

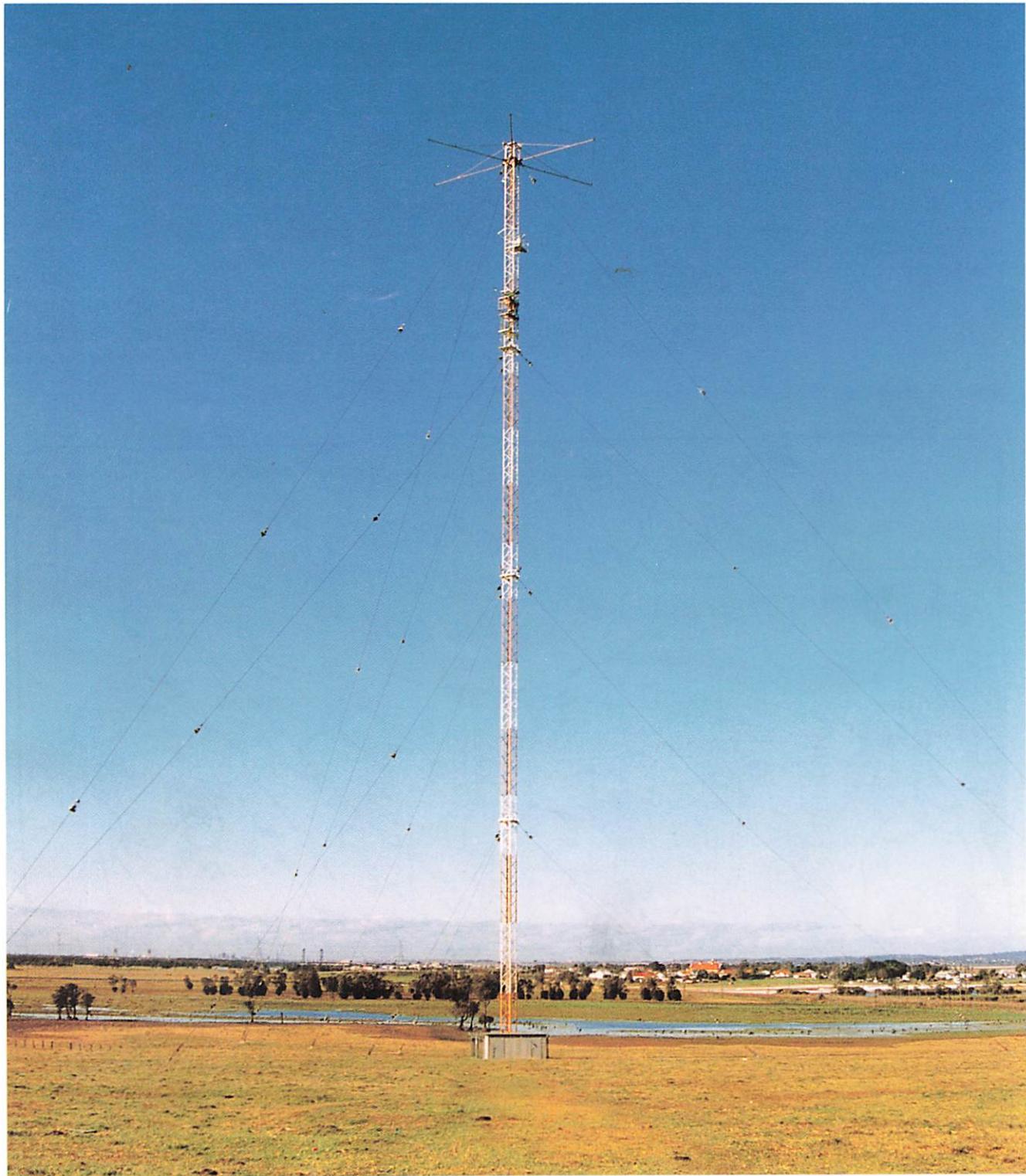
The **BROADCASTER**



Newsletter of the Broadcasting Division

No. 14

July 1989



2NC NEWCASTLE

THE BROADCASTER

The Broadcaster is the in-house newsletter of the Broadcasting Division and is published three times a year to inform and recognise the people who make up this organisation.

Articles appearing in The Broadcaster do not necessarily reflect the views of the management of Telecom Australia.

Written and photographic contributions are welcome. All material should bear the contributor's name and location and be directed to:

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EDITORIAL

This year marks a significant milestone in the field of Government funded broadcasting in Australia. It is the 60th anniversary of the operation of the National Broadcasting Service. In July 1928 the Government, following a comprehensive investigation into the whole question of broadcasting announced its intention of establishing the Service whereby one organisation would cater for national programs for all States and the Government would own and operate the technical services of eight stations known at that time as A Class stations. The stations were 4QG, 2BL, 2FC, 3LO, 3AR, 7ZL, 5CL and 6WF.

Under the plan, arrangements were made for the Postmaster General's Department to take over the A Class stations as their licences expired between July 1929 and January 1930. The Department proceeded with the modernisation of all technical equipment of the system and commenced the erection of new regional stations in provisional areas.

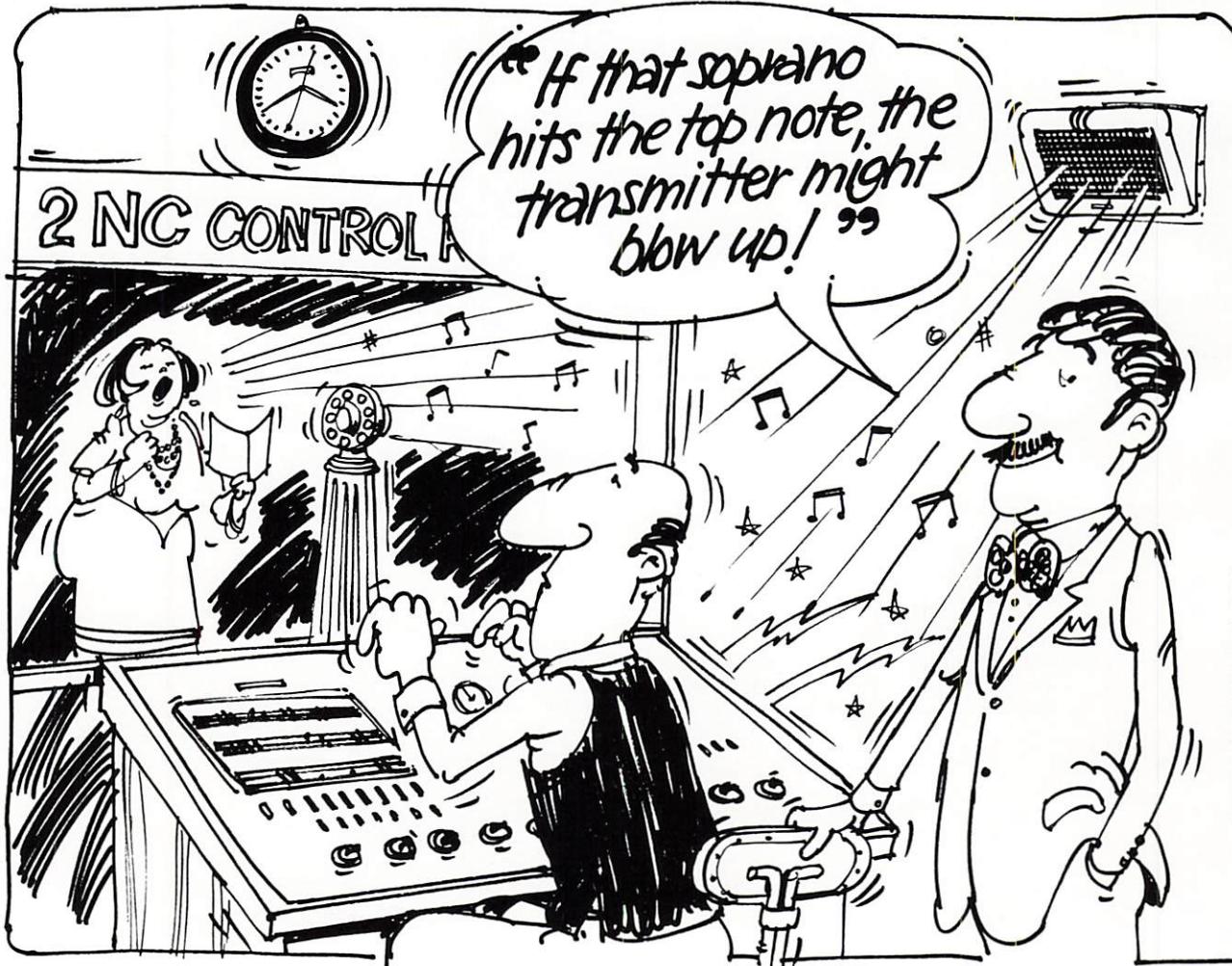
The first regional station to be opened was 2NC Newcastle in December 1930 followed by 4RK, 2CO and 5CK.

JACK ROSS

Front Cover:
Radiator 2NC Newcastle

Contributors to this issue:

Leon Sebire, Harry Desouza, David Naismith, Leo Moloney, Doug Sanderson, Ron Johnson, Col Steel, Terry Golden, Jack Saunderson, Brian Hall, Terry Said, Graham Shaw, Ron Gabelish, Alistair Gellatly, Ross Kearney and Jack Ross.





Leon Sebire

STATION ROLL CALL

ABT 2 HOBART

Situated on Mt Wellington, 1270 metres above sea level, the view from ABT2 is probably unsurpassed in Australia. Virtually the whole of Hobart can be seen, straddling the River Derwent and its magnificent harbour and the horizon extends to and beyond the east coast, bounded by the Tasman Sea.

The station itself uses a pair of AWA/Marconi 10kW colour transmitters feeding a standard four sided panel array on a 100 metre self supporting tower. The tower also carries SBS-TV and ABC-FM antennas and the whole antenna section is enclosed in two cylindrical fibreglass radome sections of 7.6 and 2 metres diameter.

The National television transmitter was commissioned in June 1960 while the SBS transmitter went to air in March 1986.

The 7ABC-FM transmitter began operation on a frequency of 93.9 MHz in August 1980 with an e.r.p. of 27000 watts using an omnidirectional antenna.

Two 150 kVA diesel alternators supply emergency power and building heating is effected by circulating electrically heated water through judiciously placed convection heaters.

Staff at the site also perform the State MIC function and are on duty seven days a week for the nominal hours 0730 - 2300. Because it is considered too hazardous to journey down the mountain at night, particularly during winter, staff remain at the station overnight, using sleeping quarters provided and are relieved the following afternoon.

A Swiss made Rolba snow plough is garaged just below the main snow line and it facilitates all year round access to the station, even though snow drifts up to six metres deep can occur over some sections of the road. Before provision of the plough staff had to trudge through a kilometre or so of snow.

BRIAN HALL

FROM THE DIRECTORS DESK

Although Australia has a generally pleasant climate, our North occasionally suffers the ravages of cyclones which move in from the Pacific and Indian Oceans. Earlier this year we had several cyclones, two of them of significant magnitude and causing widespread damage. Broadcasting transmitting stations can be very vulnerable and no amount of conservatism in design will prevent damage from the really 'big blows' encountered.

Cyclone Aivu developed in the Coral Sea and swept into Queensland just south of Townsville, the centre passing very close to our station at Brandon which radiates the 50 kilowatt MF service 4QN from a 198 metre sectionalised and capacity top loaded mast. Only recently short-wave broadcasting facilities providing a service to Papua New Guinea had been established on the same site. Despite the enormous winds, widespread flooding and dislocation of electricity mains, the 4QN service hardly missed a beat. A log-periodic short-wave aerial on site suffered considerable damage and has since required refurbishing.

Later when Cyclone Orson entered the Pilbara Region of WA from the Indian Ocean, we lost services at Karratha, Panawonica, Roebourne and Dampier. All were restored quickly with the exception of the MF station 6PN Panawonica which lost its mast in the storm.

Cleaning up after a cyclone is not a pleasant job and I am always amazed at how enthusiastically and rapidly our people leap into it. Our staff took considerable risks and endured great personal discomfort in getting to the cyclone stricken sites to rectify damage and I thank them sincerely for their efforts. Of course, one of the great bonuses from the recent unstaffing of remote stations is that our people no longer have to ride out a cyclone in isolated stations often marooned from civilisation. Hopefully, this time those in the districts concerned were able to give support to their families in what must have been a very harrowing experience.

LEON D. SEBIRE

BRIAN HALL

The Broadcaster, July 1989 - 3

7QN QUEENSTOWN

Station 7QN serves the copper mining and tourist town of Queenstown in Western Tasmania.

The town which has a population of less than 4,000 exists, despite its remote location, because of the rich copper deposits of Mt. Lyell. Copper deposits were discovered in 1886 and to overcome the isolation problem, a railway line was constructed to Strahan. Part of the route is quite steep and a railway of three rails was constructed to give greater control of heavy loads. Nearby Lake Margaret which has the heaviest rainfall in Tasmania, is the site of a hydro-electric power station.

Queenstown has a unique beauty or character in that it is surrounded by mountains denuded of topsoil and vegetation. This man-made condition resulted from the extensive use in early years of wood fired furnaces for smelting and further poisoning of vegetation by sulphurous fumes emitted by the mine works.

The station was commissioned in September 1954 using one of a pair of 200 watt Philips transmitters which were later converted to parallel operation. In 1983 these were replaced by a 500 watt solid state Harris unit.

Until recently, 7QN was the only source of national sound broadcasting on the Tasmanian west coast and complaints about its restricted service area were plentiful. In 1987 four 500 watt FM transmitters, utilising the same programs as 7QN, were installed at existing TV translator sites. These enable the 7QN program to be satisfactorily received over an area extending from the Bass Strait towns on the far north of west coast to south of Queenstown, provided listeners have receivers with AM or FM capability. All four FM transmitters utilise re-broadcast receivers as the program source.

The 7QN transmitter operates on a frequency of 630 kHz and feeds a 53m high omnidirectional radiator.

NEWS ROUND UP

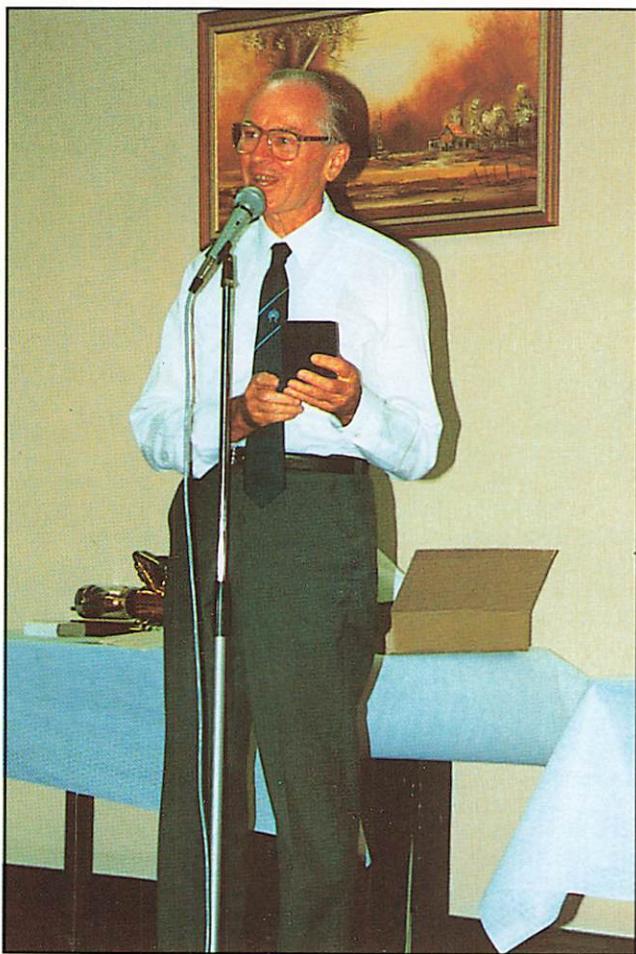
RETIREMENT DOUG SANDERSON

As briefly mentioned in the March issue of The Broadcaster, Doug Sanderson, Senior Engineer, Queensland, retired on 7/2/89 after 48 years service with the Postmaster General's Department and Telecom.

Doug joined the Department as a Trainee in January 1941 and progressively advanced through the ranks of technician, Supervising Technician, Trainee Engineer and Engineer. Almost the whole of his service was associated with radio engineering in the radiocommunications and broadcasting areas.

Before his appointment as Engineer in 1960, Doug had worked as an acting Engineer for about 8 years. He was actively involved in the selection of broadcast transmitting sites throughout Queensland and Papua New Guinea as well as on the selection of sites for the SEACOM microwave system which facilitated the introduction of National television in North Queensland. It is doubtful if there is a part of Queensland he has not visited in the course of his duties.

Doug was actively involved in community affairs and was a man of diverse interests including such fields as geology, local history, philately and numismatics. He was Queensland Coordinator for The Broadcaster and contributed many articles.



Doug has the floor.

Official presentations were made to Doug by BOM Brian Cleary standing in for SBM Allan Garner who was unable to be present. The well attended function was held in the Masonic Club in Brisbane. Many retired officers attended.

One of the items presented to Doug was a mounted water cooled transmitting tube type 3Q211E (SS1971) as employed in early STC 4QR/VLQ transmitters at Bald Hills. The mounting was beautifully carried out by Technician Greg Anderson. All the best in your retirement Doug.

LEO MOLONEY



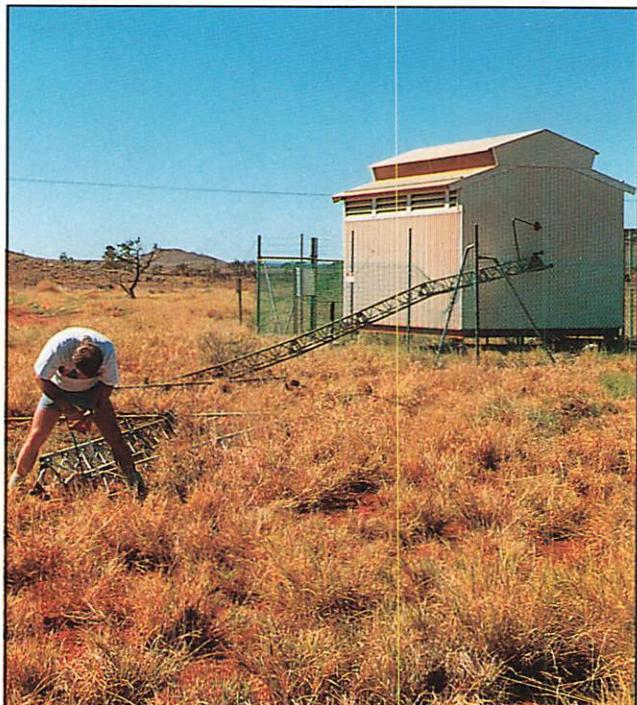
Doug with wife Shirley and the mounted tube.

CYCLONE ORSON

Cyclone Orson rated as the most powerful cyclone to hit the Australian mainland in recorded history with wind speeds exceeding 300 km/hr, demolished the 35 metre 6PN transmitting mast at Pannawonica. The station transmits on a frequency of 567 kHz with a 100 watt transmitter.

Staff effected restoration by using a temporary standby mast pending erection of a new mast to replace the one damaged. Fortunately only minor damage occurred to broadcasting equipment at nearby Karratha home of 10kW station 6KP, and Roebourne home of Radio National and ABC and commercial television services.

RON GABELISH



6PN damaged mast.

GOLD COAST RADIO

The Gold Coast area had been served by AM station 4SO for 33 years when the service ceased on 3/1/89 to be replaced by an FM service with the transmitter located at Lower Beechmont. The FM service had actually commenced on 12th December last year using 4SO program emanating from the ABC Brisbane Studios.

On 15th February the ABC opened a new studio at Mermaid Beach specifically for this FM service with a direct link to the transmitter site.

The new transmitter became the 350th to carry programs provided by the ABC and the occasion called for a special broadcast. The official opening included a five minute broadcast carried by all transmitters in the network including Radio Australia. As a result the remarks by Communications Minister, Ralph Willis, ABC Chairman, Bob Somervaille and ABC Managing Director, David Hill, were transmitted to target areas covering almost half of the Earth's land mass.

The Gold Coast became Australia's first major city to have only FM broadcasting stations within its boundaries. All this happened within a period of three months when stations 4SEA FM, 4GGG, 4CRB FM and the ABC FM station were fully operational.

Gold Coast AM radio has now gone the way of pyjama parties and Surfers Paradise mangroves.

LEO MOLONEY

6GN RELOCATION

The 6GN Station is being relocated to a new site 15km north east of the town, with a new 70m mast, new buildings and a new 35kVA generator.

The existing 6GN site is located in the town of Geraldton adjacent to a primary school. Site security has been a problem with school children breaking down fences and gaining access to the site. Additionally, the tower, transmitters and emergency power plant are all in need of replacement.

The old site has two 2kW transmitters in main/standby configuration, however, the new site will have a transmitter power of 10kW to maintain the existing signal strength in the town. To achieve this, two 5kW STC transmitters which have been in Victorian Stores for 12 years will be operated in parallel. These transmitters were written down for this job but they have proven more costly than anticipated because of the need to replace the PCB capacitors, to retune the transmitters to the required frequency, and to provide additional screening to reduce RF radiation.

Erection of the radiator and installation of the transmitters are proceeding to plan and the new station is expected to be commissioned about the end of August.

ALASTAIR GELLATLY

AND IT RAINED ... AND RAINED...

During the early months of 1989 unusually heavy and persistent downfalls of rain resulted in serious floods and record-breaking falls in many areas of Australia.

One of these areas was in the NSW Northern Rivers region at Mt. Nardi, North-East of Nimbin. Brian Robb, officer in charge of the ABC T.V. transmitter tower on the mountain, reports that in 48 hours at least 270mm had fallen. That's 10.6 inches under the old scale.

It is at these times that the true mettle of the system is tested through its ability to withstand such heavy going. To the credit of all concerned, the people of Australia were able to receive, not only their usual broadcasts, but also vital flood warnings and informative video coverage direct from the centre of the affected areas.

We often take this for granted as it is always the intention of the communications industry to build and operate systems which are able to withstand all conditions.

Our technical staff all across NSW ensured the reliability of the network, sometimes travelling to transmitting stations in 4WD vehicles and living on site for a day or two in cases of isolation by flood waters.

RON JOHNSON

CYCLONE AIVU

On April 4th cyclone Aivu crossed the north Queensland coast about 11 o'clock in the vicinity of Ayr. Although not the most violent cyclone of recent years, wind velocities of 210km per hr and torrential rain caused tremendous damage in the Ayr-Home Hill area.

The north Queensland Regional 50 kW transmitter 4QN at Brandon, about 10km north of Ayr, was almost directly in Aivu's path. Although operating as an unstaffed station, the service continued with only minor interruptions, albeit with reduced power.

Originally opened at Cleveden, just south of Townsville, in 1936, 4QN had an interesting history and a cyclone was just the latest occurrence. The station was under armed guard during World War 2, relocated to Brandon in 1959 after a disastrous fire destroyed the main transmitter and had survived the dramatic partial collapse of the main radiator in 1963. High winds associated with Aivu caused widespread disruption to power lines in the district and commercial power to the site was lost about 10.15 a.m. Transmission continued using



Log periodic antenna being re-erected following repair.

the 10 kW standby transmitter into the main radiator and the station emergency alternator until Sunday April 9th when commercial power was restored. Although wind-driven vibration caused many broken strands in bonding wires and most of the paint was removed from the main radiator, there was no significant damage to the external plant.

An expansion of facilities to provide a Radio Australia HF service to Papua New Guinea and the Pacific Islands was in progress and test transmissions were being made using a recently installed Log Periodic antenna. The 26 metre long low frequency dipole was severely damaged with consequent damage to feeders.

Technician Viv Wright, who was on leave in Brandon, and Broadcasting line staff, Vic Gulliver, Ken Heap and Ian Tyers, who had been working in the area were quickly on the scene to assess damage and commence repairs. Final repair of the Log Periodic was completed in time to allow commencement of the scheduled service on May 2nd.

Minor damage to a grid-pack antenna at nearby Inkerman repeater resulted in slightly impaired service to Spore Castle (Bowen) T.V. but otherwise only minor interruptions to service occurred in the area.

Nevertheless, Aivu caused tremendous damage in the district which was promptly declared as a disaster area. Press photos and TV News coverage of overturned aircraft on Brandon aerodrome, an almost demolished century old church in Brandon and major damage to premises in Ayr, Home Hill and adjacent areas graphically illustrated the devastating power of this tropical cyclone.

LEO MOLONEY

BROADCASTING DISTRICT

NORTH-WESTERN AUSTRALIA

The North District was formed in March 1985 and is one of the major districts in Western Australia with some 33 sites comprising 23 commercial and 61 national services. The services maintained comprise TV, FM & AM radio of various powers ranging from 2 watts to 10 kilowatts. Some of our commercial customers are Golden West Network, various mining companies and local Shires.

The boundaries of the district are indicated on the map and encompass most of the State above the tropic of Capricorn in addition to stations around Meekathara and Mt Magnet in the southern Gascoyne region.

A staff of seven is based in the Perth Depot. The sites are accessed via commercial airlines and fourwheel drive vehicle.

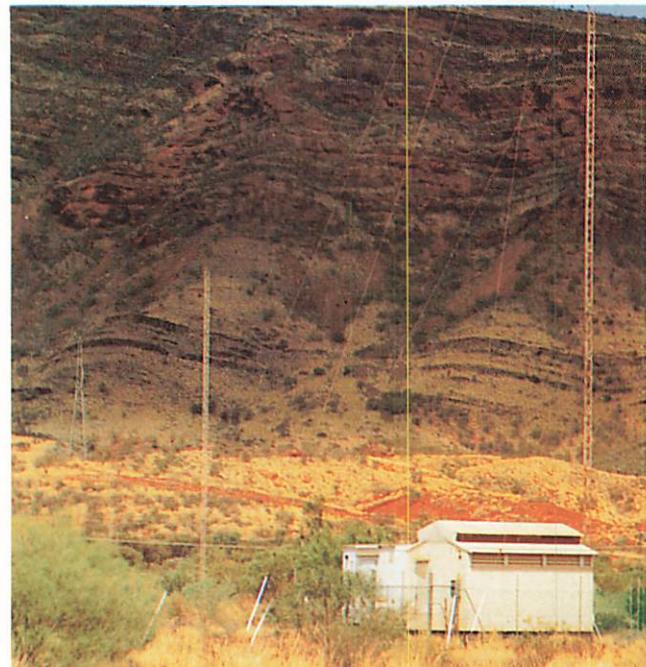
The closest site Yalgoo is some 450km away and the most remote, Wyndham, is 2200km.



District North staff L to R. Back row: Les Meyers, Dan Rossandigh, Ken Driebergs, Ross Kearney.
Front row: Tim Argus, Jim McGregham, Marty Langdon.



WA North Broadcasting District map.



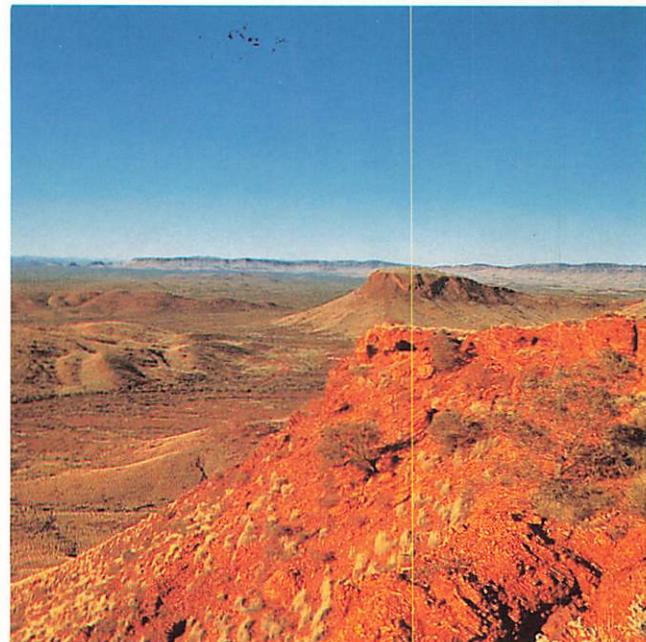
Paraburdoo broadcast site.

Harsh climatic conditions and isolation are the norm in the "North West". Marble Bar in the Pilbara region is best known as the hottest town in Australia.

In addition to towns and settlements made famous because of the giant iron ore deposits in the area there are others also well known but for other reasons. For example there is Broome on Roebuck Bay established by pearlers as early as 1883 and now Australia's major centre for the cultured pearl industry; there is Argyle and its diamond mining industry, being one of the largest volume producers in the world and many other noteworthy places.

Most of the populated areas are subject to cyclonic disturbance with strong winds, heavy rains and high humidity during the wet season from November to April. Tourists are attracted north during the dry May - April with weather conditions ideal with warm days of 30°C and clear skies.

ROSS KEARNEY



Typical landscape of the area.

OUR BROADCASTING PIONEERS

MR. J. R. (JIM) HUTCHISON

Jim Hutchison retired from the position of Director, Posts and Telegraphs New South Wales in 1964, having spent his working life in the Postmaster General's Department.

Jim died in July 1987 but fortunately his memories of his work in the Department have been recorded in a Historical Monograph of the NSW Division of the Telecommunications Society of Australia. We are indebted to the Society for permission to use excerpts from the Monograph.

The following is an edited version of Jim's comments with emphasis on his role in the broadcasting service:

"I started in the Post Office in 1918 as a telegraph messenger. The examination was advertised in the usual daily newspapers and it cost you five 'bob' which you had returned if you passed. I passed and was appointed a telegraph messenger at the GPO telegraph despatch room.

My job for a couple of years was taking out the battery that



Jim Hutchison.

worked telegraph sounders. Every racecourse had a Telegraph Operating Room with 15-20 operators.

Later, I sat for an examination for appointment as Junior Mechanic in training. I commenced training after appointment and on graduation became a mechanic at Burwood Exchange.

I commenced further study in my own time and was subsequently successful in obtaining a Cadetship.

The Depression hit and I was reclassified as a clerk. However, in 1929 I obtained a Free Place at the university and graduated in 1933.

After graduation I worked with the Radio Research Board. There is not much to say about my time with the Radio Research Board except that the big argument of the day was whether the broadcasting network that was about to be set up in Australia should be long wave or medium wave.

Fisk and company of AWA, fought very hard for long wave, probably because they had the long wave technology in place. This would have given them a lead and a commercial advantage. But the decision was made by Post Office people like Sid Witt, at Research Laboratories, and Sir Harry Brown, to have

the medium frequency broadcasting system adopted, and I think as events have occurred, they were right.

On the suggestion of Sid Witt I joined the Research Laboratories in Melbourne.

At that time Research was an interesting place to be at. Sid Witt was a fascinating character who put together a team of graduates who were all first class with men like Bruce Mair, and Alex McKenzie. Alex particularly: he invented the armature top for broadcasting aerials.

In 1938 I went to Brisbane as Divisional Engineer Radio and Broadcasting.

It so happened that soon after I got to Brisbane much of the work we were doing was with the Army and the Navy HF Direction Finding, communication stations, and of course the National Broadcasting Service.

I hadn't had much experience with transmitters and my first task there was to line up the transmission line of the Dalby 4QS transmitter to the mast. I felt a bit uneasy about it as I had never done it before, so I studied the maths of the thing and did it from first principles.

In 1942 I transferred to Sydney as Asst Supervising Engineer in the Radio and Telegraphs Division.

I don't remember too much about that period except that there was continual fighting between our technical staff and the ABC. I used to spend a lot of my time at night going around the studio seeing what was going wrong. Finally we got it pretty right.

I remember the cutover of one of the 2NC Newcastle studios. Harry Weir was there as Supervising Engineer controlling me, and Strick Gleed was there as Superintending Engineer. Charles Moses and Huc Finlay were representing the ABC. We were approaching the moment of cutover when the damned switch has to be thrown to put the station on the air. Harry Weir says he will not open the station and Strick Gleed is backing him up and going red in the face talking to Moses, and Moses is arguing with him.

I am the one who must get the station on the air and as the moment approaches I'm told not to cut it over. I am in the position of having to make decision and so I said to the Technician: "Forget them! Pull the damned switch on time and that is it."

The worst job I had in this period was the introduction of broadcasting of the national parliament; easily my worst job and it bloody near killed me.

Ben Chifley was the Prime Minister and he decided that Parliament proceedings ought to be broadcast, and the Department was asked to complete the arrangements.

The job fell into our basket here in Sydney and I went down there to meet a Len Harris then a research engineer at Headquarters.

Len Harris took many measurements in the chamber, and I finally made my arrangements. I decided that although there would be difficulties, to put microphones on their desks every so often; an operator outside a window would spot the person about to speak and activate the right microphone. It turned out to work pretty smoothly.

For the next few years it was fairly routine work for me as Supervising Engineer, Radio and Telegraphs, and that situation persisted until around 1955. In that year there was a reorganisation, and I was appointed Assistant Superintending Engineer, Country.

I don't know that I was able to contribute very much when I became Director, Posts and Telegraphs. When I took over, the organisation was all set up around the Director to stop him getting into bloody trouble ... clerks for this and clerks for that. He wouldn't sign anything until one of these minders had had a look at it.

While it was nice to end up as Director, Posts and Telegraphs, there were no thrills in it really, especially if you believe in the kind of philosophy I do.

If there is anything I see unsatisfactory in more recent years it is the tendency to over-specialisation. Organisations need people who can widen their experience in ordinary daily work and operate on a broad front."

JACK ROSS

NEW TOP END STATION

ADDITIONAL FM RADIO SERVICE FOR DARWIN

On 13th February 1989 a new radio service commenced operation in Darwin at the Top End of the Northern Territory, Station 8DDD FM is the new metropolitan radio service of the ABC. In principle, there's nothing new in that, of course, but what is different is that the service is operating in the VHF FM band rather than MF AM – a first in Australia. Previously the national MF service 8DR carried the ABC's radio Regional program which included a mix of locally produced program material together with some national programs.

With 8DDD FM providing Radio Metropolitan service (local content programs) 8DR was changed to carry Radio National program full time, thus giving Darwin the full range of ABC radio programs.

The on-air target required by the ABC dictated a need to locate the equipment away from existing broadcasting sites which were at full capacity. Hasty survey work located a potentially attractive site midway between Darwin and Palmerston and after satisfactory negotiations with the owner, the Power Directorate of the NT Power and Water Authority, site works began. Considerable infrastructure savings were achieved by making use of the existing tower and cleared area for the building, allowing establishment of the facility in very quick time.

Just when all systems were set to go, the ABC decided that the new Radio Metropolitan FM service deserved a higher priority and security than the Fine Music service which was housed in a very secure building with standby power available at Blake Street, Darwin city.

The decision was thus taken to transfer the Fine Music service to the new Hudson Creek site, and the new Radio Metropolitan service to the central Blake Street Darwin site. Rather than retune antenna systems and transmitter, the frequencies of the two services were exchanged administratively, so that in

effect a straight program swap occurred, with the confusion resulting in editorial comment, a Letter-to-the Editor, and a cartoon in the local press.

The end result is that both services are now operating well—the older service from the new site at Hudson Creek, and the new service from the old site at Blake Street, Darwin. The ABC-FM transmitter was moved from 105.7 MHz to 107.3 MHz to make way for 8DDD FM.

Darwin is now well served by ABC programs through these transmitting stations.

GRAHAM SHAW



Hudson Creek station.



(Courtesy Northern Territory News)

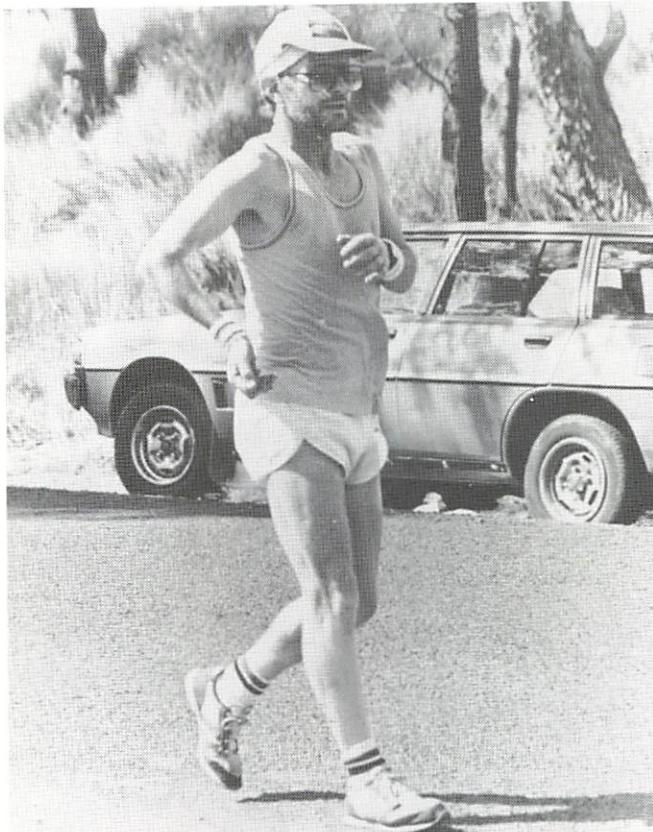
ACHIEVERS

ULTRA MARATHON RUNNER

On 15 October, 1988, Broadcasting TO1 Mike Maddock competed in the first Hobart - Launceston ultra Marathon which covers a distance of about 200km. The event was organised as a fundraiser by the St Giles Society in Launceston.

For some years Mike has been competing in the Hobart "City to Casino" and similar runs and has also run in numerous half and full marathons. He began racewalking two years ago and his career in this field reached a high when he participated in the 20 km roadwalk, the 5km trackwalk and the marathon in the World Veteran Games in Melbourne in 1987.

The run got under way at 1.30 p.m. on Saturday, when Mike's plan was to racewalk up all the hills and run the down hill and flat sections. On the climb out of Launceston he dropped to last



Mike Maddock on the road.

place - a position in which he expected to stay although he thought it would be a thrill if he managed to catch up with someone during the night.

His crew in their van were busy preparing the food and drink for Mike's consumption every twenty minutes, a routine he maintained all the way to Hobart. He went through the marathon distance of 42 km in 4 hours and 30 minutes, having passed two other competitors and feeling on top of the world. He pushed into the night and worked his way past another Tasmanian before he stopped for a scheduled hot bath at Campbell Town pub. Twenty three minutes later he was dressed and heading south again.

Sunday was spent catching and slowly passing a Victorian runner, Rob Nash, who would gradually regain the lead by running and then come back to Mike when he resumed walking. It pleased Mike just to be level with Rob, who is a well credentialed competitor in 24 hour events.

From Bridgewater it was familiar territory - many training runs out that way. A few friendly faces along the way to keep things going, then it was onto the main road at Rosetta and a straight run to the finish in front of the Sheraton.

Of the seventeen starters, ten did not complete the distance and Mike finished a creditable sixth outright in a time of 28 hours and a few minutes. As his main aim was to finish inside the maximum time allowed of 30 hours he was extremely happy.

BRIAN HALL

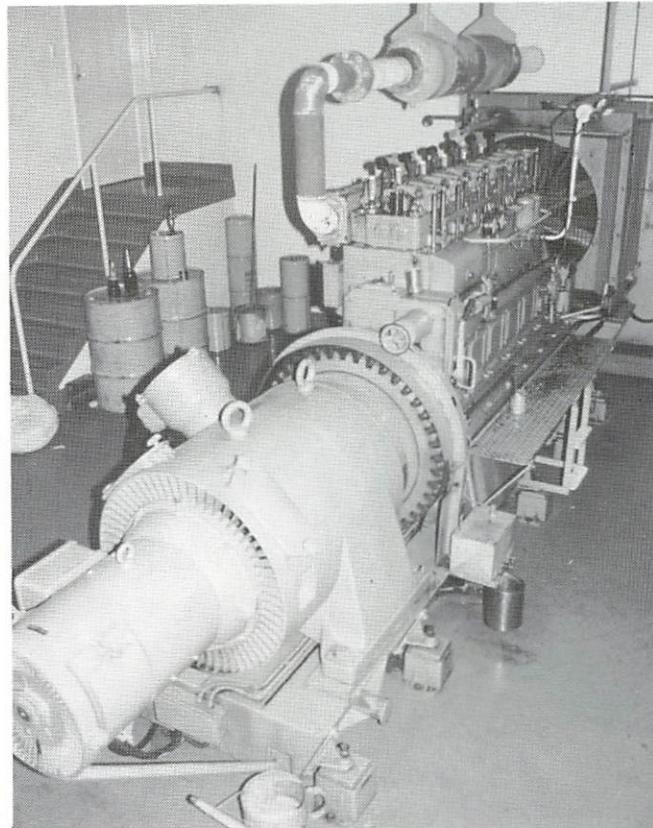
POWER PLANT

DIESEL STARTING

Many of the Division's stations, particularly television stations are located on high mountains where the temperatures frequently fall to low levels. Some of the stations, for example ABT2 Hobart, can be surrounded by snow for long periods. Under these low temperature conditions the starting of the diesel emergency power plant is not without its problems. For essential starting under cold weather conditions, the following requirements are important:-

- Reliable starting battery
- Correct grade of lubrication oil
- Coolant anti-freeze mechanism
- Correct class of fuel

For effective resolution of starting difficulties, problem areas need to be identified.



Deutz auxiliary power plant ABT2 Hobart.

The starting battery should hold sufficient charge for three separate 10 sec cranking periods. Operation and maintenance guidelines give an adequate testing procedure. If insufficient capacity exists, replacement should be considered. If lead acid batteries are not functioning at low temperatures, nickel cadmium batteries will operate more effectively and require less maintenance although they are considerably more expensive than lead acid.

The grade of engine lubrication oil should match the service conditions. Sump heaters are available although 15W/40 should be adequate for most cold weather operations.

To prevent coolant freezing, additives like anti-freeze (ethylene glycol) can be added to the cooling system. Water jacket heaters also prevent coolant freezing. They assist starting by warming the engine block and hence the engine oil, so decreasing the oil viscosity.

The principal cause of fuel problems in cold weather is waxing of the fuel. Solidifying wax crystals block filter fuel lines obstructing fuel flow. If problems exist while using winter grade distillate, then heating oil can be mixed with the fuel supply. This assists by lowering the 'cloud point' of the fuel. The temperature decrease is dependent upon the fuel-heating oil proportions. The service tank is a most suitable place for mixing. Additives are available to reduce the cloud point although they are not very effective when used with diesel fuel made from Bass Strait crude.

DAVID NAISMITH

2NC NEWCASTLE

Broadcasting in Australia officially began in 1923 when regulations relating to the use of radio frequencies were promulgated by the Federal Government. In July 1924, new regulations were introduced, based on the creation of two classes of stations, A Class and B Class stations, which required licences from the Postmaster General. This system continued in force until 1932, when there were eight A Class stations providing programs to 300,000 listeners. Notwithstanding the progressive nature of the plan, arising from the weakness in the plan, arising from the lack of experience of the licensees of both A Class and B Class stations, the establishment of their stations was slow, particularly in rural areas practically unserved. Following an investigation into the situation, the Government announced its intention to establish a National Broadcasting Service which would cater for the national program services of the station would be provided by experienced entrepreneurs under a proposed in respect of the B Class stations.

Under the plan, arrangements were made for the Postmaster General's Department to take over the stations whose licences expired after July 1932. The Department proceeded with the construction of the technical equipment of the system, the provision of new Regional stations in the areas of those not residing in or near the original stations had been erected. By 1930, the first four Regional stations had been erected, the station with transmitters being located at Rockhampton, 2CO Corowa and 2NC Newcastle. The first to be commissioned was 2NC on 19th December 1930. The site was located 19km from Newcastle on a site of 100 acres. The transmitter incorporated a 10kW power radiator with automatic temperature control, low power, automatic push to air, rotating machinery and means of protection. A dead front panel while under construction. The frequency, 1244.8 kHz was generated by a 4102D tube and was successively increased to a transmitter up to the final power of 2kW. The final stage was a 4102D tube operating as a Class C. Filament, grid bias and plate supplies were provided from motor generator sets which were in duplicate. The pump was provided in duplicate and the generators were driven from a single motor driving three HT plate generators in tandem.

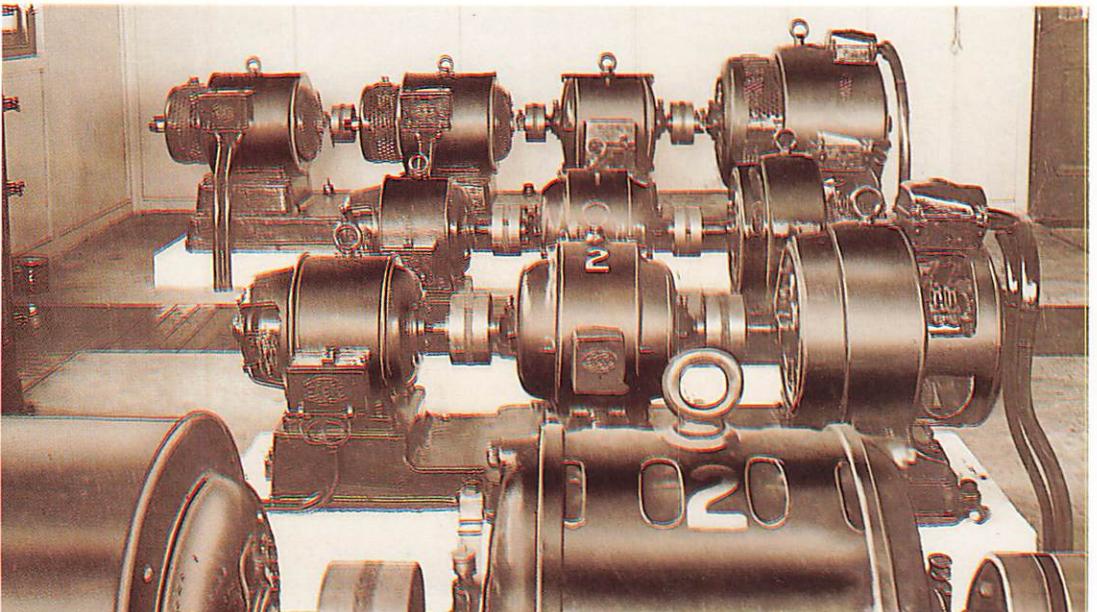
The radiating system consisted of a short flat top and a narrow cage antenna suspended between two 40m high masts. Programs normally originated from two local studios were provided, the news studio, was in use several times a day and was used for local orchestral and choral performances. The transmitter was replaced in 1975 and now shares a 91m high top loaded mast. The facilities include a 2kW transmitter and a 100kW antenna. The station operates on a frequency of 1244.8 kHz. In August 1975 began operation of the ABC Sydney rock station program at 5 a.m.



2NC standby radiator.



Main transmitter – 10kW on left.



Transmitter d.c. supply motor generator sets – 1930.

NATIONAL STATION

NEWCASTLE

ally dates from 25th July 1923, the licensing of stations were government.

ns were approved which were classes of service to be supplied respectively, operating under General.

re until July 1929 by which time 12 A Class stations and 12 B Class stations licensed listeners.

made, there was an inherent from the national inclination of and B Class stations to restrict stations to the centres of large cities, leaving the country

all aspects of broadcasting, the intention of establishing a National station whereby one organisation would be responsible for all States. The technical be owned and operated by the provision of programs would be left to under contract. No change was made in the A Class stations i.e. the commercial

were made for the Postmaster General to cover the A Class stations as the 29.

with the modernisation of all the system and commenced the erection of provincial areas for the benefit of the capital cities where the selected.

stations were under construction at 2NC Newcastle, 4RK Sydney and 5CK Crystal Brook.

was 2NC which went to air on 29th June 1930. It was located at Beresfield some distance from the city of about 4 hectares.

crystal controlled master oscillator, frequency control, 100% modulation at 1000w. The button starting control of the transmitter and a dial for tuning the transmitter from 500w to 1000w full power. The carrier frequency was generated by a crystal controlled oscillator which was selectively amplified throughout the transmitter. The final stage was an unmodulated antenna coupler which comprised two 4228A water cooled class B amplifier.

Supply voltages were all obtained from a 250v d.c. source which with the water circulating system. The filament and bias generators were driven by a single motor with another motor driving the filament resistors which were arranged in

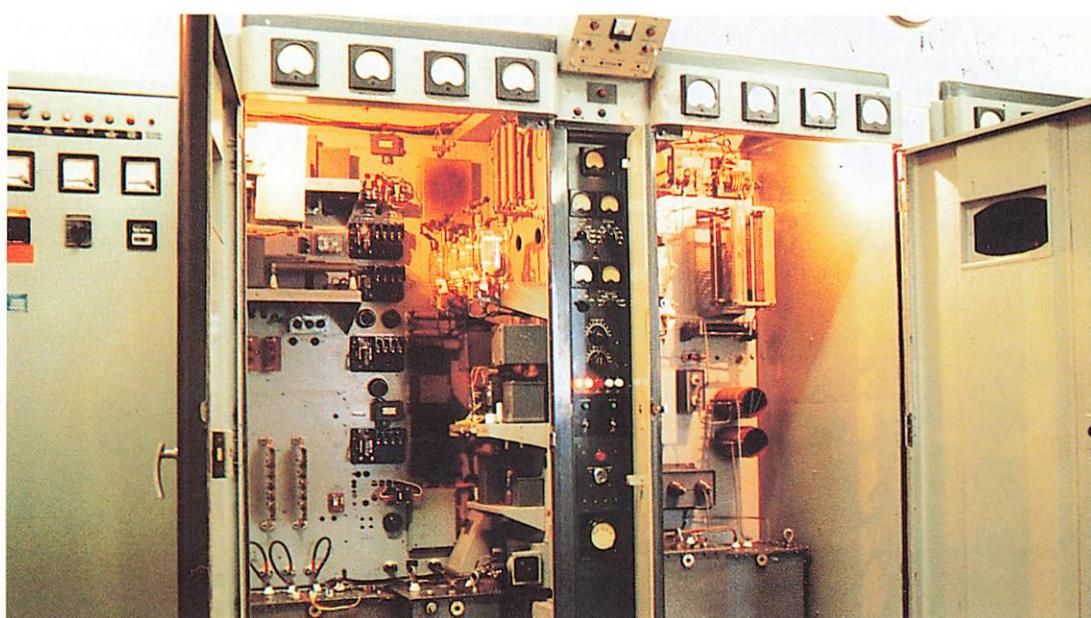
end of a T antenna with a very long down lead. The antenna was 100m long and 10m in diameter.

from 2BL or 2FC Sydney but also in Newcastle. One, a talkies and news and musical times daily, while the other was for choral programs.

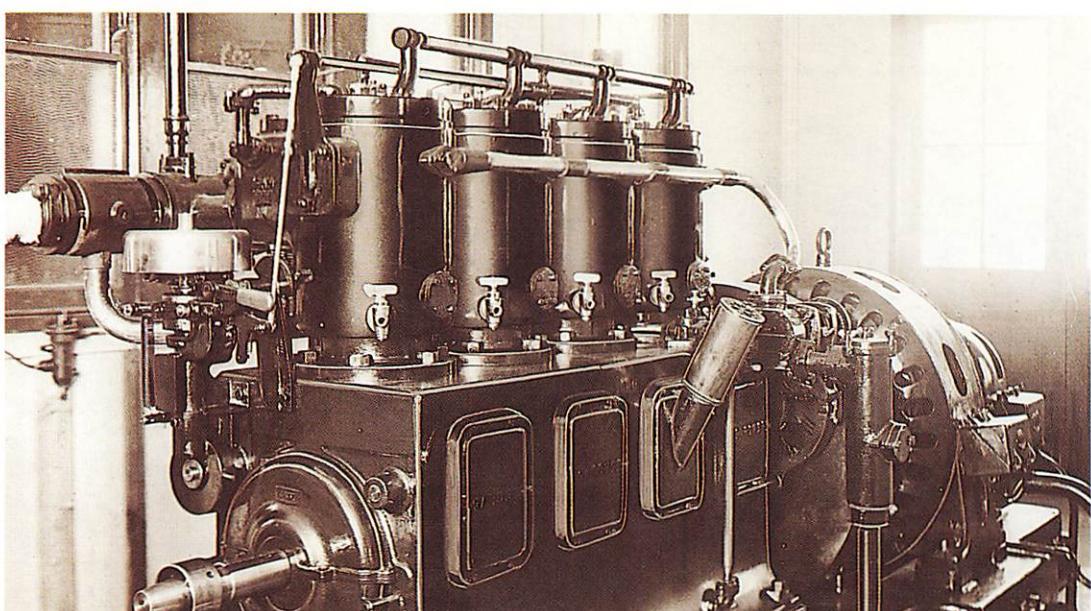
in 1959 with a 10kW unit and a main radiator with 2NA. Standby transmitter and an inverted L antenna. Frequency on 1233 kHz and during the day on a 24 hour basis broadcasting choral program between midnight and



2NC building and main radiator.



Standby transmitter - 2kW with doors open.



Emergency power plant 1930.

COL STEEL

BROADCAST OF PARLIAMENT

PARLIAMENTARY BROADCASTING AND THE NATIONAL METROPOLITAN RADIO PLAN

Under the Parliamentary Proceedings Broadcasting Act the ABC is required to broadcast the proceedings of Parliament in all capital cities and at Newcastle in New South Wales. For many years this has been done by time sharing of the Radio National transmitters with resulting programming difficulties for the ABC during periods of Parliamentary sittings. During 1988 the Directorate in conjunction with the ABC produced a plan to free the national service from this responsibility by converting standby transmitters at each of the designated stations to operate on separate discrete frequencies. This was implemented for the 1988 Budget Sessions of Parliament and has continued into 1989. All of the reallocated Parliamentary Broadcasting transmitters carry the call sign suffix 'PB' – that is 2PB, 3PB etc.

The Department of Transport and Communications has since produced a 'National Metropolitan Radio Plan' which will lead to two existing commercial MF radio services in each capital city being transferred to the FM band. In exchange for FM licences the selected stations are to relinquish their MF installations which will then be converted to provide a permanent parliamentary broadcasting outlet and a public (community) broadcasting outlet in each area. The process involves the submission of tenders to the Department for 'conversion' licences by the existing operators seeking to transfer to the FM band. The outcome should be known and the new services implemented by about the end of 1989.

The radio broadcasting of their national parliamentary debates is undertaken by more than 70 countries throughout the world. One of the earliest broadcasts took place on 26th May 1926 with the first broadcast from the House of Lords in England.

New Zealand had been broadcasting parliamentary proceedings since 1936 and immediately after the Second World War, Richard Boyer and Charles Moses of the ABC visited New Zealand in order to observe the procedure. Following on from their recommendation, the Commissioners resolved to offer substantial on air time on one of the ABC's two networks. The Parliamentary Standing Committee on Broadcasting had been studying the matter, and on receiving the favourable response from the ABC unanimously agreed that broadcasting of parliamentary proceedings should take place and they advised the Postmaster General, Senator Cameron, accordingly. The Committee believed that broadcasting would 'raise the standard of debates, enhance the prestige of parliament and contribute to a better informed judgment throughout the community'. The Committee was also of the opinion that the need for broadcasting was even greater in Australia than New Zealand, owing to the great distances separating the seat of Government in Canberra from the principal centres of population, so making it difficult for most people from seeing parliament in action.

Following an allocation of funds by the Government to equip the two chambers with the necessary technical facilities and introduction of the Parliamentary Proceedings Broadcasting Bill, broadcasting began at 8 p.m. on 10th July, 1946.

The first speaker to broadcast was the Rt. Hon. W. M. Hughes who had been in the House of Representatives since 1901 when wireless was in its infancy and only useful for the transmission of wireless telegraphy signals using Morse Code. Mr. Hughes was a great supporter of the developing technology for many years and following a visit to the front line in France during the First World War, whilst Prime Minister, he sent the first direct wireless message to be received in Australia from England.

Although a peripheral responsibility, parliamentary broadcasting is one of only two mandatory ABC activities. The other is the provision of an independent news service.

LEON SEBIRE



EARLY BROADCASTING ANTENNA

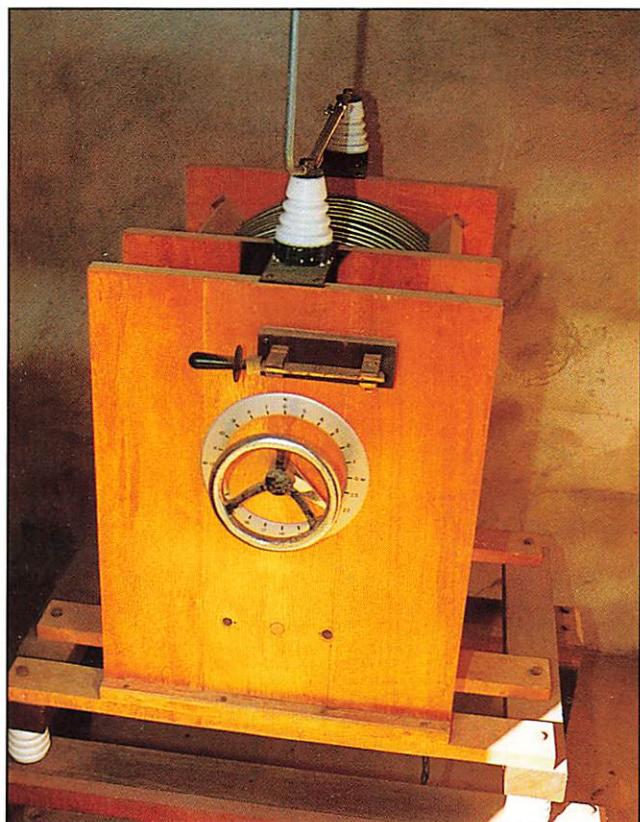
Many of the regional broadcasting stations which were installed in the early 1930's by the Postmaster General's Department when it assumed responsibility for the National Broadcasting Service employed flat top antennas. Stations such as 2NC Newcastle, 6WF Perth, 2CO Corowa, 5CK Crystal Brook, and 4RK Rockhampton were typical, although there were some slight variations in the formats.

The 2CO, 6WF and 5CK installations were multiple tuned types developed by EFW Alexanderson of the General Electric Company, USA. The basic purpose of using multiple tuning is to improve the radiation efficiency of the antenna system.

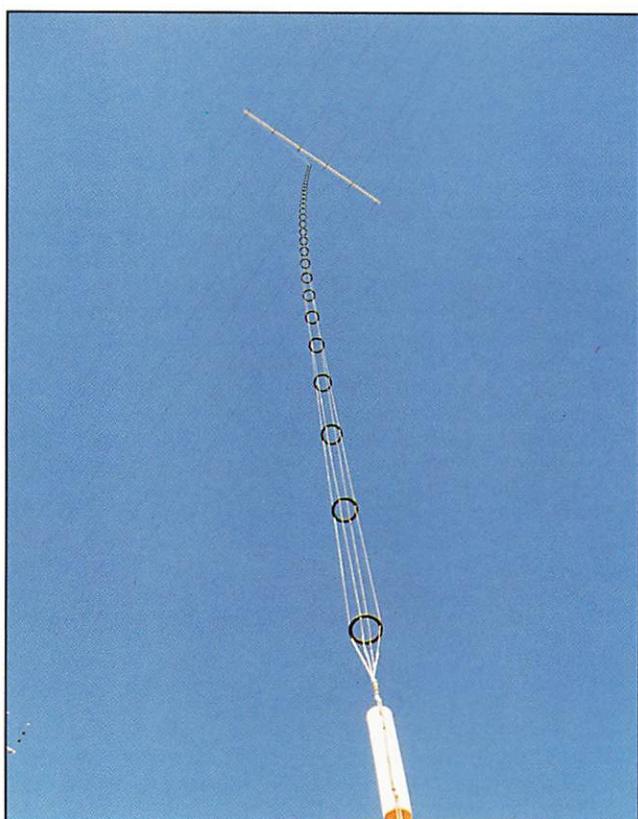
The flat top antenna was originally adopted for long distance transmission because it was believed that it had highly directional properties and therefore advantageous on point-to-point working. However, subsequent experience and exhaustive testing showed that the directional effect almost disappeared at distance beyond about 400 km from the antenna.

A major disadvantage of the flat top antenna was that it had a comparatively high total resistance. With the enormous radio frequency currents resulting from the employment of high power low frequency transmitters, this was of great concern to the engineers because of high power losses.

The reason for the high resistance was said to be due to the long path through which part of the ground current had to pass to the far end of the antenna. This was a path of relatively high resistance. This resistance could not be materially decreased by laying wires in the ground because of the high inductive reactance of long wires at radio frequencies resulting in a large percentage of the ground current still passing through the earth.



Tuning inductor.



Flat top antenna and feeder.

Alexanderson came to the conclusion that if the length of the ground path in the radiating system could be reduced, a considerable saving of RF power would be effected. He developed the multiple tuned system to make this possible.

His antenna which employs multiple grounds can be compared to a station using a number of small antennas connected in parallel, the height of each of which is great compared with their horizontal dimensions. It follows from electrical principles that several antennas in parallel will possess a lower joint resistance than a long antenna of the same radiating capacity. The result may be achieved with the flat top antenna by bringing down leads from the flat top, at regular intervals, to the ground through appropriate tuning inductances. With this construction the antenna charging current has a much shorter path through the down leads than it has with the single feed.

In one of the first trials with the system, Alexanderson reduced the total resistance from 3.7 ohms with a single feed point to 0.5 ohm for a multiple tuned arrangement. This meant he was able to reduce the transmitter power from 1330 kW down to 180 kW and still achieve the same signal strength at the receiving test station.

The radiation resistance component of the total resistance is almost increased by a factor N^2 over that of a single feed where N is the number of tuned down leads.

In the case of 6WF, 5CK and 2CO where three tuned down leads are employed, the inductive reactance of each down lead is made three times the capacitive reactance of the flat top at the operating frequency. The capacitive reactance is thus neutralised at three places. The circuit as far as the transmitter is concerned is therefore equivalent to three independent radiators operating in parallel.

These antennas are relatively efficient antennas for medium frequency broadcasting stations and in the case of 2CO is still the main station antenna. At 5CK a 190m sectionalised radiator was installed in 1962 and the Alexanderson antenna became a standby. At 6WF, the Alexanderson antenna is also used as a standby.

JACK ROSS

STAFF NEWS

CENTRAL OFFICE

New staff who recently commenced in Central Office include Gopalan Sampath, Engineer Class 3 following 20 years broadcasting experience in India and Personnel Officer Fiona Somers who has joined us from State Broadcasting Branch WA for six months.

Fiona has assumed the role of Office Services Manager while Philip Davey undertakes the big task of preparing up to date Delegations, Administrative Actions and Personnel Instructions Manuals.

After a relatively short stay in Melbourne, Senior Works Programming Officer Mark Martin has returned to his native South Australia while Engineer Class 4 John Hodgson has departed for Western Australia as acting State Broadcasting Manager following the retirement of Don Purdy.

In the March issue of *The Broadcaster*, staff were a little puzzled to read of an alleged new starter by the name of Len Achowicz. After further investigation it was established that the person in question was really Supply Officer Ed Ledachowicz. (Sorry about that Ed. Gremlins got into the Fax Machine.)

VICTORIA

A warm welcome is extended to staff who recently joined the Branch. They include James Fisher with Engineering Services, Doug Brodie, formerly of 2NR Lawrence with Radio Australia and Karina Ishak who transferred from DOTAC Canberra to join the Engineering and Construction Section. Congratulations are extended to Phil Nicholson on his promotion to STO3 in the Engineering and Construction Section. One of the best known identities in the Branch, Geoff Hayes of the Mt. Dandenong television station was farewelled after many years of dedicated service. Being an active man, always on the go, Geoff was pleased to receive a seven metre extension ladder on his retirement. Geoff was the man behind the scenes who did such a magnificent job in maintaining the station gardens to a botanical garden standard. He even set up his own nursery and propagating sheds. He was very resourceful and never missed an opportunity to make improvements and to enhance the beautiful setting for which the station is well known. Visitors often expressed their delight at the lovely surroundings.

Best wishes Geoff in your retirement from all your colleagues and friends.

SOUTH AUSTRALIA AND NORTHERN TERRITORY

Rod Cunningham State Broadcasting Manager has transferred permanently to the Defence Projects Group of the Corporate Customer Division. Best wishes Rod in your new position.

Graham Shaw is acting SBM while Wayne Croft is acting Supervising Engineer in Engineering and Construction Section.

Barrie Morton, Manager NT Section enjoyed some well earned Recreation Leave and Murray Fopp acted as Manager during Barrie's absence.

Graham Baker from Australian Construction Services in Canberra was appointed to fill the vacant Engineer 3 position in the Northern Territory and took up duty in July.

Andrew Edwards and Glen Moore are both on Study leave for the year while attending university to study Engineering.

Jan Shirra, Secretary of the Branch retired earlier in the year. Jan was one of the early appointments on formation of the Branch and in addition to handling the day to day secretarial work of the Branch was the backbone in typing copy for *The Broadcaster*. All staff and Jack Ross wish you a happy retirement Jan.

QUEENSLAND

Two long serving members of the Operations Section took advantage of redundancy provisions and handed in their valve

testers. Jack Barden STO Stanthope and Russ Dahl TO 4QB Pialba are now enjoying retirement and we wish them both good fortune in the happy years to come.

Chris Patrick has transferred to Central Office as Engineer Class 2 for a six month period and no doubt he will be buying some woolen clothes to brave the Melbourne winter.

Carol Callendar, Typist/Receptionist transferred to another area of Telcom on promotion and Barbara Nagy who took Carol's place has settled in well.

Allan Garner SBM demonstrated the problems facing the Good Samaritan. After helping to lift a small car out of trouble, he had an extended period of sick leave with a bad back. This sort of thing would never happen at sea.

Technician Steve Griffin, after sampling international competition in Europe has decided to take up Hot Air Ballooning on a full time basis. May your landings be soft ones Steve.

NEW SOUTH WALES

Bill Papadatos and Chris Cooper have been promoted to Engineers Class 2, while Graham Tabain Engineer Class 3 has left the Broadcasting area to work with cellular mobiles. Melanie Bartholomeusz and Phyllis Hsia, left the clerical area to explore other areas of Telecom, while Jane, our typist has gone to travel the world. Welcome to Tania McDonald who takes over the typewriter, and to Darrell Smith who promises to keep our filing system in check.

Operations technical staff were saddened by the death of Norm Pearce from a heart attack. Norm was only 39 years old and had the promise of a good career before him.

TASMANIA

Brian Hall, State Broadcasting Manager, retired in July after 38 years service with the Postmaster General's Department and Telecom. After commencing work as an Assistant Radio Inspector he qualified as an Engineer in 1961 and worked in almost every activity in design, installation and maintenance of radiocommunications, sound broadcasting and television activities throughout Tasmania.

To add to the enjoyment of retirement, Brian has welcomed a new grand-daughter from South Korea into the family circle. Danica (Eum Hwa Cha) is four years old and has already stolen many hearts including some in the Branch office.

David Johns, who often relieved as State Broadcasting Manager, retired in March, Senior Engineer Pat Alessandrin transferred to Network Engineering, Graham Richelme TO(T)1, a member of the Kelso staff retired on invalidity, and Lionel Bird TO(T)1 sought greener pastures at the Australian Maritime College. They all contributed to the development of the Branch and we wish them well for the future.

Lavina Spurr was employed in the office on a temporary basis to provide much needed assistance during absence of staff on leave.

David Johnstone of the Mt. Wellington station became a proud father with the arrival of a baby daughter.

WESTERN AUSTRALIA

John Hodgson from Central Office temporarily took over as SBM following retirement of Don Purdy until Bill Edwards from Central Office took up duty as the new SBM in June. Brian Raynor has recently commenced as the new Branch Engineer Class 1. Ron Gabelish, Human Resources Manager, recently resumed duty following four months Long Service Leave, while Doug Blackney, Engineer Class 2 recently commenced seven months leave to travel to Europe. Isobel Deans has joined the Branch as an Administrative Officer Grade 2, replacing Merran Barrett who resigned in March.

A number of other staff cessation occurred recently including: Victor Daniels, Technician, retired after 20 years service; Don Jupp TO2, with 19 years service resigned to try his hand in private enterprise; Brian Wheeler TO2 resigned after 24 years service to also work in private enterprise; Trish Hearne Admin Officer Grade 2 resigned after 7 years service to undertake outside studies; Phil Wood STO1 (Buildings) transferred to the Department of Aviation, while John O'Mara, Engineer Class 2 will be transferring to an Engineer Class 3 position in Broadcasting Branch Tasmania, subject to gazettal confirmation. Steve Moore TO1 transferred to the State DISNET Project.

NATIONAL MAINTENANCE CENTRE

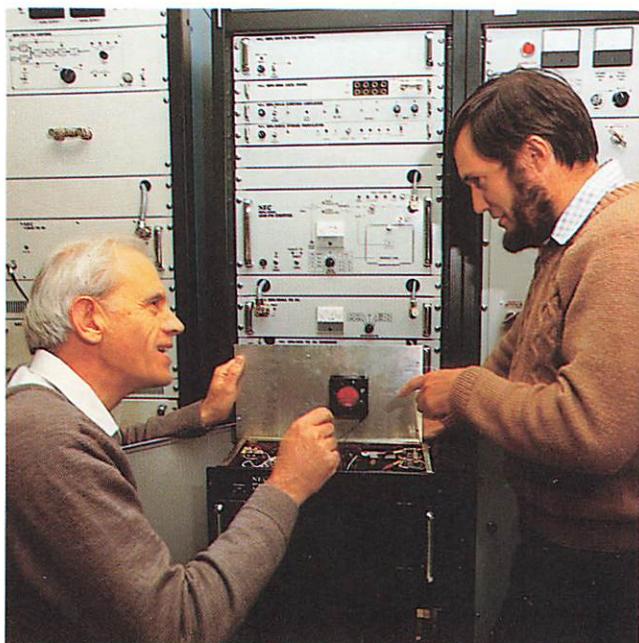
The ABC FM stereo service is one of the largest FM networks in the world. There are some 40 high power transmitters operating as far apart as Cairns in Queensland to Geraldton in Western Australia, Adelaide in South Australia to Darwin in Northern Territory and in Tasmania.

To service these transmitters, a national maintenance centre has been established at the Broadcasting Services Centre, Adelaide. The Centre has a test bed of several working transmitters and components used to provide maintenance parts, panels and modules required at short notice for despatch to any of the operating stations throughout Australia.

Panel changeover is effected without fuss on a 24-hour-7-day-a-week basis to ensure transmitter downtime is kept to an absolute minimum. All faulty panels and modules are repaired at the Centre using locally held spare components.

Service is provided for NEC 7200E, 9200E and 11k20E transmitters with Jim Beard, Technical Officer Grade 2 being responsible for panel repair and co-ordination activities. Jim's wide experience in workshop and field operations is available for technical queries and advice.

Experience has shown that the centralised repair and spares holding centre is a cost effective means of servicing the widely scattered FM transmitters. It has a number of other advantages including the development of expertise in maintaining particular types of transmitters, the accumulation of statistics which may indicate trends in failure patterns or design shortcomings, and it minimises duplication of spare part stocks as would occur if each district held its own maintenance components. Also, Adelaide is a reasonably central place for despatch

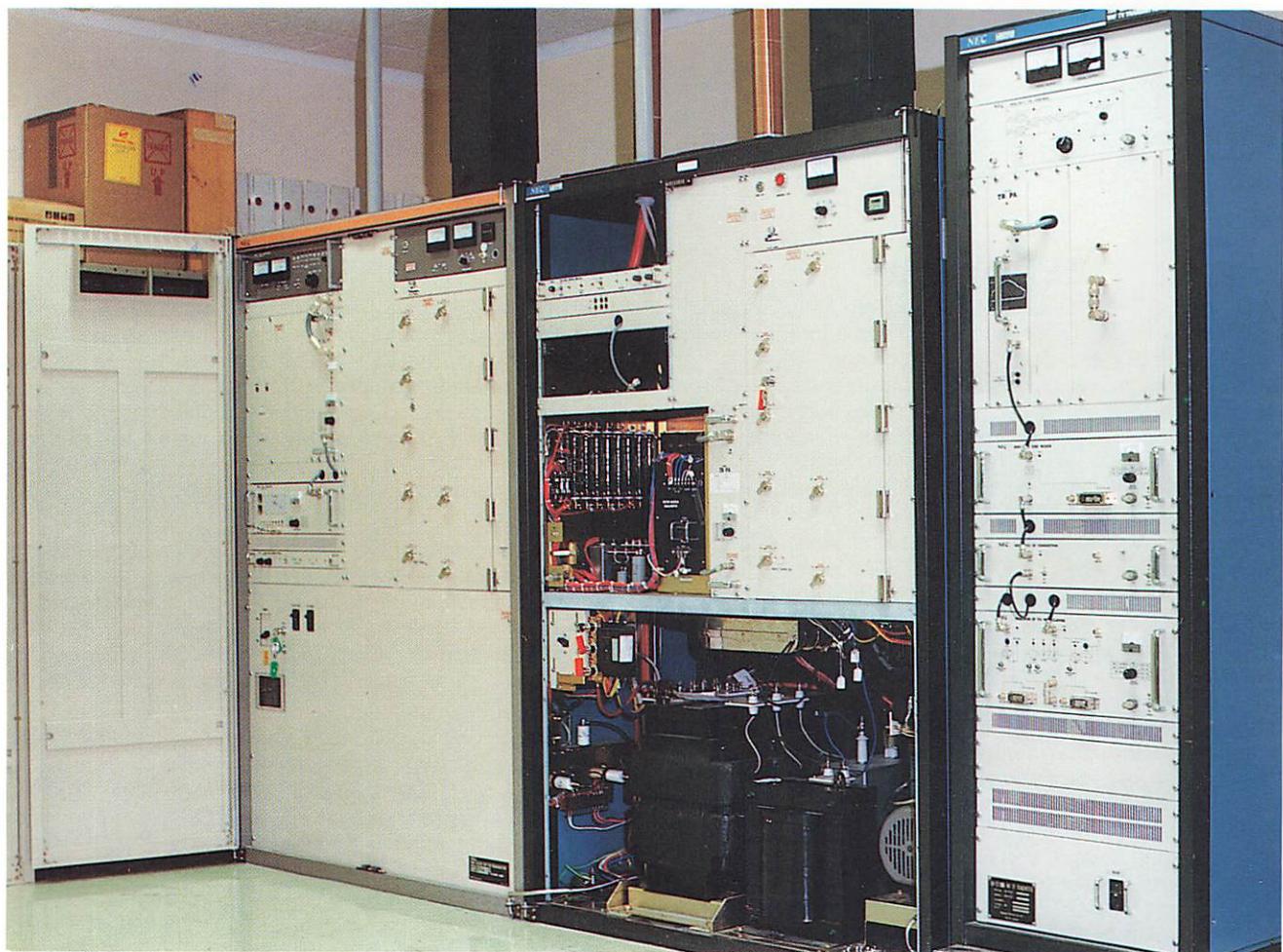


Panel Co-ordinator Jim Beard (L) and Maintenance Supervisor Roger Fitton.

of equipment, to the north, the west and the east of the country. Air freight or overnight road transport ensures speedy delivery to most stations.

The FM stereo network is the ABC's principal fine music performance network and has attracted a large loyal following of listeners. In addition to provision of programs from the Collinswood Studios in Adelaide, it collaborates with ABC TV in simulcasts, usually on Sunday nights.

TERRY SAID.



Some of the FM and TV transmitters at the Centre.

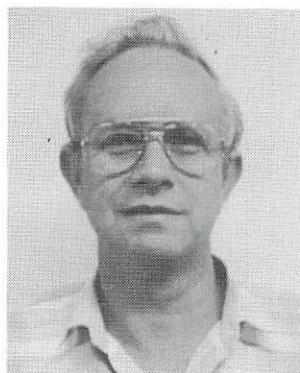
LEN SOM DE CERFF

Since graduating from the Swinburne Institute of Technology with a Degree in Electronic Engineering in 1982, Len Som De Cerff commenced employment with the Ammunition Factory, Footscray where he was involved in the development and design of munitions trigger devices. He transferred to Telecom in 1983 joining the materials Inspection Laboratories in Victoria where he assessed the Approved Firm status of cable and electronic equipment suppliers to Telecom.

With the formation of the Broadcasting Directorate, Len joined the Northern Territory Section of the South Australian Broadcasting Branch as an Engineer Class 2 in 1984. In this area he was initially involved in providing technical advice on the maintenance of MF and television station equipment. More recently his role has expanded to encompass the HF Inland Services, and Project Engineer for several installation projects in the Northern Territory.

These projects included Second Regional Radio Network Services at Groote Eylandt, Borroloola, Nhulunbuy and Galwinku and the re-location of the Jabiru MF service.

Len, and Sue have two daughters, Amanda and Sarah. Len is actively involved in veterans football and enjoys camping, photography and swims year round.

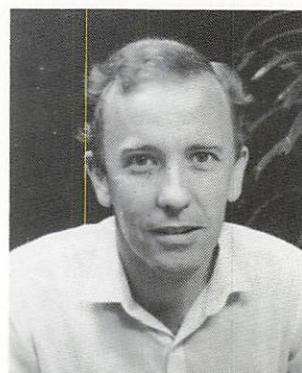
*Len Som de Cerff**Terry Said***TREVOR GOWER**

Trevor Gower, Engineer Class 2 MF/HF South Australia joined Broadcasting as an Engineer Class 1 in 1983 following part time study to obtain formal Engineering qualifications. He worked for 18 months as an Engineer Class 1 with Radio Comm. before becoming Engineer Class 2 TV/FM in the Broadcasting Branch, South Australia in late 1984.

Since joining Broadcasting, Trevor has contributed in the installation and commissioning of the SBS transmitter at Mt. Lofty, the AUSSAT conversion of 30 sites in South Australia and the Northern Territory, the initial selection of the sites and the subsequent installation of UHF National Television Services on the Eyre Peninsula at Coffin Bay, Mt Damper, Winter Hill and Borthwick Hill. He also worked on the HF antenna testing at Katherine, Tennant Creek and Alice Springs, the initial introduction of ACTTS into South Australia and the Northern Territory and the co-ordination of radiation measurements.

Other projects included the Second Regional Radio Network FM stations at Woomera, Andamooka, Marree, Leigh Creek South and Coober Pedy and replacement of the 5WM Woomera transmitter.

In mid 1986 Trevor responded to a call by Central Office and spent a very interesting 3 month period there where he made many valuable associations with staff as well as learning how Central Office co-ordinates the various State's activities.

*Trevor Gower**Murray Fopp***TERRY SAID**

Terry Said ST03 Broadcasting Services Centre, Adelaide, qualified as Radio Technician in 1959 and took up his first appointment at Radio Australia, Shepparton.

With the introduction of Regional TV in Victoria Terry transferred to Ararat as a shift leader. After three years at the station he moved back to Shepparton as Maintenance/Installation cell leader. In 1974 he was promoted ST02 at the station and was heavily involved in the installation and subsequent maintenance of new transmitters.

When Radio Australia Darwin was recommissioned following damage from cyclone Tracy, Terry, wife Marlene and the three youngest children transferred to Darwin to discover the rugged charm of the Top End.

In 1985 he was promoted station OIC and set about implementing major modifications and maintenance to improve reliability and performance of the three 250kW Collins transmitters. The installation of a new computer system did much to improve operational control and monitoring.

Whilst in Darwin, Terry and his family took the opportunity to visit many of the isolated scenic spots of the Territory and remembers many exciting experiences not the least of which included being bogged and being rescued by other staff.

In 1987 Terry transferred to Adelaide to take charge of the Broadcasting Services Centre following the promotion of Wes Graham to Broadcasting Operations Manager.

Terry, Marlene and family have settled at Happy Valley and are now exploring many of the South Australian scenic spots.

MURRAY FOPP

Murray Fopp, Principal Technical Officer, Northern Territory Broadcasting District, joined the PMG Department in 1970. On completion of his first year as Technician-in-training he found himself in the Radio Section. Murray cut his teeth in broadcasting, working at staffed transmitter stations in South Australians. He admits to itchy feet and, when qualified as a Technical Officer in 1979, readily accepted the responsibility for second-in maintenance of the new MF transmitters in SA and NT.

With the formation of the Broadcasting Directorate, Murray transferred from the Broadcasting Services Centre, Adelaide, to Darwin as assistant to the OIC of the newly formed NT Broadcasting District. Establishing a large and remote district was a busy time for everyone involved. In accepting the challenge he learned a great deal about broadcasting in remote areas.

Just when things seemed to be settling down, the NT District was expanded with three 100kW shortwave transmitters operated from Darwin. Spending so much time travelling, Murray says his staff have more in-flight dinners in a year than most broadcasters have in a life time. The district now has 34 stations.

In his spare time, Murray manages to study for a Degree in Public Administration, spending time with his wife, Diane and two children, ride 30km on his bike most days, swim occasionally and fit in School Council responsibilities.

DISH ANTENNAS FOR BROADCASTING

This article has been contributed by Andrew Antennas, a major manufacturer of microwave and satellite ground station antennas for the Australian communications industry since 1966.

The company recently supplied the TV and FM antennas for the new facility at Knight's Hill near Wollongong. The main company plant is at Campbellfield, a Melbourne suburb where about 150 people are employed. About 30 more work mainly on development work in a facility on campus of the South Australian Institute of Technology at The Levels, an Adelaide suburb.

In 1985 the Broadcasting Directorate initiated a Satellite Conversion Program, under which most program distribution to regional TV, FM and AM broadcasting sites around Australia was switched to 12/14 GHz satellite circuits provided by AUSSAT. The program included upgrading some 60 Remote Area Television Service (RATS) installations, which had previously used INTELSAT 4/6 GHz satellite circuits, and eventually extended to provide service to about 200 broadcast



A view inside the plant showing the spinning machine in the background with spun reflectors nearby.

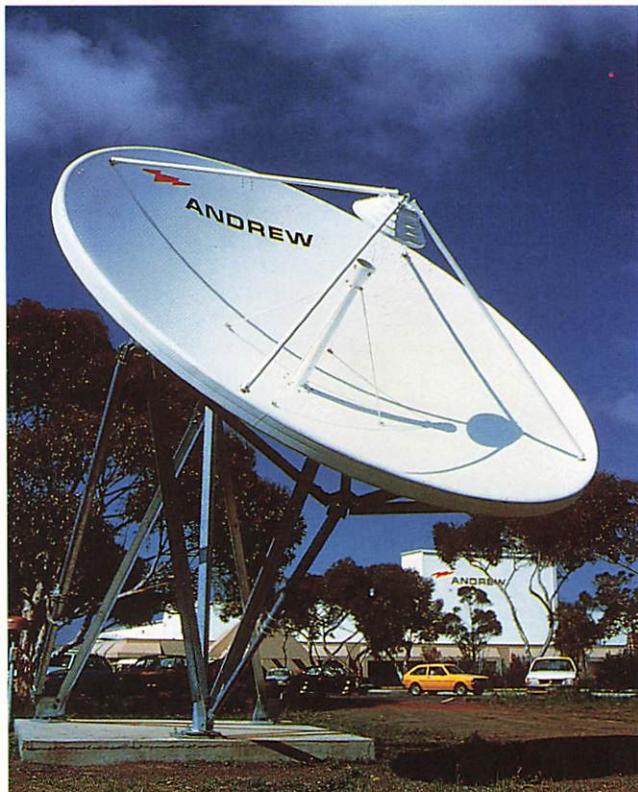
station sites. This article outlines the design, development and manufacture of the earth station antennas (ESAs) used to 'collect' programs from the AUSSAT satellites in geostationary orbit 36000 km above the equator at longitudes between about 156°E and 161°E – just west of Nauru.

Antenna design depended largely on decisions made within the Directorate based on the technical parameters of the Homestead and Community Broadcasting Service (HACBSS). Considerations included:

- whether 'national beam' or 'spot beam' antennas and high power or low power satellite transponders would be used. This established the strength of the 'down-link' signal at the various sites around Australia.
- the grade of signal (usually expressed as signal-to-noise ratio) required at the input to the earth station receivers.
- the 'trade-off' between antenna gain (ie antenna size) and low noise amplifier (LNA) performance – essentially a 'dollars for dB' decision.
- whether 'receive only' or 'two way' facilities were required at the earth stations.
- the precise localities around Australia at which the earth station facilities were required.

– wind velocities at which antennas were required to operate. Technical decisions made within the Directorate required two types of earth station antenna – 4.6m and 3.7m diameters, both 'receive only'.

Andrew Antennas was selected to supply the earth station antennas. For the design of the 4.6m antenna, Andrew engineers adapted an existing Gregorian design. This antenna consists of a single-piece specially shaped main reflector, a subreflector supported by struts attached to the rim of the main reflector, a tapered corrugated feedhorn and a galvanized steel ground mount which allows azimuth and elevation adjustment of the antenna. A new antenna was developed for the 3.7m requirement. A cassegrain design was chosen, consisting of a parabolic reflector, close-spaced shaped cassegrain (CSSC) feedhorn, and a ground mount generally similar to that used on the 4.6m antenna.



A 4.6m earth station antenna. The subreflector is supported by struts. The feed protrudes from the main reflector and illuminates the subreflector.

Single-piece aluminum spun reflectors are used for both antenna sizes. Reflectors are spun from a special grade of aluminium plate produced for the purpose. Subreflectors for both antennas are aluminium castings, machined on an NC lathe to the required profile. Corrugated feedhorns for the 4.6m antennas are also machined on an NC lathe. Parts for CSSC feeds are machined on a conventional lathe. Feeds for both antennas are assembled using specially designed jigs and fixtures. All feeds are serial numbered, so that feeds and their test results are immediately traceable if field problems arise.

Reflectors, subreflectors and feeds are painted using white water-reducible paint. This provides the standard of finish and surface protection required, without risking the possible environmental hazards of solvent-based surface finishes. Galvanized ground mounts are not painted.

Delivery of the single-piece reflectors to operational site or to store was a problem. Escorts were required for the overdimension loads, so consignments to adjacent destinations were consolidated to minimize freight costs. Special unloading arrangements were required at some remote destinations.

JACK SAUNDERSON

SUPPLY SECTION

The Supply Section is a multi-disciplinary group encompassing commercial, financial and technical cells. The Section located in Central Office is responsible for equipment and services, provisionary processes including all stages from the calling of tenders to the issuing of contracts in the purchase of broadcasting equipment such as transmitters, antennas, components, test equipment etc., under a collective schedule purchases system. This system enables equipment to be purchased collectively resulting in a better price than if bought as individual items.

The Section is part of Finance Accounting and Supply Branch established in July 1988 to bring together those groups involved with Finance and Accounting, Programming and Resources and Supply functions.

The Section is headed by John Day, Principal Supply Officer with cell managers being Gordon Evans, Engineer 4 Technical Cell, assisted by Terry McManus, Engineer 3, Garry Ross, Admin. Officer 4, Commercial Cell assisted by Ed Ledachowicz, Admin. Officer 3, and Martin Val, Admin. Officer 4, Financial Cell, assisted by Neil Cornell, Admin. Officer 3.

The establishment of a multi-disciplinary group in the Section provides significant advantages, particularly in relation to the team approach in arranging material supply. It has eliminated the previously inefficient and bureaucratic processes that had to be observed, by several groups scattered across several Departments. Contracts can now be let in days rather than months. This was recently highlighted when the Section was

able to achieve an extremely tight timetable set by Department of Transport and Communications in the Equalisation project for Southern New South Wales (Aggregation Market C).

As well as being responsible for the day-to-day provisioning/purchasing activities of the Division, the Supply Section performs a consultancy role on Supply matters for the State Branches and other groups in Central Office.

Included in the longer term aims of the Section are streamlining of its computer based reporting and monitoring system to better reflect needs and a detailed review of its General Conditions of Tender with a view of simplifying the tendering process by providing a better workable framework for its purchasing activities. Particular emphasis will be placed on penalty type provisions to ensure that suppliers appreciate the importance of meeting delivery time tables and general performance requirements for critical projects.

The Supply function is an important activity of the Division's operation and calls for a high level of expertise spanning technical, commercial and financial areas in both Government and private enterprise.

The Division is fortunate in being able to assemble together a team of dedicated people with wide experience in these areas. Prior to working with the Section, staff have worked in such areas as Research, Engineering, Supply Policy, Supply Operations and Procurement, Public Relations, Materials Services, Financial and Accounting and Tender and Specification Preparation. To ensure that their individual expertise is enhanced, staff are being actively encouraged to expand their knowledge and expertise of other areas within the group.

HARRY DESOUZA.



Gentlemen:- To win this transmission contract there are only five people to worry about- the Director, the Deputy Director, the Asst. Director Operations, the Asst. Director Development, and me!!

LETTERS TO THE EDITOR

Contributors to Letters to the Editor are reminded that full names and addresses must be supplied. Letters should be brief and to the point. Long letters may be edited. The Editor's decision in respect of the suitability of letters for publication in The Broadcaster is final and no correspondence on the Editor's decision will be entered into.

Sir,

After the fire which destroyed the main transmitter building at 4QN Clevedon in 1951 (See The Broadcaster, March 1988 article by G. Beetham), the station continued to operate with temporary equipment until the new site at Brandon was ready.

The Clevedon property was then sold to graziers named Pope.

Always curious to see what had happened over the years to the old site, I took the opportunity recently to drive out over the new Causeway and along the sandy track now called Crocodile Ck Rd to old QN.

What an astonishing sight! The palm trees along "Coconut Avenue" which were barely 10 feet high in 1947 are now towering giants. I ought to have expected this – 40 years is a long time in the life of a tree, but I had always imagined QN as I had once known it.

I talked with Mrs. Pope and explored the property.

One house and garage remains, the second house and the single men's quarters having gone, leaving only the brick laundry chimneys standing.

On the concrete floor slab of what had been the transmitter building, I could easily identify the locations of the control room, store, transmitter hall, mounting blocks for the pumps which circulated cooling water for the rectifier and power amplifier valves, and the large foundations for the two 180 hp Rustons which supplied station power.

The small brick building where Ian Byrnes, Blue Talty and I installed the AWA 2kW standby in 1947 still stands, but termites have eaten out the timber. It was this transmitter which survived the fire and enabled 4QN to go to air again so soon after the disaster.

I walked down to the old aerial coupling hut forlorn in the long grass, and stood on the mast base and located the guy anchor blocks. Empty but for some derelict farm equipment, the hut still had on one wall the two insulators for the 600 ohm balanced line input, and on the opposite wall the three output insulators where the feeds to the three wire conical aerial left the coupling equipment.

No trace of the 500 feet high steel lattice mast remained, demolished for scrap years ago, but wonder of wonders, almost hidden in the grass like a pile of dinosaur eggs were the shiny brown guy insulators, some still in perfect condition, but of no value to the scrap iron merchants.

One of these monster porcelain insulators weighing 14 kg lies on my table as I write and brings back memories of those happy days installing the standby, when we lived in tents in "Bindieye Estate" at the end of Coconut Avenue and watched the wallabies and brolgas pass and looked forward to the weekend when we could go fishing and crabbing at Salmon Ck and Ticklebelly Bay.

Great days at old QN!

DOUG SANDERSON

Sir,

Your article on Wireless Telegraphy tests from Fort Queenscliff in the July 1988 issue of The Broadcaster brings to mind another interesting experiment conducted from Fort Lonsdale, near the same spot during the Second World War.

I was a field engineer in the 6th Field Coy., but when the C.O. at the Drill Hall in Ballarat found out my hobby was building radio transmitters and receivers and testing them out, he transferred me to Fort Nepean. He explained they needed someone with such experience down there "for something they had in mind". It was some months before I realized what that was!

There were four searchlights at Nepean. One was always exposed across "The Rip" so that an enemy sub. or ship could not sneak in without being seen. Human nature being what it is, the two men on duty throughout the night, could not keep their eyes on the beam continually.

Later I was asked to go to the workshop to meet with an electronics specialist who needed assistance.

The idea was this: Over at Fort Lonsdale the plan was to have a truck headlight with both high beam and low beam elements lit simultaneously, to produce more light. A lens was to be placed in front to narrow the beam and a red filter in front again, in order that it would be less noticeable.

At Fort Nepean a photo electric cell was to be placed at the focal point in a searchlight barrel facing the 36 inch diameter glass mirror. This meant the infra-red light from Lonsdale would hit the mirror, then focus to a spot on the photo-electric cell which would then be amplified by a direct current amplifier, then to a relay switch which would keep the contacts apart whilst the current is maintained. Should the beam be blocked, a spring would pull the contacts together, and the 230 million candlepower searchlight would come on and light up the object that had blocked the light. All very good in theory! However, it didn't work on the night we tested it.

We were waiting for a Liberty boat getting a pilot aboard outside The Rip when the M.V. "Taroona" came through. When it blocked out the light, the relay did not switch on. The specialist looked at me and said "What the Hell!" I looked over at Lonsdale and saw the almost full moon beside, and half-way up the Lonsdale lighthouse, and remarked that the moon must be keeping the cell going. He said, "Surely not!" He then stepped in front and blocked the moonlight from getting in. The relay then switched on at once. He looked at me and said, "What do we do now?" I thought for a while, and then asked him whether there was a lamp of any kind which could be turned on and off say, fifty times a second. He said, "No, but why do you ask?" I then suggested that if there was such a lamp the cell would produce a pulsating dc current, which would be like an ac current, and an ordinary audio amplifier would handle it. As the moon couldn't turn itself on and off, it wouldn't matter if it was there. He said, "I think you've solved our problem. I'll be back in a weeks' time".

The night of the test, the sea was as calm as a lake, and one seagull was enough to set it off. I then desensitised it slightly and next time it was three seagulls, then a dozen, then about sixty birds; then dawn came.

One very black morning, with low, black clouds, no visibility at all at approximately 4 a.m. the light came on, and there was a fishing boat, with no light and a lone guy sitting on the seat in the centre. He got such a fright when 230 million candlepower hit him with full force, he fell backwards into the bottom of the boat, legs in air! Soon as the initial shock was over, he stood up – shook his fists at us. I heard the Sergeant up in the Directing Station laughing his head off through my head and breast set. He was watching the fisherman through his powerful glasses, and dryly reported that he looked 'quite unhappy'!!

TERRY GOLDEN

BROADCASTING MILESTONES

4QN – BRANDON

The expansion of the National Broadcasting Service Regional transmitters in Queensland began with 4RK in 1931 and was followed by 4QN located at Clevedon just south of Townsville in November 1936.

The site chosen for the station was very isolated and there were access problems. The site was flat with sandy soil and the rear of the mast paddock was only just above the high tide mark of mangrove lined Crocodile Creek. Access was via a built up causeway through tidal flats.



Original transmitter at Clevedon 1936.

Because of the isolation it was necessary to build accommodation for staff and to generate power on site for the transmitter operation and domestic requirements.

The transmitter building accommodated the transmitter, control desk, program input equipment in a separate screened room which doubled as an emergency studio, battery room,

engines and switchboard. A small adjacent brick building housed the radiators and fans for the engine cooling water. The transmitter built by Standard Telephones and Cables operated at a carrier power of 6.25 kW and was similar to units installed earlier at 2CO, 5CK, 7NT and 2NR. The first linear amplifier used a pair of 4015A type air cooled triodes to drive a pair of 422OB water cooled triodes in the final stage. The EHT supplies for these two stages were 5kV and 12kV respectively with the 12kV being provided by three 4222A high vacuum water cooled rectifiers. The 5kV supply was provided by a bank of selenium rectifiers as were other low d.c. voltages.

Porcelain tubes inserted in the circulating water system served to isolate the grounded components of the cooling system from the EHT and RF voltages of the plates. However, owing to its fragile nature the porcelain sections were subsequently replaced by rubber hoses.

The antenna was basically a three wire conical type. It consisted of three wires supported by a 152 m high lattice steel mast. The RF was split in the coupling hut at the base of the mast to feed the three wires. Each wire ran from the hut horizontally to a point some 60 m out, then upwards at a steep angle to the top of the mast where it terminated on insulators. The horizontal runs were spaced equally in azimuth. The erection of the mast was undertaken by Johns and Waygood with the work being completed in November 1935.

During the installation, severe flooding isolated the station and staff were obliged to supplement their diminishing rations with wildlife shot locally. Supplies eventually came by boat. This was a foretaste of problems due to bad roads and floods which were to plague the station for its entire life.

On 26 May 1951, the transmitter building was extensively damaged by fire and plans were stepped up to relocate the station at a more accessible site. A site was chosen at Brandon near Ayr where a 55kW transmitter was commissioned in June 1959 to feed a 198 m sectionalised radiator. The transmitter is still in service with a 10kW standby unit.

DOUG SANDERSON



Present station building at Brandon