

Amplitude Modulated (AM) Broadcast Stations in South Australia

By Lloyd Butler VK5BR

AM Broadcasting was introduced in the 1920's. But it has still lived on despite the introduction of FM Broadcasting on VHF and the introduction of the various progressive stages of television: monochrome, colour and digital format.

First published in OTN March 2014
(The journal of the Radio Amateurs Old Timers Club of Australia)
Web version updated March 2018

Introduction

There are many aspect of radio broadcasting including running of the studios and managing the programmes. However this article is essentially about the broadcast transmitters and transmitter stations on the Medium Frequency (MF) band in South Australia. It is about how they started in a modest way in the 1920s and are still operating today in larger numbers and with higher radiated power.

Today, AM broadcast station transmitters are essentially un-staffed and located away from housing, where good propagation is anticipated. In the event of a transmitter failure, a standby transmitter is automatically switched in to keep the transmission in operation until a technician is called in to rectify the problem.

But let's go back to earlier days when every broadcast transmitter had to have a qualified technician or engineer in attendance. Many stories could be told by some of these early technical operators. I am going to write about what I know based on my own limited experience in broadcast stations in South Australia and from other information gathered from a number of sources. In particular, I refer to the book by John. F. Ross (Reference 1) which described much of the history up to 1977.

Classes of Stations

There are two classes of stations labelled A and B. As things stand, the A class (National) stations are those owned by the Government. These are operated by the Australian Broadcasting Commission (ABC) which was initiated by Act of Parliament in 1932. The B class stations are those owned by private industry. But looking back to the early history, we find that in 1923, the A class station was actually defined as one which was financed from broadcast receiver licence fees. (Remember that for many years, up to 1974, we all paid a broadcast receiver licence fee and later a television receiver licence fee). Also A class stations were initially started by commercial interests in 1924, before being taken over by the ABC in 1932. The B class licence station was then defined as one funded by advertising fees.

The A or B class station classification seems to have faded with time and the names National and Commercial are more commonly used. Another classification is the name Community Radio indicating that it is supported by a community and neither publicly financed nor operated for commercial profit. Some stations are defined as Narrowcast Stations rather than Broadcast Stations, indicating that their transmission is directed at a specific group of listeners. For example, Adelaide station 5RTI is narrowcast directed at the Italian community. LPON is an abbreviation for Low Power Open Narrowcasting and HPON for High Power Open Narrowcasting.

Responsibilities have changed in more recent times but the Radio Branch of the Postmaster General's Department (PMG), through their Radio Inspectors, administered Stations. They carried out station inspections and set the qualifications required for technical operators in charge of broadcast transmitters. To take charge of a the transmitter of a Commercial station, these operators had to qualify in the PMG Broadcast Operators Certificate of Proficiency (BOCP), or have other acceptable qualifications. A number of early technical operators were qualified with a First Class Commercial Operators Certificate of Proficiency and had previous experience as a wireless operator on board ship.

It is interesting that PMG technical staff were used to take charge of the National transmitters. Some were qualified with internal PMG qualifications in telecommunications or radio, but some were not. There seemed to be no specific standard set by the PMG, such as defined by the BOCP.

The A Class stations

A licence to transmit broadcasting was issued to Millswood Auto and Radio Company with call sign 5MA on November 2, 1923, but this didn't lead to any real outcome. A further licence was issued to the South Australian Radio Company with call sign 5AB in July 1924. Regular test broadcast programmes were carried out. The company was taken over by a new company the South Australian Radio and Broadcasting Company on September 17, 1924. Regular programmes ceased on November 1.

The **first A class station** in the State was established at the Grosvenor Hotel in North Terrace, Adelaide by Central Broadcasters Ltd in November 1924, following the experimental tests by the South Australian Radio Company. The transmitter at the Grosvenor had an input power of 175 watts. The initial tests were carried out with call sign 5AB but this was quickly changed at the Grosvenor to 5CL.

Plans were soon initiated for a 5 kW installation of 5CL at Brooklyn Park. A new transmitter building was erected to house the new transmitter which was to be built and installed by Amalgamated Wireless Australasia (AWA). First broadcast tests were commenced around 1925 and the power was raised to the 5 kW rating in January 1926.

A 62 metre high steel lattice guyed mast and a large earth mat were erected. The antenna proper was 25 metre long between the top of the mast and 13 metre strain poles. However when I worked at 5CL for a short period in the early 1940's, filling in as one of the PMG technical operators, the steel mast was being used as the radiator. The bottom of the mast was grounded and the mast was shunt fed part way up with a single wire feed line.

In 1930, the Transmission Section of the PMG took over the operation and maintenance of all the technical equipment concerned with the National broadcasting system. This included the transmitter station for 5CL at Brooklyn Park and the studios that had been established in 1928 at Hindmarsh Square, Adelaide. The ABC took over programme control when they were established by the Parliament Act in 1932. (This did not include programme mixing and studio switching which was the function of the PMG technicians).

In the later period of 1974/1975, the National studios equipment was moved from Hindmarsh Square to a new ABC multi-story radio and television studio building at Collinswood. The new home of the ABC was officially opened on March 29, 1974. In their new home, the ABC took over all the technical side of the studio equipment but not the remote transmitters which were still maintained by PMG staff.




The ABC studio building
at Collinswood

**The National Studios at Hindmarsh Square,
Adelaide**

In 1936 the PMG staff replaced the 5 kW SCL transmitter. When I worked there in the 1940's, it was feeding 3.7 kWatts to the aerial system at a frequency of 730 kHz.. Around 1944, the PMG raised the mast above ground and insulated its base from direct connection to the earth mat. It was then series fed with a 200 ohm six wire transmission line.



**SCL Main Transmitter
RF Unit, Brooklyn Park 1949**

**STC 2 kW Transmitter
Standby for SCL,
Installed 1949**

A second Adelaide national station (5AN) on 890 kHz was introduced in 1937. The 500 watt transmitter was installed in the Commonwealth Offices building in Post Office Place. The aerial radiator was a 62 metre steel tower on the top of the building. In 1944, both the transmitter and its tower were moved to the Brooklyn Park site. A new building housed the transmitter which was modified to increase power to 2000 watts. At the time I worked at Brooklyn Park in the 1940's, there was also a low powered standby unit for 5AN which I had to put to use one night. By 1949, the new building housed an additional 2 kW STC transmitter unit which provided standby for the main SCL unit in the other building.

Addition of the new nearby West Beach airport, instituted some changes to the SCL/5AN operations. In 1948, the two SCL and 5AN masts were reduced in height to 45 metres. A new site was ultimately established in a more country area at Pimpala and by 1959, work commenced to move the stations to that site. The Pimpala broadcast facility on Sherriffs Road, Reynella is still the National transmitter site today.



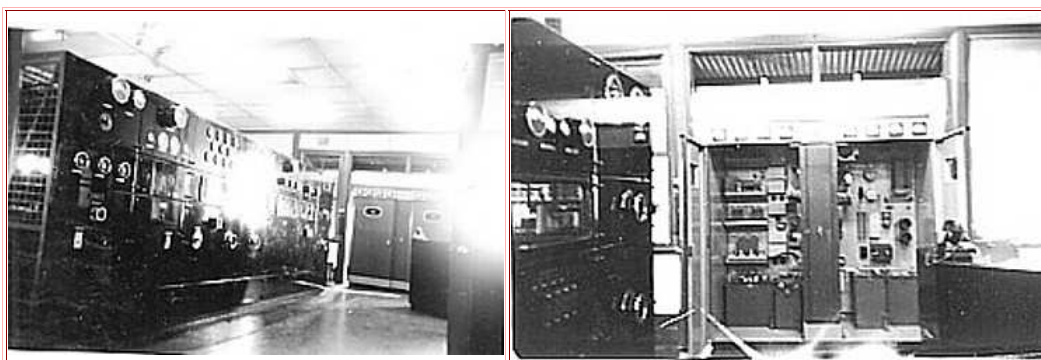
**SCL & 5AN Transmitter
Masts at Brooklyn Park 1949**



SCL & 5AN Tower at Pimpala

SCL on 729 kHz is now called 5RN or ABC Radio National. The call sign 5AN on 891 kHz remains but is also now called ABC Adelaide . Both stations now feed 50 kW each into a the same 172 metre free standing steel tower at Pimpala. All the earlier transmitters using electron tube and water cooled valves power stages have been phased out and they are now all solid state using many modules of paralleled power MOSFET transistors. Such is the technology of radio transmitters today. What was open country around the Pimpala transmitting site when it was first established is now a surround of housing. I have to wonder how the residents get on in the near field (induction) zone of a 100 kW radiator.

The first regional national station 5CK was put into service in 1932, near Crystal Brook with a 7500 watt STC transmitter. Similar to the early SCL transmitter, the output stage of 5CK operated with water cooled valves. Two 56 metre lattice steel towers were installed, 80 metres apart. These supported an Alexanderson aerial fed at its centre with the ends of its horizontal section dropped down vertically to individual tuning huts. From February 1962, the station operated using an added 190 metre vertical steel lattice radiator on an insulated base.



**SCK Main Transmitter with
AWA 2kW Standby
Transmitter in background,
Crystal Brook 1949**

**AWA 2 kW Transmitter
- Standby installed at SCK,
Crystal Brook, Sept 1949**



**Station SCK at Crystal Brook
with original towers**



**Aerial Towers at SCK
including 190 metre tower added**

A 2 kW AWA transmitter was installed as a standby unit in 1947 and in 1966 the main transmitter was replaced by two AWA 5 kW units operating with outputs in parallel.

All programmes were relayed via landline from the ABC 5CL/5AN studios in Adelaide until 1954 when an additional studio facility was opened at Port Pirie.

Additional regional national stations were progressively added by the PMG staff starting with 5LN Port Lincoln in 1950, followed by 5WM Woomera in 1953, 5MG Mt Gambier in 1955, 5PA Penola in 1956, 5MV Berri in 1957, 5LC Leigh Creek in 1971, and 5SY Streaky Bay in 1977.

It appears that 5MV in Berri (labelled Renmark/Loxton) transmits the 5AN ABC Adelaide programme on 1062 kHz. A second transmitter at the same site transmits the 5RN (ex 5CL) ABC National programme on 1305 kHz.

All the national stations mentioned still remain today with the same call signs, except for 5CL which is now 5RN.

There is one other **national station 5PB** which is the ABC news station and which transmits on numerous frequencies. It took over the 972 kHz frequency after commercial station 5DN went to FM in 1990 and the frequency of 972 kHz became vacant. It transmits via a 2000 watt transmitter at South Road, Wingfield, the same location as Community Station 5RPH. I rather suspect (but not verified) that it took over the MF 2000 watt transmitter at Wingfield previously used by 5DN.

National Telecommunications (including radio) separated from the PMG to become the Telecommunications Commission (trading as Telecom Australia) in 1975 and later the Telecommunications Corporation in 1991. The Corporation combined with the Overseas Telecommunications Corporation in 1992 and was renamed the Telstra Corporation in 1993. Maintenance of the National broadcast transmitters was carried through by each organisation, including Telstra as a private company. However, it seems that more recently, maintenance of many National transmitters, such as those at Pimpala, are in the hands of contractors.

The B Class or Commercial Stations

By the early 1940's, the following commercial stations and station networks were in operation:

Network owned by the "Advertiser": 5AD Adelaide with relay stations - 5PI Crystal Brook, 5MU Murray Bridge, and 5SE Mt Gambier.

5DN Adelaide and relay station 5RM Renmark/Berri.

5KA Adelaide and 5AU Port Augusta (Local & relay from 5KA)

As will be seen from the following paragraphs, the 1940s ties between Adelaide stations and country stations have changed considerably over the years. Also, as a wartime security move, the federal government closed down 5KA and 5AU in January 1941. The reason for closure is another story. They were put into operation again in December 1943.

In those earlier days, there were no satellites, or fibre optic cable links, to transmit wide band signals over long distance. Programmes to relay stations were sent over open wire pairs (as used for telephone trunk circuits), rented from the PMG. For broadcasting use, these had to be equalised for flat frequency response. Lines for Class B relay stations, such as those in the Advertiser Network, were equalised for a response up to 5 kHz. This means that audio response transmitted was limited to frequencies up to 5 kHz with an AM bandwidth of 10 kHz. However, National relay station 5CK line was equalised to 10 kHz and hence could transmit higher audio frequencies. The programme lines generally had an additional cailho circuit (or circuit operated between the line electrical centre and ground). This supported a telegraph system for communication between the relay station and the programme source station. Although not a requirement set by the PMG regulator, it was useful for the station operator to be proficient in sending and receiving Morse code and be able to read the telegraph sounder.

Over the whole of Australia there were really a lot of broadcast stations, so the stations were spaced at 10 kHz intervals on the broadcast MF band. Further down the track this was changed to 9 kHz so that stations such as 5CL and 5AN changed from 730 and 890 kHz to 731 and 891 kHz respectively. Some stations were actually allocated the same frequency and physically spaced by being in different Australian states. This sometimes caused interference at night when signals travelled between States sky wave via the ionosphere.

The Adelaide Broadcast Station Towers

By the time I had left Murray Bridge in 1942 to work with the PMG in the "Big Smoke", the skyline of Adelaide city was lined with broadcast station aerials and towers.

Station 5DN had two 31 metre guyed wooden masts mounted on the top of the 12 level Colonial Mutual Life (CML) building on the corner of King William Street and Hindley Street. The masts supported a centre fed T antenna with a six wire top cage.



The top of the 12 level CML Building with the guyed masts installed for 5DN in 1936

Station 5AD had a 50 metre self supporting steel tower insulated at its base and mounted on an Advertiser building in Waymouth Street. The tower had replaced an earlier T type antenna, 50 metres above the ground and which was supported by two wooden masts mounted on two of the buildings.

National station 5AN, commissioned in 1937 had a 62 metre self supporting steel tower insulated at its base, and mounted on the top of the Commonwealth Offices, in Post Office Place, at the rear of the Adelaide GPO. The 5AN transmitter in the Commonwealth Offices building was re-located to the Brooklyn Park site in 1944 and the tower was also moved to that site.

This was all in 1942, but the reign of tall masts in Adelaide proper didn't end there. Station 5KA came back on the air in 1943 at the Central Methodist Mission building in Franklin Street, initially using a wire strung from the church steeple as a radiator. A year later, a new 62 meter self supporting steel tower was brought into operation. This was mounted on the ground and insulated at its base.

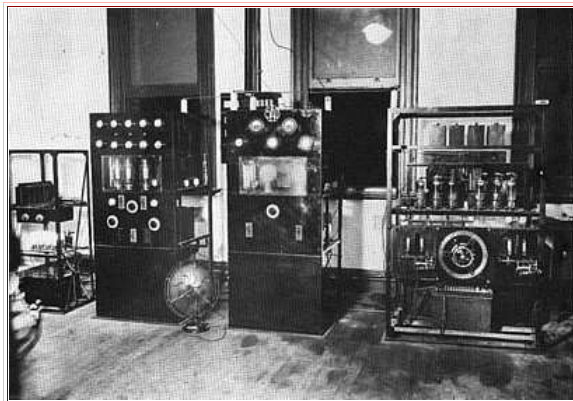
A problem with all these radio transmitters within the city proper was that they were limited by regulation to a maximum RF power output of 500 watts. In the long run, they have all moved out of the city to locations where they are allowed to use higher power, where the propagation characteristics of the location might be better, and where they can make use of more space to erect better aerial systems.

In 1954, 5AD and 5KA went on the air at the Cavan Road, Gepps Cross, each with 2000 watt transmitters sharing an 86 metre lattice steel mast. Also in 1954, 5DN moved transmission to a 2000 watt transmitter, feeding a 63 metre lattice steel mast, at Dry Creek. In 1958, after many air services were moved from nearby Parafield to West Beach, transmission of 5DN was permitted to be transferred to a 145 metre 'sectionalised' radiator.

The Advertiser Network

Station 5AD commenced on the air in June 1930 in an Advertiser building in Waymouth Street. The original transmitter was designed by Harry Kauper who came over from the early 5CL and became the first Chief Engineer. This was taken over in 1931 by Don Gooding, also from the early 5CL. Don remained as Chief Engineer until 1958 when he was appointed as Chief Engineer at television station ADS7. The 5AD studio facility was also part of this broadcasting installation.

The original transmitter had an input power to the final amplifier of 560 watts and a licensed power output of 300 watts. The original 5AD frequency was 1310 kHz but this was changed down the track to 1323 kHz.



Transmitter 5AD Adelaide in 1930
Photo from Ref. 1



86 Metre Mast
used by 5AD and 5KA
Cavan Road, Gepps Cross

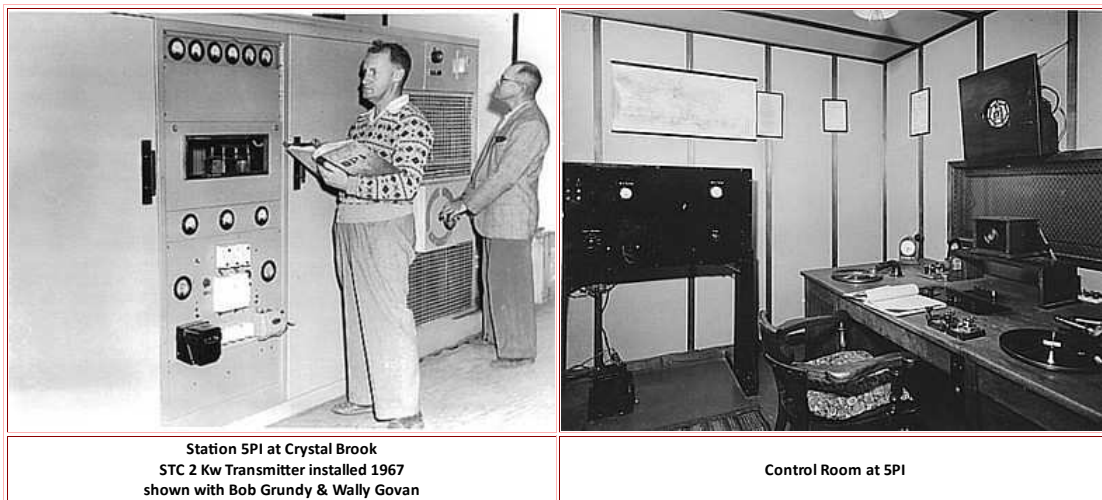
A new transmitter site was established in the outskirts of the city at Gepps Cross in 1954. A 2.5 kW STC transmitter was provided for 5AD. A new Metters 86 metre high lattice steel mast was installed and this was shared between the 5AD transmitter and another transmitter used by 5KA. The mast was also later used by Community Station 5RPH.

Understanding what happened in the 1990s is a little confusing. From July 1993, 5AD commenced simulcasting on both its AM frequency of 1323 kHz and on FM on 102.3 MHz. The station came up for sale and was bought by Montclair Investments whose owners included personalities such as Jeremy Cordeaux. The AM station, previously 5AD, became Cruise 1323. AM station 5DN had moved to FM in 1990 and in 1994 it was decided to adapt the 5DN call sign. So the AM channel on 1323 kHz changed call signs from 5AD to 5DN.

Station 5PI was first established in Port Pirie in January 1932, a few months ahead of 5CK, to become the first country station in South Australia. The station initially operated with a 20 watt transmitter provided by Bill Barber and later a 50 watt transmitter designed by Don Gooding. The station was first operated by the Midlands Broadcasting Services Limited but was acquired by the Advertiser in the 1932 year.

The station opened at a new location near Crystal Brook in June 1934 with a new 2kW transmitter designed by Don Gooding and constructed by 5AD staff. The transmitter originally used water cooled final amplifier valves but these were replaced by air cooled types in 1945. Station 5PI frequency was 1044 kHz.

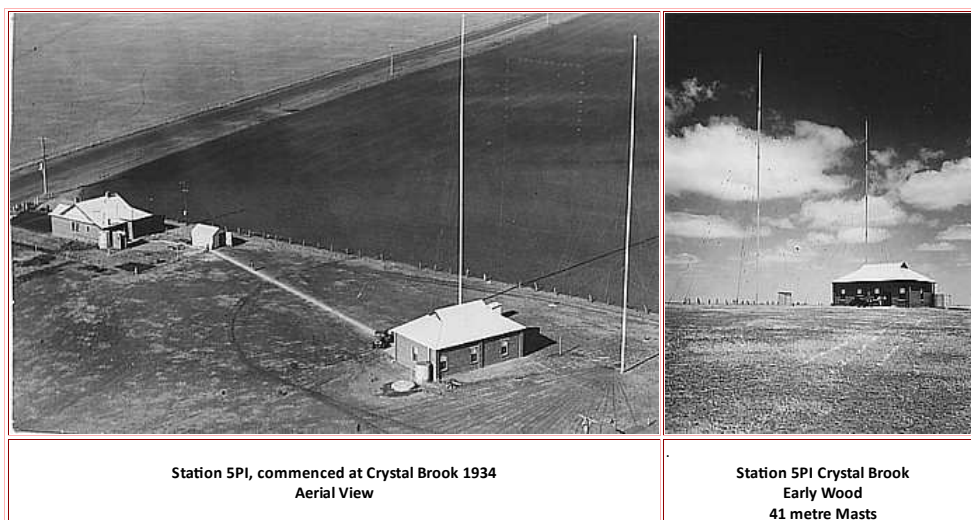
In the same era, 5AD and 5PI technical staff built a further 1000 watt transmitter. This was installed at 5PI as a standby unit for the main transmitter. In 1967, a new STC 2 kW transmitter, Type SU55D was installed as the main unit.



**Station 5PI at Crystal Brook
STC 2 Kw Transmitter installed 1967
shown with Bob Grundy & Wally Govan**

Control Room at 5PI

The original Crystal Brook 5PI antenna was an Alexanderson type with a six wire cage and supported by two 41 metre Oregon pine masts. Each end of the antenna was tuned to ground by variometers. A new antenna was erected in November 1949 but we don't have details of the design.



**Station 5PI, commenced at Crystal Brook 1934
Aerial View**

**Station 5PI Crystal Brook
Early Wood
41 metre Masts**

A 153 metre high vertical lattice steel antenna, guyed at four levels, was erected in May 1953. At the time it was considered to be the highest radio mast in South Australia and also the highest structure in the state. This vertical antenna mast lasted 50 years and was demolished in February 2013. Operation was maintained using a 60 metre standby tower. More recently the 60 metre tower has also disappeared from view. In May 2014, it was reported that a new tower was being built, of equivalent height to the original 153 metre vertical mast.



**New 5PI cum 5CS Tower during erection in 2014
Photos by Ian Sutcliffe VK5IS**

The original 5PI at Port Pirie had its own broadcast studio facilities. However, 5PI became a relay station of 5AD programmes after it was acquired by the Advertiser. We have no record of when that took

place, or whether there was a transition where both local and relayed programmes took place.

Len Porter was chief engineer at 5PI from 1934 to until 1952. Bob Grundy from Murray Bridge (and a previous operator at 5MU) took over as Chief Engineer at 5PI in 1952 and remained until he retired.

The 5PI call sign was changed to 5CS in 1987. The station ultimately became part of the Fairfax Media, but in 2013, it was sold to Grant Broadcasters Ltd. 5CS still operates on a frequency of 1044 kHz.

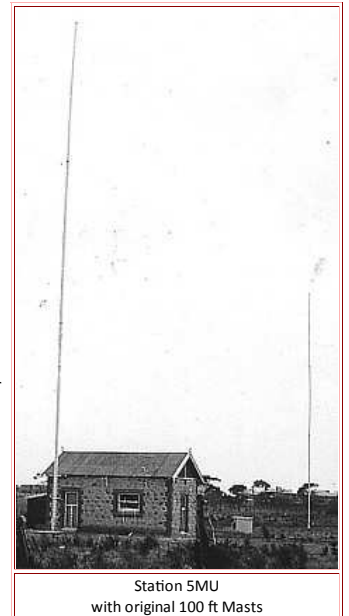
Station 5MU went on the air in Murray Bridge on September 1934 with a 50 watt transmitter built by Frank Miller. The station was erected on the corner of Eleanor Terrace and Thomas Street and owned by a Company formed by Frank and H.W.Smith. The small building had two rooms, one which housed the transmitter and the other which formed a studio. At that time, Murray Bridge power supply was DC and a small attachment at the rear of the building housed a motor/alternator set to provide AC for the transmitter.

The antenna system was erected with the help of a number of local volunteers. The flat top T antenna was supported by two 30 metre wooden masts. In October 1949, the original antenna and earth mats were replaced with a 50 metre guyed vertical tubular mast and supporting earth mat.

Sufficient business from local programme support was not adequate and the station was purchased by the Advertiser to become a relay station from 5AD. Frank Miller remained in charge of 5MU until he retired in 1953. Under the ownership of the Advertiser, the 5MU staff, led by Frank, added a linear amplifier to the transmitter which advanced the output power to 200 watts. This was upgraded further to 500 watts in 1954. To make room for the transmitter extensions, the partition between the previous transmitter room and the studio was removed so that the building proper became all transmitter room.

An STC Type 4-SU-55 was installed in December 1965 with 2000 watts approved for use in the day and 1000 watts approved for use at night..

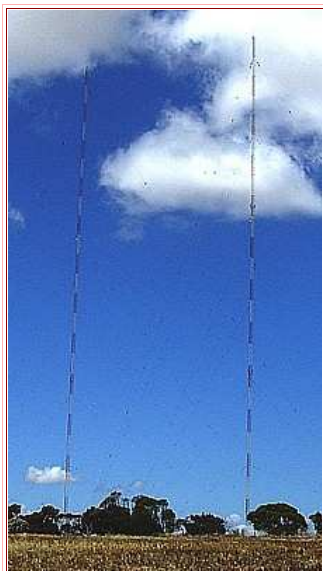
The radio background of Frank Miller (VK5BF) in Murray Bridge is quite legendary and he helped many others interested in getting into radio. I spent many hours in technical discussion with Frank and Bob Grundy (VK5BG) and I believe this helped me pass the Broadcast Station Operators Certificate at the age of 16 years. The Radio Branch of the PMG wouldn't issue the actual certificate before age 18, but in my case, they granted an interim permit for me to accept employment as a Broadcast Operator at age 17. So in 1941 I commenced employment with the Advertiser Network taking a shift at 5MU, and also spent a few months at 5SE Mt. Gambier.



Station 5MU
with original 100 ft Masts

In 1941, the war was in progress and the station staff at 5MU had some special instructions. We had an axe, a bottle of acid and concealed under the station control desk, a calibre 0.25 inch automatic pistol. In the event of the enemy taking over control of the transmitter, the axe was to destroy the final amplifier stage and the acid was to pour over the motor-alternator windings. It was never quite clear on what one would do with the gun. I have to assume that other stations would have had similar security instructions.

Frank Miller was one of the experimental broadcasters as early as 1924. Much more on the radio background of Frank Miller, including his amateur radio activity, can be found in reference 2



Station 5MU masts at Gifford Hill

The ownership of 5MU was transferred to the Murray Bridge Broadcasting Company in January 1974 and in May 1975, broadcasting commenced from a new studio in Seventh St. Murray Bridge. The present address of Radio 5MU is now 9 First St., Murray Bridge. The present owner of 5MU is Grant Broadcasters Ltd.

Today 5MU transmitter is located at Gifford Hill, 6 Km South West of Murray Bridge. It operates with a power of 5 kW at a frequency of 1125 kHz, somewhat lower than its earlier frequency of 1460 kHz. I believe this was changed to improve the ground wave coverage at distance. (The lower the MF frequency, the lower the ground wave attenuation). Quite an impressive array of towers on Gifford Hill can now be viewed from the Princess Highway when travelling close to Murray Bridge.

With 5 kW of carrier power, 5MU is the most powerful regional commercial station in the State. Quite an upgrading from the 50 watts it commenced with in 1934.

Station 5SE at Mt. Gambier was opened in July 1937. It was built in Arthur St., part way up the slopes of the extinct volcano which contains the Blue Lake. The building had quite a large studio and an equipment and control room housing the 100 watt transmitter. This was built and installed by 5AD staff under the supervision of H.B.Wilson. The studio was provided to initiate programmes from Mt Gambier. However, by the time I was sent to work at 5SE in 1941, the station had become a straight relay station from 5AD, as was 5MU. Like Murray Bridge, Mt. Gambier had DC power mains and similar to 5MU, the station power was supplied via motor/alternator sets.

The transmitter frequency was originally 1340 kHz but this was changed to 1370 kHz in 1938. The power of the original transmitter was advanced to 200 watts in September 1940. The 200 watt unit was replaced in September 1940 by a 500 watt transmitter built by 5SE staff and the original unit was then used as a standby facility.

Two wooden masts, 38 metres high, supported an inverted L antenna, 3/8th wavelength long. This was replaced by a self supporting 58 metre tower in December 1958.

The first Officer-in-Charge, after the initial installation, was Tom Welling who remained in the position until he died in October 1960. Colin Ferguson VK5CJ then took charge.

A 2000 watt STC transmitter type 4-SU-112A replaced the 500 watt unit in November 1972 at the new location of Compton, seven kilometres south west of Mt. Gambier. A 1000 watt standby unit, built by 5AD staff, was also provided. New studios were opened in Commercial Street, Mt. Gambier in October 1976.

The frequencies of the broadcast stations were closely monitored by the PMG Radio Branch at Somerton. A shift of 50 hertz from the approved frequency was considered outside the approved licence

specification. The PMG actually policed operation to be within 10 hertz and if they detected a shift more than that, the station received a telephone call. One night at 5SE, I received such a call.

I must explain that both 5SE and 5MU had the station frequency control crystal mounted in a temperature stabilised oven. Connected across the crystal, but outside of the oven, was a small variable capacitor which could be used to alter the frequency a little in the event of the frequency deviating from that approved. So I altered the capacitor setting a little as I needed to do. The unexpected happened. The crystal oscillator stage just stopped oscillating and the transmitter went off the air. To a commercial broadcaster, loss of air time is loss of advertising time and loss of money. Within minutes, while I am scratching my head wondering what I am going to do about this, Tom Welling (the boss) burst through the door. (Tom lived just up the road from the station and he had been listening to 5SE). He had experienced this trouble before and altered the capacitor back until oscillation was restored. I don't know whether he ever had the oscillator stage fixed, but for the time being, we just tolerated a few hertz shift.

Station 5SE now runs at a power of 5000 watts. The original frequency of 5SE was 1296 kHz but they now operate further down the MF band on 963 kHz. This was probably changed to obtain an advantage of lower ground wave attenuation. 5SE is now licensed under the ownership of South East Broadcasters Pty Ltd.

5DN & 5RM

Station 5DN is recognised as being the first commercial station in South Australia (SA) to carry out broadcasting. E.J.Hume initially applied for an experimental broadcasting licence in 1923. He purchased private transmitting equipment from amateur experimenter Lance Jones who had built the transmitter with a final stage input power of 35 watts. Test transmissions commenced in June 1924 from a building in Montpellier Street, Parkside with audio fed by landline from the Music Room in the Hume household. A Class B station licence was granted in December 1924 and commercial broadcasting, including charge for advertising, was born in SA.

In 1926, 5DN Propriety limited was registered as a company whose shareholders included E.J.Hume, Lance Jones and others. The company took over the 5DN licence in 1929 when it expired after 5 years. In 1930 Hume Broadcasters Limited was formed.

In August 1926 the station occupied new premises in the Paringa Building, Hindley Street, Adelaide. Rooms equipped included a studio and control room. Upgraded equipment increased the input power to 240 watts with the original 35 watt unit provided as a standby.

For economic reasons, the station moved back to Parkside and stayed there until 1932 when Saverys' Pianos Ltd acquired an interest in the company. The station moved to Rundle Street with an increase of carrier power to 300 watts. The station frequency was altered a little over time. In 1933 it was recorded as 960 kHz. In the 1940s it was 970 kHz and by the 1980s it had changed to 972 kHz.

Around 1936, a move was made to 12th floor of the new CML building in King William Street. A transmitter, originally used at 2GB Sydney, was purchased and installed. This transmitter, with a water cooled final linear amplifier, provided for an increase in output power to 500 watts. The transmitter was replaced by a locally built 500 watt transmitter with air cooled final amplifier in 1948. The studios in the CML building were shifted to Tynte Street, North Adelaide in December 1956. (The CML building was refurbished and opened as the 170 room Mayfair Hotel in 2015.)

In May 1952, the 5DN transmitting facilities were transferred to Dry Creek, north of the city, and transmitter power was increased to 2000 watts. A new 2000 watt transmitter was installed at Dry Creek in 1974. In May 1976, the transmitters were transferred to another northern site at South Terrace, Wingfield.

Station 5DN moved to FM as Radio 102FM on the FM band in 1990 and 5DN AM ceased to exist. The previous 5DN frequency allocation (972 kHz) is now used by ABC News Radio 5PB.

Station 5RM was built on the raised banks of the River Murray near Spring Cart Gully between Renmark and Berri. It commenced transmission on 850 kHz in September 1935. It was registered as the River Murray Broadcasters Ltd with interests from the fruit growing area and certain Adelaide interests. (At that time there were clearly interests from the owners of 5DN). The station building on the high cliffs of the Murray River housed separate rooms for the transmitter, a local studio, a machine room, and housing for the engineer in charge. Programmes were initially generated from the local studio plus relays from 5DN. The antenna was suspended between two wooden masts 41 metres high. The original antenna was a flat top Marconi type, later modified to a single wire T type.

The transmitter, built by Ern Hume, was a low level modulation type with a following water cooled linear amplifier stage, which delivered 1000 watts to the antenna.

In May 1939, the existing transmitter was modified to increase the power to 2000 watts. A new 2000 watt Philips transmitter was introduced in November 1952 and a 200 watt AWA transmitter was provided for a standby unit.

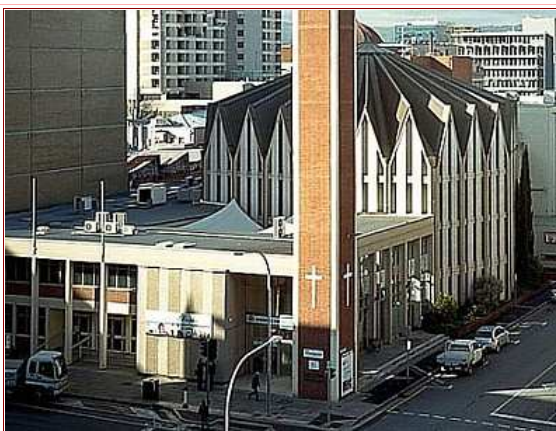
The arrangement to take relayed programmes from 5DN expired in November 1952 after which programmes were taken from 5KA. Studios for 5RM were erected at Vaughan Terrace in Berri in 1965 to provide local programmes.

New transmitting facilities were set up in July 1976 at a location around 2 kilometres north of the previous site. This housed the 2000 watt Philips transmitter, a 2500 watt STC unit and a diesel generating set to maintain power in the event of mains power failure. The radiating antenna was a top loaded lattice steel mast.

The station now operates on 801 kHz and still runs a power of 2000 watts. In later years, but prior to 2013, the station became part of the Fairfax Media. In 2013, it changed ownership to Grant Broadcasters Ltd.

A second transmission, from the same location, is High Power Open Narrowcast (HPON) labelled as Wild Country. This transmits 500 watts of power at 1557 kHz.

5KA & 5AU



Mauhan Church, Franklin Street, Adelaide was the home of 5KA in the 1940's (The grand building was demolished in 2016)

Station 5KA was originally set up by a company called the Sport Radio Broadcasting Company Ltd. It was first opened at Kintore Avenue, Prospect in March 1927 with a carrier power of 300 watts at a frequency of 1197 kHz. Around May 1928, the station moved to the corner of Flinders Street and Divett Place in Adelaide city and in January 1941, again moved to Richards Building, Currie Street, Adelaide. At the last venue, the transmitted power was increased to 500 watts by the installation of a transmitter constructed by the station staff. The antenna used was a flat top type with horizontal spreaders and fed with a feed line at one end. The antenna and was supported by two wooden masts. Roy Buckenfield VKSDA was originally in charge of the technical operations. Roy was one of the early amateur experimenters who broadcasted experimental programmes on the MF band.

In January 1941, station 5KA and its relay station 5AU at Port Augusta, was closed at the orders of the Federal Government. The war was in progress and there were security reasons why this took place.

The station was re-opened in December 1943 by a new ownership and administration in the Central Methodist Mission building in Franklin Street. The transmitter previously located in Richards Building was used feeding a wire strung from the church steeple. The following year, the steel tower discussed previously, was brought into service. Studio services were provided for both 5KA and remote station 5AU within the building.

In May 1954, the transmitting services were upgraded by the installation of a 2000 watt transmitter in a building at Cavan Road, Gepps Cross and using the 86 metre vertical tower shared with station 5AD.

In 1974, a pair of STC 5/2.5 kW transmitters were purchased for 5KA & 5AU. The 5kW transmitter was factory modified to operate at 2.5 kW by rewiring the primary connections to the main transformer from 415 Volt "delta" to 240 Volt Y or "star". Station 5KA moved to VHF FM in 1990. The AM frequency 1197 kHz was taken over by Adelaide Community Station 5RPH and apparently the 5KA STC transmitter was last used in the early 1990s as a stand-by at 5RPH. By 2000, all transmitters were closed down at the Cavern site.



This STC transmitter was one of the pair purchased in 1974 for 5KA & 5AU.



Transmitter Building 5AD & 5KA at the Cavan
Photo courtesy of Craig Marich - Chief Engineer

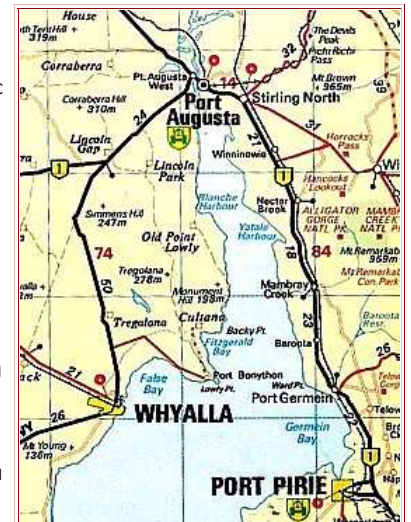
Station 5AU was established by the Port Augusta Broadcasting Co Ltd, a private company. Situated in a large building on a hill near the local hospital, the station was made up of a number of rooms housing studios and a 200 watt AWA transmitter (later increased to 500 watts). There was also a 150W standby transmitter built by the technicians of the day. The power supply at that time in Port Augusta was a three wire 440DC system and the transmitter was powered by a 440vDC to 230vAC Motor-Alternator set.

The antenna was a guyed 58 metre vertical mast, insulated at its base, and constructed of bore casing, 15 cm at its base and 10cm at its top. The station was connected by landline to 5KA to relay programmes additional to those initiated from its own studios. The station operated on 1450 kHz.

The station was opened in May 1938 and operated until it was closed in January 1941, coincident with the closing of 5KA. The station was re-opened again in December 1943.

A new transmitter station was established in 1961 at Nectar Brook, 29 Km south of Port Augusta, with a new 2000 watt STC transmitter. The original AWA 500 watt transmitter from Port Augusta became the standby unit. The transmitters were remotely switched by a simple remote module supplied by STC which operated on a caihlo (i.e center tapped) circuit on the incoming programme line. The station had an antenna system supported by two 50 metre lattice steel masts, The masts were separated at a distance apart such that their individual fields were phased to provide a vertically polarised beam aimed at the Whyalla area. Modern studios were opened at Port Augusta in December 1968 and Whyalla studios were rebuilt and commissioned in July 1972.

To improve coverage, particularly into the Whyalla area, the transmitter station was relocated in 1976 to Mambray Creek, 47 Km south of Port Augusta. The transmitters were the STC transmitter from Nectar Brook (operating at 2.5 kW) plus a new 2.5 Kw unit. The transmitters operated in an automatic main/standby mode. The frequency was changed from the original 1450 kHz to the lower 1240 kHz (and later 1242 kHz) to improve ground wave coverage. Two 92 metre lattice steel masts supported the antenna which were appropriately separated to provide the vertically polarised beam, similar to that achieved for Nectar Brook, and aimed at Whyalla.



Locations of 5AU at Pt. Augusta, Nectar Brook, & Mambray Creek with coverage to Whyalla

In later years, but prior to 2013, the network of 5AU, 5CS at Crystal Brook, 5RM in Riverland, and 5CC at Port Lincoln was owned by Fairfax Media. In 2013, these stations were sold to Grant Broadcasters Ltd, whose ownership already included 5MU at Murray Bridge.

Commercial Stations which commenced later

Commercial station 5AA commenced in March 1976, initially on 1386 kHz with a later change to 1395 kHz. Two 2750 kW transmitters were installed at the Bolivar with outputs in parallel to provide 5000 watts to a directional antenna supported by two 59 metre masts. The site is now listed as being at Burton Road, Paralowie which is adjacent to the Bolivar.

In the 1980s, 5AA was sold to the State Government for the Totaliser Agency Board (TAB) racing transmissions. The initial studio was at the TAB headquarters in Pulteney Street but moved to Hindmarsh Square in 2004.

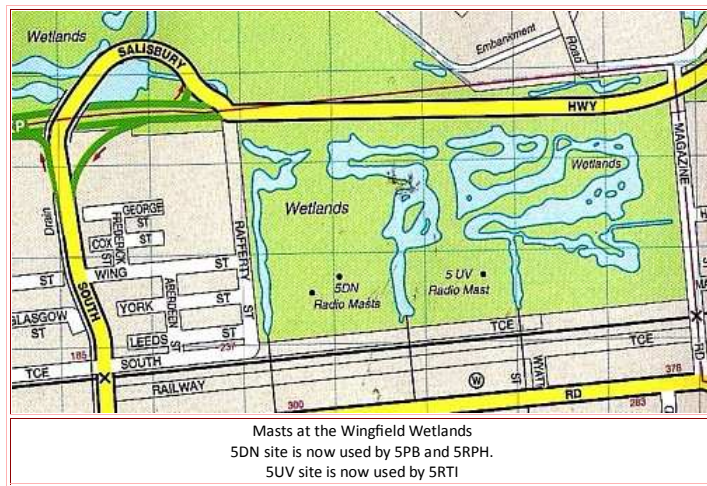
The Government sold the station in 1996 and it separated from the TAB. It is now owned by DMG Radio and operates in the name of Festival City Broadcasters Pty Ltd. Its operation includes that of a talkback station.

Station 5UV on 1630 kHz was set up for the University of Adelaide to provide tertiary assistance. It initially started in June 1972 as VL5UV and became 5UV in February 1975 on a frequency of 530 kHz. It operated using a 300 watt transmitter at Dry Creek with the studio within the University grounds. More recent records show 5UV transmitter site at South Terrace, Wingfield. Broadcast of 5UV changed to VHF-FM in year 2001.

Station 5RPH on 1197 kHz commenced in March 1991 as a Community radio operated by volunteer staff. It provides a radio reading and information service to those unable to access daily printed material. Its studios in Morphett Street, Adelaide feed a 2000 watt transmitter at South Terrace, Wingfield, the same location as ABC news station 5PB (and the previous 5DN site).

In November 2002, the old frequency region of 5UV at 531 kHz was auctioned and won by Radio Television Italiana for use as a Narrowcast service with a licence as call sign 5RTI and a power of 500 watts. The transmitter is now located at another South Terrace, Wingfield site.

There is also regional AM station at Port Lincoln 5CC, operating on 765 kHz with a power of 5 kW. The AM broadcasting service commenced in December 1985. Prior to 2013, the station was owned by Fairfax Media but is one of the four regional stations sold to Grant Broadcasters Ltd in 2013. An FM broadcasting service was added later at Port Lincoln in December 1999.



Further Stations added

This article was originally prepared in 2013 and published in the March 2014 issue of OTN. In reviewing the contents in March 2015, a number of additional South Australian stations have been recorded. The frequency band approved in Australia for public broadcasting is 526.5 to 1606.5 kHz. Some of these additional stations operate narrowcast in a region above 1606.5 kHz.

Totaliser Agency Board (TAB) station **5TAB on 1539 kHz** is located on Burton Road Paralowie as is 5AA. The new licence on 1539 kHz for TAB was issued in 1994 replacing the TAB operation previously on 5AA (1395 kHz). With a directional pattern antenna, it runs an equivalent radiated power of 5 kW and is classified as a High Power Narrowcasting service (HPON).

Vision Radio Network located at Salisbury East runs a station on **1611 kHz**. Vision Radio is a large Christian Radio network of country FM stations in South Australia and interstate.

RET Italian operates on 1629 kHz from Regency Park with a power of 400 watts. It was launched in March 2014, operated by the Niche Radio Network, and broadcasts in Italian and other languages. Niche Network also operates a 50 watt station on 1629 kHz at Mt Gambier.

2ME Radio in Arabic language operates a Narrowcast broadcast on **1647 kHz** with a power of 400 watts. Its operators are Heart N Soul Productions. It is located on Magill Road, St Morris, Adelaide.

The Early Amateur Experimental Broadcasters

Whilst the article essentially deals with the history of licenced AM Broadcast Stations, it is of interest to include reference to the amateur experimental broadcasters operating in the 1920's and 1930's. Much of the development of the established licenced broadcast networks led from the early activity of those amateur broadcasters. Experimental licences for transmitting purposes were issued from around 1922 and this included the Broadcast band. However from 1927, broadcasting by amateur experimenters on the broadcast band was restricted to hours outside of those used by the licenced broadcast stations, essentially Sunday mornings and late at night. All amateur radio activity was stopped in 1939 at the start of World War 2. Whilst amateur radio activity was restarted after the war, the permission for experimental broadcasting was never restored. In the John F Ross book (Reference 1), he discusses the activities of 28 those early experimental broadcasters in South Australia, and the equipment they used.

Summary

Official broadcasting on the Medium Frequency Broadcast Band, using amplitude modulation, commenced in the 1920's. One might have thought that the wider frequency response achievable using frequency modulation on the VHF band would have caused a gradual phase out of AM broadcasting over the years which followed. But at VHF, transmission range is limited to virtually line of site, whereas strong reception is achievable via the ground wave at hundreds of kilometres using medium frequencies. Probably because of this and also because of the high demand for broadcasting channels within the general frequency spectrum, MF broadcasting has lived on. One might have thought that the introduction of television for entertainment might have killed mere sound broadcasting but there is clearly a continuing requirement for entertainment and speech communication by sound only.

It is interesting that the network of National AM broadcast stations in South Australia, progressively set up over the 1920-1930 era, and the regional national stations added in the 1950's, are essentially still in place today. Within the commercial stations, there are a few alterations of frequency, call signs and changes of ownership. Where commercial AM channels have been released to move to VHF FM, the channels vacated have been picked up for use in other broadcast operations.

Of course AM broadcasting on the MF band is only part of the Australian broadcasting story. My article does not attempt to write about FM broadcasting or Television broadcasting or the more recent digital radio broadcasting. Also my article is confined to the broadcast transmitting stations rather than the studio side of the business. And of course my article is confined to broadcasting in my home State of South Australia.

Perhaps another RAOTC member will be able to add to what I have written, perhaps in their own State.

References

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- 5 Cruise 1323 (Station 5DN)
http://en.wikipedia.org/wiki/Cruise_1323
- 6 5AN 891 Adelaide
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