

# THE BOYER NEWSPRINT MILL

Nomination for a  
Heritage Recognition Award



*Boyer Newsprint Mill in 1946*

Prepared by Bruce Cole  
for  
Engineering Heritage Tasmania

June 2010

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## INTRODUCTION

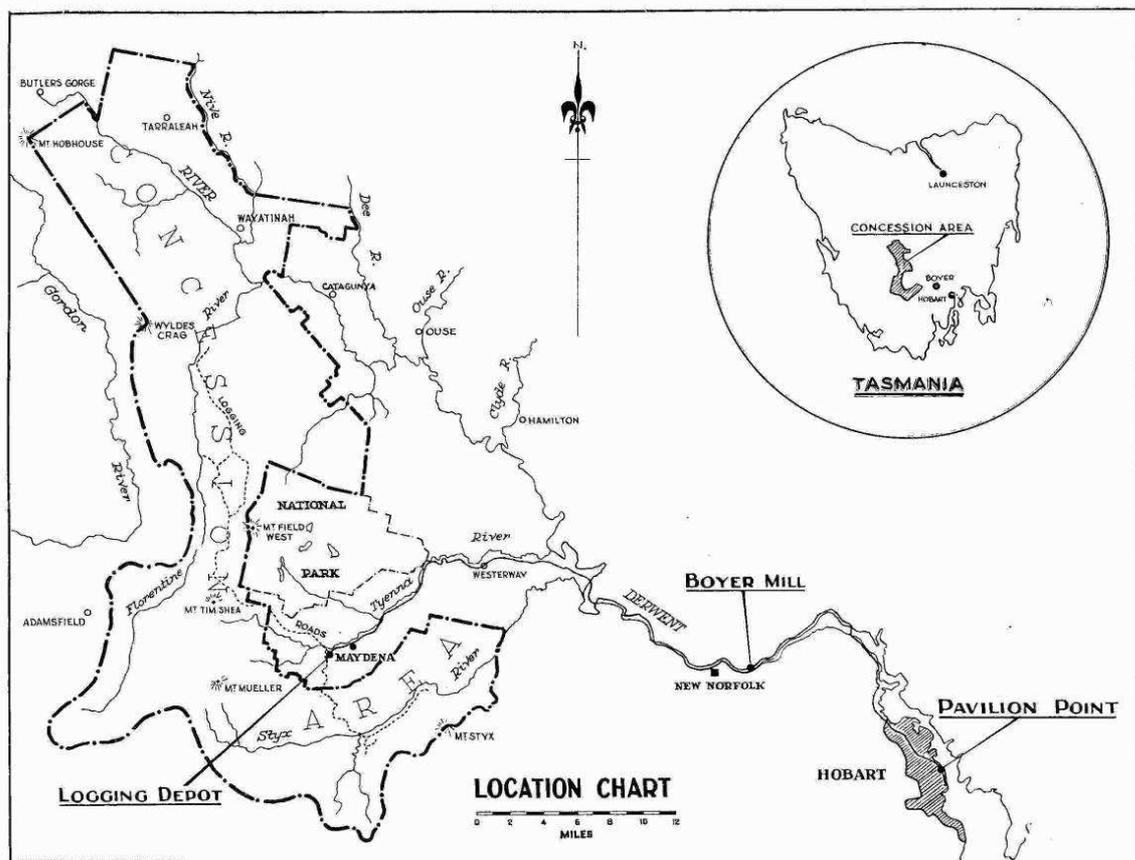
Until 1941 Australia had imported its newsprint from those countries with an abundance of softwood, as the relatively long fibres were eminently suited for the manufacture of paper. Tasmania has a large resource of eucalypt timber which was considered unsuitable for making newsprint because of its hardness and shorter fibres. Finding a feasible method of using hardwood for newsprint presented a significant challenge.

After many years of experiments, a viable process was developed and that led to the establishment of the Australian Newsprint Mills Pty Ltd (ANM) in Tasmania. The government assigned a large forest concession area to ANM for the long term supply of eucalypt timber.

ANM was the first mill in the world to produce newsprint from eucalypt hardwood. ANM also pioneered the use of high ash content Tasmania coal in large industry in Tasmania and transferred the technology to other Tasmania industries during World War II when there was a critical shortage of shipping to bring coal to Tasmania.

While the mill has been expanded on several occasions, and another mill has been established at Albury in New South Wales, this nomination focuses on the development of the manufacturing process, the original machinery at the Boyer site and the people who made it work.

## LOCATION MAP



Showing timber concession area, Derwent River and Boyer Mill site.

## HERITAGE AWARD NOMINATION FORM

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

**Name of work:** THE BOYER NEWSPRINT MILL

**The above-mentioned work is nominated to be awarded a  
National Engineering Heritage Landmark**

**Location, including address and map grid reference:**

Boyer Road, Boyer, Tasmania  
AMG E 508 350 N 5 263 636

**Owner (name & address):**

Norse Skog Paper Mills (Australia) Limited

**The owner has been advised of this nomination and a letter of agreement is attached.**

**Access to site:** From Boyer Road, a short access road leads to the entrance gate.  
Tours of the Mill can be arranged.

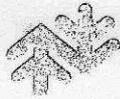
**Nominating Body:** Engineering Heritage Tasmania,  
a Special Interest Group of Engineers Australia.

*Bruce Cole*

Chair of Engineering Heritage Tasmania

Date: 9 June 2010

## OWNER'S LETTER OF APPROVAL



**Norske Skog**  
Boyer

G-2

August 28, 2006

Mr Bruce Cole  
Chairman  
Engineering Heritage Tasmania  
Royal Engineers' Building  
2 Davey Street  
HOBART Tas 7000

Dear Mr Cole

On behalf of all Boyer employees and especially our contingent of past employees, I would like to thank you and your committee for your consideration to nominate the Boyer Mill for an Historic Engineering Marker plaque.

It is our pleasure to accept your very thoughtful invitation and we welcome the opportunity to assist in any way we can, both in the preparation of the proposal and, if successful, the ongoing plaquing program.

For a mill with more than 65 years of continuous operation and one whose very beginnings and subsequent development is due to the pioneering spirit of its workforce, recognition such as this seems an appropriate gesture and historic account of these efforts.

Again, thank you. I look forward with anticipation to the outcome of this initiative.

Yours sincerely

**John Laugher**  
Acting General Manager

Norske Skog Paper Mills (Australia) Limited  
Boyer

Boyer  
Tasmania 7140

ABN: 84 009 477 132  
Phone: +61 3 6261 0111

## HISTORICAL SUMMARY

Major challenges to the production of newsprint in Australia were many, in particular the development of a suitable pulping process for eucalypt hardwood trees for the manufacture of a wood pulp with an acceptable yield and sufficient strength and brightness to produce a sheet of newsprint

The issue was well summarized in the 1915 report to the Tasmanian Government by Henry E Surface, an American consulting engineer in forest products, who advised in part:

*“Much to my regret, I have not been able, conscientiously, to conclude other than that the manufacture of the woods in question into pulp for resale would not be a feasible enterprise from the profit standpoint under present or even normal conditions. The main difficulty lies in the woods themselves; their hardness, natural colour and comparatively short fibre confine their possible use to only one class of pulp (i.e. soda pulp) with a limited usefulness for papermaking in general.”*

However Lou Benjamin and his research team of industrial chemists were not ones to give up. He was employed by the Bureau of Science and Industry, the forerunner of the present CSIRO, from about 1918 to 1928, in charge of eucalypt and cellulose research in Perth and Melbourne.

Initial attempts were unsuccessful. By 1927 Benjamin and his colleagues had examined the soda, sulphite and mechanical processes of pulping eucalypt woods (see glossary of terms). He had shown in a small trial at Fyansford mill (near Geelong) that the soda process was suitable for making printing papers.

The sulphite and mechanical processes were then examined in an experimental mill operated by Tasmanian Paper Pty Ltd at Kermandie south of Hobart in 1928-30. Mechanical pulping (using grindstones) to separate the wood fibres was proven to be valuable for newsprint manufacture, but the depression halted progress.

Benjamin was then with Australian Paper Manufacturers Ltd., Melbourne, from 1930 to 1932 when he joined Sir Keith Murdoch's Derwent Valley Paper Co Pty Ltd in Hobart.

In 1934 at Ocean Falls Mills in British Columbia, Canada, Benjamin and staff carried out a large mill-scale test, using 1000 tons of Tasmanian eucalypt. On arrival some logs were lost when the wharfies tossed them overboard expecting them to float, and some of the pulp from Tasmania was stained with coal dust and rust. However the trial was successful in so far as the problems of using this wood for making newsprint were sufficiently resolved to commence the design of a pulp and paper mill. This assurance led to the erection of ANM's mill at Boyer beside the Derwent River, 30km upstream from Hobart and 5km downstream of the established town of New Norfolk. Design and procurement of plant and equipment began in 1938.

Benjamin was appointed General Superintendent, with Percy Sandwell as Chief Engineer. Sandwell was English born, and had been an engineer with the Powell River Company in British Columbia, and later a consultant based in Vancouver.

The pulp consisted of about 75% hardwood fibres produced by grinding, and 25% imported softwood fibres.

The first newsprint was produced on 22 February 1941.

*“From sheet-on-wire to sheet-on-reel took two and a half days. Every man from the General Superintendent Lou Benjamin to the lads holding the brooms in the machine and grinder rooms stood waiting with fear, apprehension and hope. Then suddenly but quietly the great volume of stock was put on the wire and the shining monster was away...”*

*The Canadians were galvanised into frantic action. It was a moment they had waited for and they made full use of their skill in a moment of great anxiety and suspense. They waited and measured carefully with expert skill as the first mass of stock hit the wire. They guided the heavily watered sheet containing the precious fibre on to the first press. Then, as if by magic, it flowed along the dryers until it raced out at the end of the machine as a finished sheet of newsprint.” (Dave Clark in Burns, 1988)*

*“The sheet was heavy and unmarketable....but the fact that the first sheet of newsprint had been produced in Australia was cause enough for a celebration ... the birth of a new industry. But many problems had to be overcome. When the weight of the first sheet was reduced, breaks occurred on the machine; then the inability of the groundwood mill to keep pace with paper production became evident.” (Burns, 1988)*

The paper machine was soon producing 100 tons per day.

The timber supply came initially from areas around Karanja on the rail line from New Norfolk to Fitzgerald. ANM constructed a settlement at Karanja and a spur line into the Styx River Valley. Logs travelled to Boyer by rail.

Without this mill there could have been a critical shortage of newsprint in Australia during World War II.

Rolls of newsprint were transported to the Hobart wharves by rail until 1946 when twin barges lashed on each side of a tug performed that task. In 1986 road transport replaced the barges.

For the second paper machine erected in 1951, ANM built a township at Maydena and a road into the Florentine Valley. Logs were loaded onto rail at the Florentine depot two km beyond Maydena. In later years road transport replaced rail.

In 1997 ANM (then owned by Fletcher Challenge) entered into a new wood supply agreement with Forestry Tasmania which allowed the State Government to proceed with rescinding the ANM Forest Concession Act. Many of the previous arrangements for forest planning, harvesting, road construction, fire fighting and regeneration for the area were subsequently altered.

The mill continued to make newsprint from hardwood for almost 70 years, expanding production from 32,000 tons per year to over 300,000 tons per year, meeting 40% of Australia's needs.

Old Growth logging and groundwood pulp production ceased in 1992, along with the closure of the inaugural No 1 paper machine. This followed the successful upgrades and modernisation of Nos 2 and 3 paper machines in 1991 and 1989.

Softwood thermo-mechanical pulp (TMP) was introduced in 1978 (the first such pulping facility to be built in the Southern Hemisphere and the first to use Radiata Pine) but with Cold Soda; chemi-mechanical pulping of regrowth Eucalypt continued the Mills long association

with Tasmanian Hardwood Eucalypt until November 2009 when it too was replaced by an expansion of TMP capacity.

### **CHANGE of NAME**

Until the late 1980s Australian Newsprint Mills had been owned by the Australian publishers and, with consolidations, for the most part a 50/50 venture between Fairfax and the Herald and Weekly Times. In 1988 the New Zealand paper company Fletcher Challenge took the Fairfax interests and then acquired the News Corporation's (HWT) share in 1997. The operations were rebadged to Fletcher Challenge Paper Australasia (FCPA). In July 2000 the Norwegian paper giant Norske Skog purchased the global interests of Fletcher Challenge Paper, and the Mill was again rebadged to Norske Skog Paper Mills (Australia) Limited, Boyer Mill (Norske Skog means Norwegian Forest.)

## BASIC DATA

<b>Item Name:</b>	Boyer Newsprint Mill
<b>Other/Former Names:</b>	Australian Newsprint Mills Ltd Norske Skog Newsprint Mill
<b>Location</b> (grid reference if possible):	AMG E 508 350 N 5 263 636
<b>Address:</b>	Boyer Road, Boyer, Tasmania
<b>Suburb/Nearest Town:</b>	New Norfolk
<b>State:</b>	Tasmania
<b>Local Govt. Area:</b>	Derwent Valley Council
<b>Owner:</b>	Norske Skog
<b>Current Use:</b>	Manufacture of newsprint
<b>Former Use</b> (if any):	None
<b>Designer:</b>	Canadian Engineer, Percy (Dick) Sandwell & Associates
<b>Maker/Builder:</b>	No. 1 Machine: Walmsleys (Bury) Ltd, Lancashire England
<b>Year Started:</b> 1938	<b>Year Completed:</b> 1941

### Physical Description:

Main original process components

Log handling, saw mill and billet production

Six two-pocket Great Northern grinders, each pair driven by a 3,600 hp motor.

Pulp Mill combining 75% of groundwood pulp, 25% imported hemlock sulphite pulp.

No. 1 paper machine as above, paper width 170 inch (4.3 m), speed 1200 feet/min (365 m/minute)

Mill capacity 100 tons/day; 20,150 tons in the first year.

Support services components

Lawitta pumping station, 6 km pipeline, water treatment plant producing 30 ML/day.

Zinc hydrosulphite plant for bleaching groundwood pulp

Hydro-electric substation supplying 20 MW.

Boiler house burning low grade coal, wood chips and saw dust, producing 40,000 pounds/hour at 200 psi.

Rail transport to the Port of Hobart.

### Physical Condition:

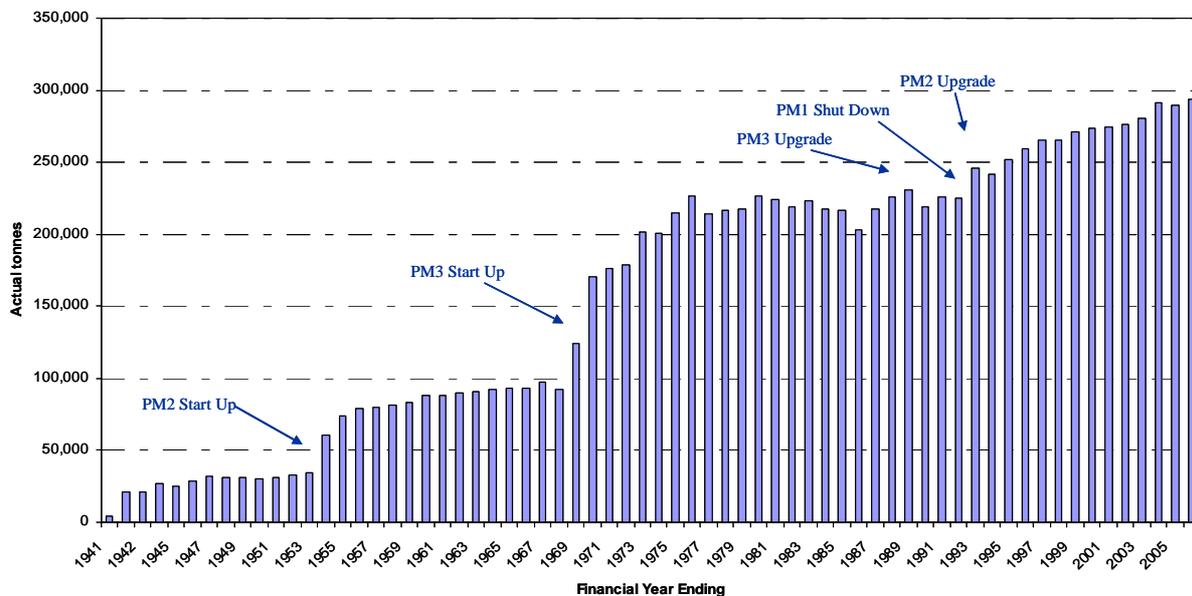
None of the original process equipment remains in service, as it was unable to meet the quality requirements for modern newsprint.

## MODIFICATIONS & DATES

- |          |  |
|----------|--|
| 1949     | New Wood Mill commissioned   |
| 1951-52: | No. 2 machine, Dominion Engineering, Montreal, Canada.<br>Paper width 5.9 m, speed 450 m/minute.<br>Mill capacity 80,000 tons/year.                      |
| 1957:    | Cold caustic soda impregnation of wood chips introduced; it enabled a wider range of species and younger trees to be used and produced a stronger paper. |
| 1966:    | A small quantity of alkali was added to reduce pulping energy inputs under state-wide electrical power rationing in drought conditions.                  |

- 1969: No. 3 machine, Beloit Walmsley, Bolton UK.  
Paper width 6.6 m, speed 760 m/minute.  
Mill capacity 170,000 tons/year
- 1977: Thermo-mechanical plant (TMP 1) built in response to the increasing availability of pine pulpwood and increasing cost of imported kraft pulp.
- 1987: Thermo-mechanical plant (TMP 2) commissioned.
- 1989: Mill capacity 230,000 tons/year through upgrades, major rebuild and modernisation of No 3 paper machine.
- 1990 No 5 Boiler commissioned
- 1989 9.35 am October 31, No 1 paper machine was decommissioned after 48 years of continuous service
- 1991 No 2 paper machine rebuilt and modernised  
Old growth woodmill and groundwood pulp mill closed
- 1995 New Warehouse and Distribution system commissioned with paper railed to Burnie for shipment.  
Recycled fibre from Albury backfreighted on new distribution system
- 2009: Cold caustic soda pulpmill converted for thermo-mechanical pulp (TMP 3) and a new 600,000 tpa softwood chip plant commissioned  
Use of eucalypt wood ceased and Boyer converted to 100% softwood plantation fibre supply.

The actual annual production of newsprint is shown in the chart below.



**Historical Notes:** See Introduction

**Heritage Listings** Nil

## HERITAGE ASSESSMENT

### Historic Phase:

In 1915 the Tasmanian government was advised by US consulting engineer Henry Surface that there was little prospect of making paper from hardwood. Two events encouraged continuation of research by L R Benjamin and John Somerville: there was a severe shortage of paper in World War I, and pulping tests on eucalyptus globulus in France were encouraging. In 1926 Benjamin produced sheets “as good as imported newsprint”. A pilot plant was built at Kermandie in Tasmania’s Huon Valley, using young eucalyptus regnans (swamp gum) but there wasn’t enough of this timber for long term production. In 1932 four directors of the Herald & Weekly Times formed the Derwent Valley Paper Company Pty Ltd and were granted 300,000 acre timber concession by the Tasmanian Government. Benjamin and his staff carried out a mill-scale test in Canada, using Tasmanian eucalypt, a trial which convinced them that the making newsprint from this wood was achievable. The strong desire of newspaper publishers and the Commonwealth and Tasmanian governments to have a newsprint industry in Australia had encouraged these efforts. Australian Newsprint Mills Pty Ltd was formalised in 1938 and mill construction began on the 56 acre site at Boyer. The outbreak of World War II caused a shortage and rationing of imported newsprint and the price to rise, making the project even more viable.

### Historic Individuals or Association:

**Louis R Benjamin CBE** (1892-1970) graduated from the School of Mines, Kalgoorlie and



worked on the eastern goldfields as a metallurgist. He was introduced to the field of wood-pulping in 1918 by I H Boas at the Technical School, Perth. Until 1928 Benjamin was in charge of eucalypt wood-pulp and cellulose research for the Council for Scientific and Industrial Research in Perth and Melbourne. In 1924 Benjamin and David Avery attempted to make newsprint from eucalypts in a paper mill in Holland. Whilst unconvincing the trials were encouraging enough for sponsors to push on with the endeavour to establish an industry based upon local hardwood. In 1928-30 Benjamin was technical superintendent of an experimental pulp and paper mill at Kermandie, examining the sulphite and mechanical processes of pulping. Mechanical pulping was proven valuable for newsprint manufacture but the depression halted progress. In 1934, employed by the Derwent Valley Paper Co Pty Ltd in Hobart, Benjamin and his staff

carried out a successful large mill-scale test at Ocean Falls, British Columbia, using 1000 tonnes of Tasmanian eucalypt in which the problems were shown to be manageable. This assurance led to the erection of ANM’s pulp and paper mill at Boyer from 1938 with Benjamin as general superintendent. In that position he oversaw the successful production of newsprint and significant expansion of the mill until 1956 when he retired, having “the satisfaction, rare for a scientist, of managing the industry he had created in the laboratory”.

**John Somerville (1899-1986)** After graduating from the university of Western Australia, he joined the Forest Products Laboratory (Perth) in 1921.



There he and L R Benjamin developed a modified soda press for pulping eucalypts, which led to Australia's first commercial production of eucalypt-based pulp and paper. In 1928 Somerville moved to Tasmania to conduct pilot plant trials of eucalypt pulping at the Tasmania Paper Co plant at Kermandie. He was appointed Chief Chemist at London Paper Mills in Kent (1931-34). There he developed the Somerville Fractionator, a machine used for testing pulp and which is still in use today. He returned to Australia around 1935 to become Chief Chemist at the Australian Newsprint Mills until 1965. One of the problems to be overcome was the corrosive nature of eucalyptus pulp. Staining of the pulp in contact with ferrous materials had to be counteracted by pulp washing and brightening with zinc hydrosulphite.

**Sir Keith Murdoch (1885-1952)**, head of the Herald & Weekly Times, took an interest in



Louis Benjamin's early experiments to make newsprint from eucalypts and, in 1938, with the Sydney Morning Herald as the other dominant partner, he established Australian Newsprint Mills Pty Ltd at Boyer and was its chairman until 1949.

As Chairman of Directors for Australian Newsprint Mills, Sir Keith wrote in 1941: *"The Australian Newspapers, concerned in the newsprint-making industry on the River Derwent, set out on their hazardous venture with double intention. They wished to secure for the free press of the Australian Commonwealth a native supply of this essential raw material; and they wished to build another industry as a contribution to that national greatness to which these newspapers daily urge others to aspire."*

The principal shareholders were:

Herald & Weekly Times Ltd	Melbourne
John Fairfax & Sons P/L	Sydney
Associated Newspapers Ltd	Sydney
Advertiser Newspapers Ltd	Adelaide
Argus & Australasian Ltd	Melbourne
Queensland Newspapers P/L	Brisbane
Western Australian Newspapers Ltd	Perth
News Ltd	Adelaide
Australian Consolidated Press	Sydney
Davies Bros Ltd	Hobart

The Tasmanian Government provided £250,000 preference capital.

**Percy Sandwell**, a consulting engineer of Vancouver, Canada was appointed Chief Engineer of ANM in 1938. Known as “Old Dick” he was responsible for the design and construction of the mill. Unfortunately he died in February 1941, eight days before paper was produced at the mill. The original engineering team was:



Bill Adams	Civil Engineer
Geoff Armitage	Electrical Engineer
Arthur Gardner	Mechanical Engineer
George Hughes	Services Engineer & Steam Plant Superintendent

Percy's son, **Percy Ritchie Sandwell**, known as “Young Dick”, was employed by ANM from June 1940 when design and construction were already under way. He became Resident Engineer until 1944 when he returned to Canada. After two stints with expanding paper companies, he established in 1950 the consulting engineering firm Sandwell & Co which eventually became a world-wide organisation in the pulp, paper, timber products and power engineering industries, with clients in 50 countries.

**George Hughes** and **Geoff Armitage** went on to have long careers with Australian Newsprint Mills and contributed much to the early development and operation of the Boyer Mill in various Engineering roles.



George Hughes was born an educated in Melbourne, graduated from the Gordon Institute in Geelong and joined ANM in 1940 following various positions in Victoria and also a 2 year scholarship to the UK. A member of Tasmanias State Coal Committee he also served as Chaiman in 1953 for the Tasmanian division of the Institute of Engineers. He retired from Boyer on the 31<sup>st</sup> March 1964 after 24 years service.



Geoffrey Armitage joined ANM in 1939 and was long regarded as one of the old timers of the Mill. He took his technical education at RMIT and Swinburne and later became an Electrical Engineer with Australian Cement at Geelong before joining ANM. He retired from Boyer at the end of March 1968 after 29 years service.

**Creative or Technical Achievement:**

The commercial production of quality newsprint from hardwood was a great technical achievement in itself. That success established a new industry which is still thriving today, using *Pinus Radiata* softwood and recycled fibre. More than 75% of Australia's daily newsprint consumption is still produced in Australia some 70 years since the first import replacement ton of newsprint was produced at Boyer on the 11 February 1941

Of the two Babcock boilers originally installed, one was designed to burn high grade Newcastle coal, the other wood waste from the wood mill. When the supply of NSW coal was stopped due to the war and only low grade high ash Tasmanian coal was available, a whole series of boiler setting adjustments had to be made. ANM thus pioneered the use of high ash content coal in large industry and transferred the technology to other Tasmania industries similarly affected. In his memoirs George Hughes wrote that "it took about 12 years to finally solve the problem of finding a boiler setting suitable for high ash coal and wood mill waste."

ANM earned a well-deserved reputation as a leader in eucalypt regeneration. The techniques are the result of 30 year's experience and research based on the pioneering work by Dr Max Gilbert and Dr Murray Cunningham in the 1950s. An important part of Dr Gilbert's work was to devise treatments to enable eucalypts to re-establish in an area, winning the battle against denser rain forest species. After clear felling, this process involved coupes being burned with precision to destroy the understory trees before the disturbed ground was fertilised and sown with seed of the same eucalypt species which previously occupied the site.

Fundamental to the Boyer Mill's longevity has been building value through innovation, product and process development, research, technical support, efficient resource utilisation and long term mutually beneficial relationships with customers, stakeholders and the wider community

**Research Potential:**

No claim under this heading.

**Social:**

The social benefits of this new industry are substantial. Not only were there the physical assets of housing and new community facilities but also the intellectual and human capital for the enhancement of the community generally.

A new housing estate with 220 houses was built in three stages at New Norfolk, bringing with it expanded levels of services to match the increased population. ANM employees built a kindergarten with materials supplied by the company. The sports oval, tennis courts and swimming pool encouraged the formation of numerous sporting clubs.

A logging town was built at Maydena, the headquarters of forest operations, 56 km from the mill. From this town timber workers felled eucalyptus regnans, globulus and obliqua, trucked them to the railhead at Florentine Depot near Maydena, for transport to Boyer.

**Rarity:**

The mill at Boyer was the first paper mill in the world making newsprint with groundwood from hardwood and then subsequently the first with cold soda mechanical pulp from

regrowth eucalypt . The Mill was the first Newsprint producer in the Southern Hemisphere. In later years Boyer was also the first to make thermo-mechanical pulp using Pinus Radiata.

**Representativeness:**

While the use of hardwood for paper making has recently ceased, the Boyer Mill has all the current features of newsprint manufacture on site, from the handling of its own logs, wood chipping, the making wood pulp, the conversion into newsprint, with the ancillary services of water supply, steam production, electricity usage and effluent disposal.

Almost all of the original buildings and many of Mill services assets are still integral to today's manufacturing activities.

**Integrity/Intactness:**

While the majority of the original paper-making equipment has been scrapped, the rest of the mill is a working operation so that proper maintenance is an essential requirement for reliable output.

**STATEMENT OF SIGNIFICANCE**

The Boyer Mill was the first paper mill in the world to produce newsprint from eucalypt hardwood. Over twenty years Louis Benjamin and John Somerville carried out research which eventually solved the problems of the timber's hardness, short fibres and acidic nature, using sulphite pulp. Backed by the major Australian newspaper publishers, Australian Newsprint Mills produced the first newsprint in 1941, averting a shortage of newsprint during World War II.

This new industry has provided employment and prosperity to the township of New Norfolk, and has created a new village at Maydena. The Mill has continued to expand its production, with two more paper-making machines producing 300,000 tons of newsprint per year and supplying 30% of the Australian market. Personnel from Boyer provided the technical expertise for a second larger newsprint mill built at Albury in NSW in 1981.

**LEVEL OF SIGNIFICANCE** National

## INTERPRETATION PLAN

It is proposed to erect the marker and the interpretation panel beside the visitors car park at the entrance to the Mill, where the original grinder from the Kermandie pilot plant is on display and an Interpretation Panel for the 2009 Softwood Conversion Project already stands.



*Visitors car park*

**Interpretation Panel Title: THE BOYER NEWSPRINT MILL**

### **Proposed themes:**

#### **1 Newsprint from Hardwood – 20 years of research and trials**

Until 1941 newsprint was made from softwood fibres and none was made in Australia. Starting in 1920, Metallurgist Louis Benjamin and Chemist John Somerville worked out how to overcome the hardness, short fibre length, acidic nature and poor colour of hardwood pulp for paper-making, in order to take advantage of Tasmania's huge resource of eucalypt timber. A mill-scale test using 1000 tons of Tasmanian hardwood in Canada was sufficiently successful for the design of a hardwood pulp and paper mill to proceed.

#### **2 Constructing the Mill**

Backed by 10 Australian Newspaper publishers and the Tasmanian Government, the Mill was built in 1939-41. Canadian engineer Percy Sandwell designed the Mill and supervised its construction with a team of Australian and Canadian engineers. Walmsley's of Bury, UK supplied the paper machine. ANM harvested its timber from the 300,000 acre forest concession in the Styx and Florentine River valleys.

#### **3 Making newsprint here in 1941**

The first newsprint was produced on 22<sup>nd</sup> February 1941, with Benjamin as Mill Superintendent and Somerville as Chief Chemist. Hardwood fibres were produced by thrusting timber billets against patterned grindstones revolving at high speed. The resulting pulp was mixed 75:25 with softwood kraft pulp which has longer fibres and gave vital strength to the paper. The water content of the pulp, initially over 99%, was progressively

reduced as the layer of pulp travelled over a mesh belt, through a vacuum box and around many steam-heated rollers at high speed to emerge as a continuous sheet of newsprint with the required moisture content of 7–9 %.

#### **4 Community benefits**

The mill overcame a shortage of newsprint during World War II. A new housing estate with 220 houses was built in three stages at New Norfolk, bringing with it expanded levels of services to match the increased population. A logging town was built at Maydena, the headquarters of forest operations.

#### **5 Hardwood pulp ceased in 2009**

In November 2009 the mill ceased using hardwood pulp. The newspaper publishers needed brighter paper for colour printing and only softwood could meet the new standard. Pinus Radiata plantations in Tasmania were then able to supply sufficient timber for newsprint making.

#### **Illustrations**

The flow chart of the pulp and paper making process  
Photographs of Benjamin and Somerville  
Eucalypt forest  
Rolls of paper on rail wagons

#### **Implementation**

The design, manufacture, supporting structure, funding and on-going maintenance has been discussed with the owner, and a good working arrangement is expected.

## ACKNOWLEDGEMENTS

The author is indebted to Ken Hughes who first suggested that the mill be recognised and subsequently supplied valuable information about its early days when his father was part of the original engineering team. Thanks are also due to John Brodribb, a long term mechanical engineer at the mill, who reviewed the nomination, and to John Laughler, Strategy & Development Manager, who added valuable material to the nomination.

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## GLOSSARY OF PULPING TERMS

**Mechanical pulping** functions by pressing a short log of wood (billet) lengthwise against a wetted, patterned grinding stone revolving at a speed of around 250 rpm. Fibres removed from the wood are abraded and washed away from the stone surface.

**Chemical pulp** is produced by cooking wood chips with appropriate chemicals at high temperature and pressure. The objective is to degrade and dissolve away all but the cellulose fibre leaving those fibres intact. Two principal chemical processes are:

- a) The (alkaline) **Kraft process** which cooks the wood chips with sodium hydroxide. Kraft pulps produce very strong products.
- b) The (acid) **sulphite process** cooks the woods chips in a mixture of sulphurous acid and bisulphide ion. Sulphite pulps are lighter in colour, can be bleached more easily but the suitable types of timber are limited, and the paper is weaker.

**Semi-chemical pulp** combines chemical and mechanical methods. Essentially the wood chips are partially softened with chemicals and then shredded between rotating discs in a device called a refiner. This pulp typically retains more long fibres and yields a stronger paper.

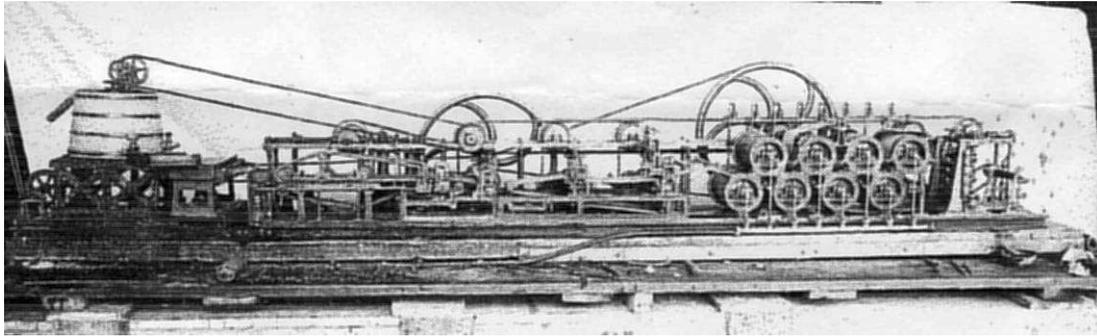
**Thermo-Mechanical Pulp** is typically produced by feeding washed and pre-steamed softwood (*Pinus Radiata*) chips between two counter-rotating refiner disks driven by six to twelve MW motors operating at 1500 rpm and an operating clearance of 0.6 mm.

**Stock or Furnish** is the controlled mixture of component pulps used to make newsprint.

## PAPER-MAKING PROCESS

*The stock contains only 0.6% of fibre. It is fed onto a travelling wire cloth which allows some water to drain away before the pulp moves into vacuum boxes to remove more water. The pulp is still 80% water when it passes onto a travelling felt that carries it between two rolls, a granite upper and a perforated rubber lower where vacuum is applied to bring the moisture content down to 65%. The stock then travels at high speed through multiple rolls heated to 235°F and a vertical stack of eight highly polished steel rolls to put a smooth surface on the sheet. The finished paper emerges with a moisture content of 7-9 % as required by the customers. This amount of moisture prevents the excessive penetration of expensive ink into the paper.*

## ILLUSTRATIONS



Model paper-making machine for trials at Kermandie in 1928



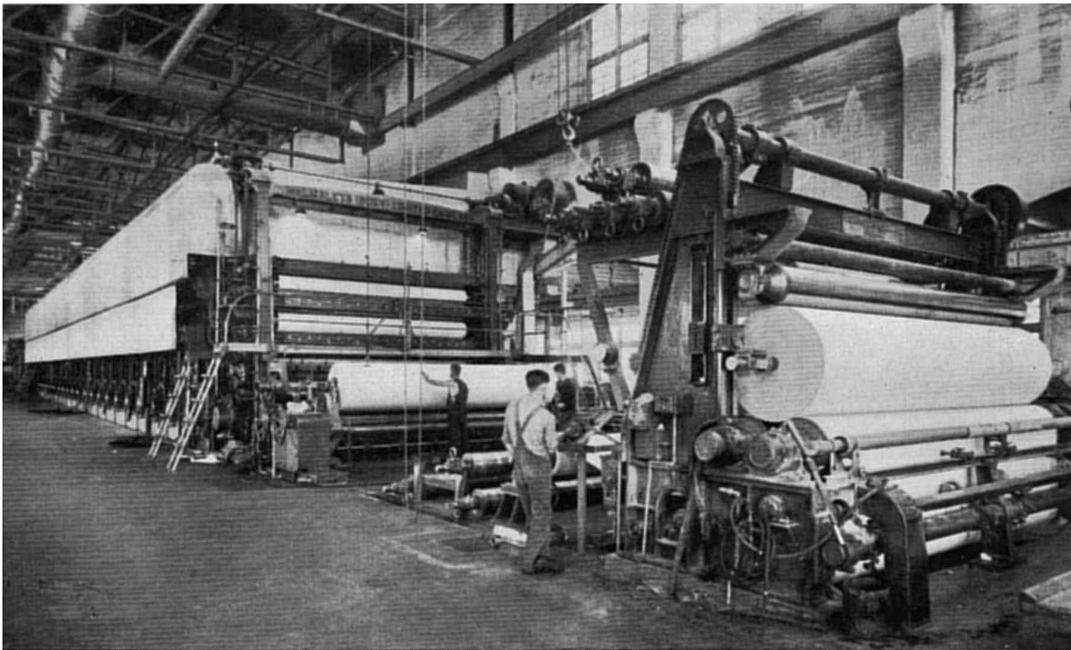
The raw material – Eucalyptus forest



Felling huge eucalypts with cross cut saws



Grinder room with six Great Northern grinders in front and seven Ring Grinders in background.



No.1 Paper Machine



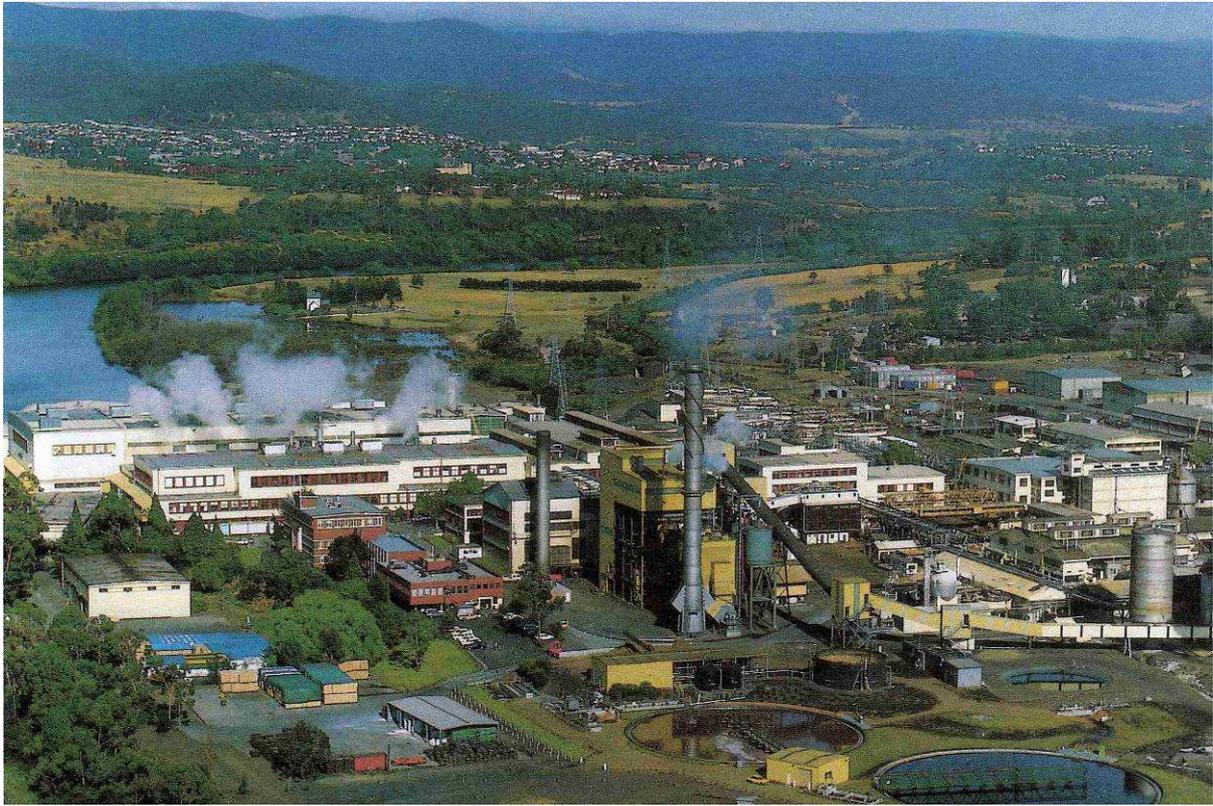
From rough eucalypt logs to finished newsprint



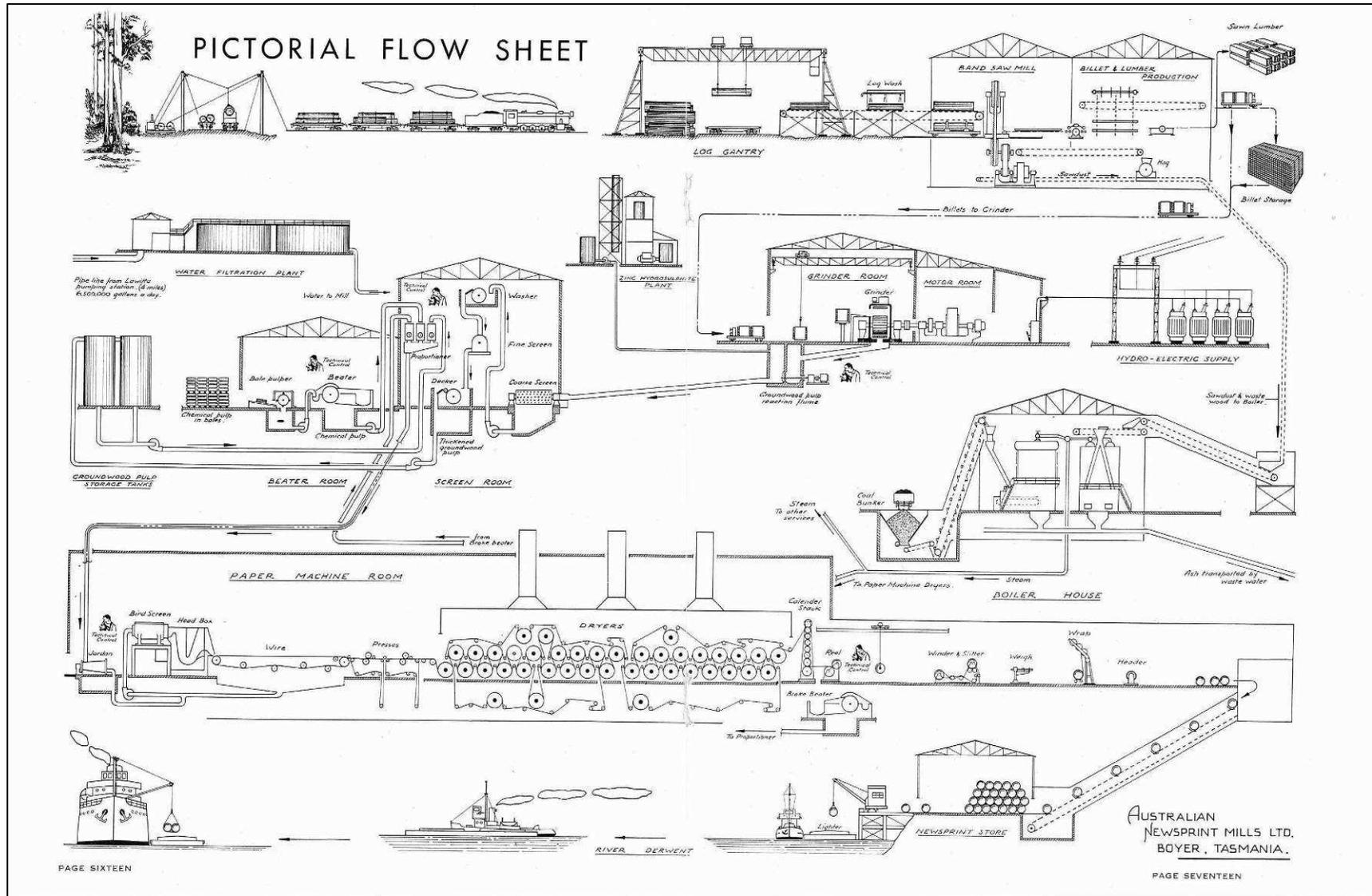
Paper Store at Pavilion Point with docking for barges.  
Hobart's floating bridge behind.



Boyer Mill about 1966  
showing the rail line on the right, the boiler house chimney, two paper machines sharing the long building near the wharf on the left. Newsprint was transported to Hobart on barges until about 1975.



Mill about 1990



Flow sheet after 1946