.56 = 2.82 pence per kWh

Gas 1.2 + 1.14 = 2.34 pence per kWh

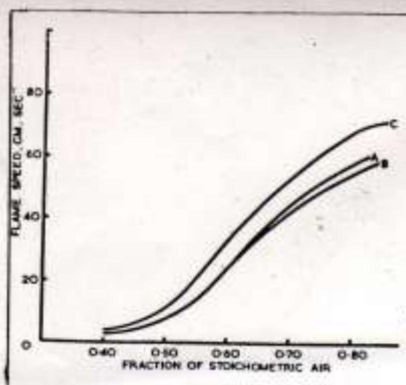
The installation of these producers has enabled tariffs to be stabilised in the face of rising costs and in one case to make a slight reduction. At Clermont which is very close to the mine, savings have been of a much larger magnitude but this is considered to be a special case and is not taken into the comparison.

SIZE OF INSTALLATIONS

At the present time we have producers of this type installed at four stations to an aggregate capacity of 350 therms per hour.

ACKNOWLEDGEMENT

Acknowledgement is made to the Commissioner of Electricity Supply for permission to publish this paper and to members of his staff who have assisted in its preparation, and to Messrs. Major Furnace and Combustion Engineers for permission to publish copies of drawings of the plant supplied.



C4

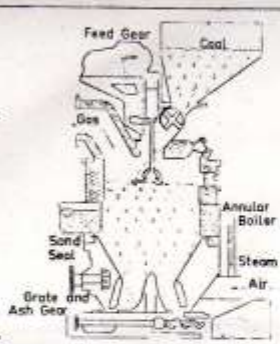


FIG.1 AUTOMATIC GAS PRODUCER

C5

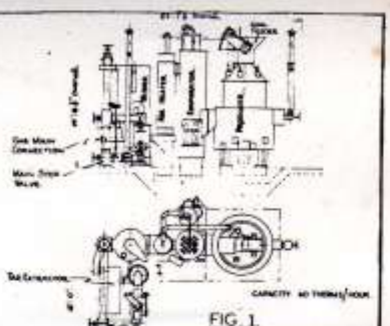


FIG. 1
GENERAL ARRANGEMENT
MAJOR COAL BURNING GAS PRODUCER

C6

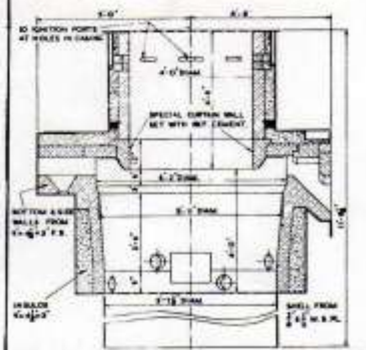


FIG 2 SECTION OF PRODUCER GENERATOR

C6

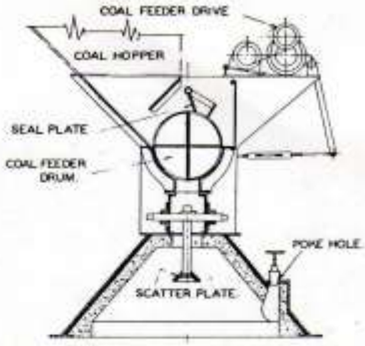


FIG3A. SECTION THRU TOP OF PRODUCER

C6

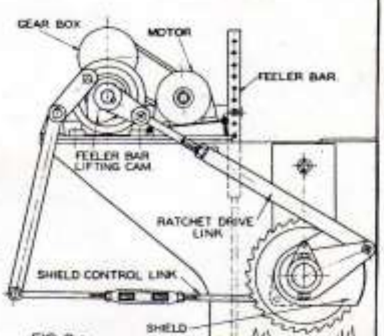
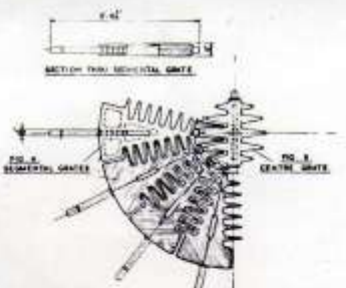


FIG 3B
AUTOMATIC COAL FEEDER DRUM DRIVE

C6



FIGS 4 & 5
PART ARRANGEMENT OF ROCKING GRATE

C6

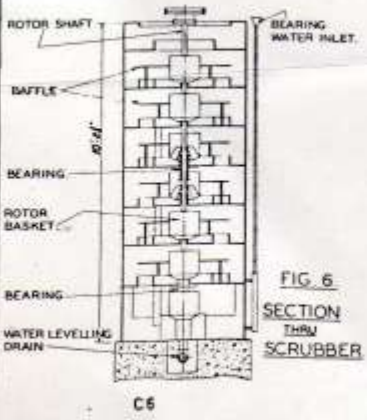


FIG 6
SECTION THRU SCRUBBER

C6

C8

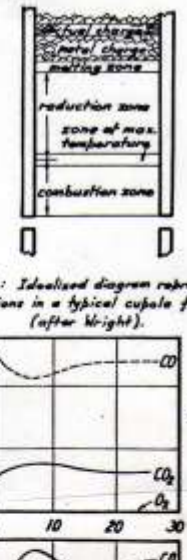


Figure 2: Idealised diagram representing conditions in a typical cupola fuel bed (after Wright).

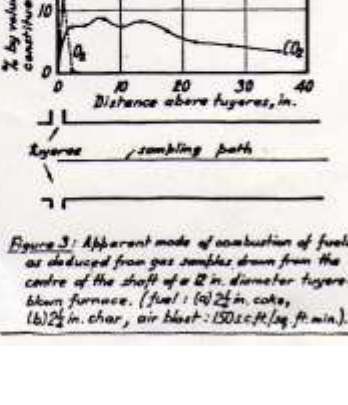


Figure 3: Apparent mode of combustion of fuels, as deduced from gas samples drawn from the centre of the shaft of a 12 in. diameter tuyere-blown furnace. (fuel: (a) 2½ in. coke, (b) 2½ in. char, air blast: 150 s.c.ft/sq.ft.min.).

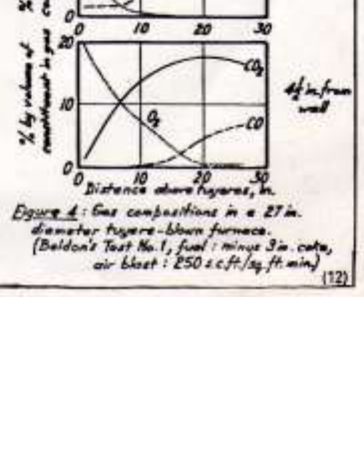


Figure 4: Gas compositions in a 27 in. diameter tuyere-blown furnace. (Beldon's Test No.1, fuel: minus 3 in. coke, air blast: 250 s.c.ft/sq.ft.min.)

Attachment 5

THE LONGREACH LEADER

"Biggest Engine Of Its Kind In Australia" In Powerhouse Hand-over

A giant generator, described as the largest engine running on suction gas in Australia, was commissioned at a Longreach powerhouse ceremony yesterday.

The claim was made by Mr. J. Smith, Victorian factory representative for the Crossley Premier units, one of which now is bearing the main load of Longreach's power production.

During daytime the unit will carry Longreach's load on its own; at night its output will be supplemented by some of the five older engines that have been producing the town's current.

At the commissioning function, held on the lawn in front of the powerhouse yesterday morning, speakers were introduced by the Shire Clerk, Mr. R. A. Harris.

The Deputy Shire Chairman, Cr. Searles, said that since 1951 the Shire Council had spent £244,000 on electricity, excluding the new unit. The cost of the new engine, the first Crossley Premier at the powerhouse, was estimated at £55,000.

This expansion in the use of electricity sprang from the growth of the town and the greater use of appliances. It was necessary for the council to keep ahead of the consumers, and it felt that the installation of a 650 kilowatt unit would meet the town's requirements for years to come.

With the existing five engines it gave the powerhouse a total output capacity of 1650 kilowatts, whereas the town's maximum load was about 800 kilowatts.

The installation also would simplify the task of the staff in maintaining the other engines. In the past, when one of these was out it was touch and go whether the others could carry the town's load. Under test the new machine had come up to expectations, and if it realised the council's hopes that would be the end of blackouts.

ECONOMIES

Cr. D. C. H. Barrett, chairman of the committee that supervises the powerhouse, said that was a great day for Longreach, which had had a lot of trouble with its electricity supply. It had had to be the guinea pig in operating coal gas producer generators. The staff had done all it could to keep the supply up. Last night the town's load went up to 800 kilowatts, but in the daytime the new unit would be able to keep up with demands on its own. The machine would make for considerable economies, including a 33 per cent. saving in coal consumption.

Mr. A. West, Acting Chief Mechanical Engineer of the State Electricity Commission, said he did not think people knew how much work went on and how much expenditure was involved in keeping pace with electrical development in the State, and in Longreach in particular.

He had seen the plant grow markedly in this town with the installation of successive new engines since 1951. Every time he came to Longreach he saw striking changes in the main street and in the number of new houses. From tests he could say the council had a very satisfactory new engine.

"HARD TO PLEASE"

Mr. Smith said that in the trials the engine had come up to expectations.

Mr. C. Millard, manager for William Adams and Co., suppliers of the engine, said the installation had gone smoothly because of the co-operation of the staff and the Commission. Yesterday, he said, the machine had been run at full load for eight hours, then at 10 per cent. overload for an hour.

Symbolising the commissioning of the machine, he gave the starting handle to Cr. Searles.

Cr. Searles, who said the occasion marked the end of the town's power troubles, praised the powerhouse manager, Mr. P. G. B. Matthews, for his work. "If he is satisfied wtih this new engine the people will be satisfied, because he is a very hard man to please," Cr. Searles said.

Mr. Harris thanked the Shire Accountant, Mr. D. Pollard, for having arranged the function during Mr. Harris' absence in Brisbane.

Email to John Fordham
12-6-2012

John,

The Powerhouse Museum will be open on the 24th. Contact the visitors information centre on 07 4658 4111 for the opening times.

The council would like to support the initiative but has some concerns. We really need some information about the proposal in general, who is driving it, what council's involvement will be and if this will affect our operation of the museum or leave any legacy in the short, medium or long term.

Please provide this information formally for council to consider on letterhead to the address below or via my email.

Please do not hesitate to contact me if there are any queries.

Regards,

John Roworth

Director of Infrastructure Services
Longreach Regional Council

PO Box 472, Longreach, QLD, 4730
Phone 07 4658 4115
Fax 07 4658 4105email engineer@longreach.qld.gov.au

Attachment 7

Engineers Australia Queensland Division

Engineering Queensland

ENGINEERS AUSTRALIA

18 June 2012

Mr John Roworth,
Director of Infrastructure Services
Longreach Regional Council
PO Box 472
Longreach, QLD 4730

Dear Mr Roworth,

Longreach Power Station – HERITAGE RECOGNITION PROPOSAL

Engineers Australia Queensland Division proposes to nominate the Longreach Power Station for recognition by Engineers Australia's Heritage Recognition Committee. The Engineers Australia (EA) website at http://www.engineersaustralia.org.au/heritageregister/search sets out procedures for this program, which aims to bring public recognition to outstanding examples of engineering heritage and to the engineers who created them.

Heritage recognition would not affect the operation or functions of the site, and will be celebrated in a heritage recognition ceremony and on-site identification with a marker and interpretation panel highlighting its engineering significance. Engineers Australia provides the heritage marker and interpretation panel; the owners bear the mounting costs. The modest function costs of the heritage recognition ceremony are usually shared between the owner and Engineers Australia. No restrictions to the site are involved in the program, and the only legacy long term is for the site owners to care for and maintain the marker and interpretation panel.

The Brisbane based Heritage Panel of Engineers Australia (EHAQ) will organise the nomination with the åssistance of a former Generation Superintendent of the Power Station, Mr John Fordham, the local Engineers Australia Central West Group president, Mr Stuart Bourne, and staff of the Museum. In recent years Her Excellency the Governor of Queensland, Ms Penelope Wensley, has regularly attended EHAQ heritage recognition ceremonies on site.

Recent examples of previous heritage recognition ceremonies in Queensland are on the EA web site http://www.engineersaustralia.org.au/queensland-division/welcome-queensland-branch-webpage.

Since 1984, a total of 14 sites have been recognised with Engineering Heritage Plaques/Markers in Queensland, and over 150 throughout Australia.

Engineers Australia conducts this program only with the approval and support of the owners and operators. Accordingly EA seeks the Council's formal approval and support to proceed with this important recognition, and to join EA in the project.

If you require further information regarding this proposal, please do not hesitate to contact me.

Yours faithfully

A. K Barnes

Andrew Barnes,
Chair EHA(Q)