

The **BROADCASTER**



Newsletter of the Broadcasting Division

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MODULATOR TUBE • RADIO AUSTRALIA • SHEPPARTON

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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This issue of The Broadcaster focuses on the Golden Jubilee of the Government funded and operated international short wave broadcasting service in Australia.

From a small beginning in December 1939, with the nation embarking on a long and costly war, a service known as Australia Calling was born and today, the Radio Australia transmitting and studio technical facilities costs are a sizable proportion of the total broadcasting budget.

International broadcasting is an activity practised by almost every country in the world today. It is an expensive operation, yet the total number of program hours by both minor and major international broadcasters is increasing. Important problems faced by these broadcasters, including Australia, quite apart from the constant worry of obtaining adequate funds for expansion, upgrading and operation is maintaining contact with the listeners in distant and foreign lands and in tracking where the technical future lies for international short wave broadcasting.

Many people, including former Radio Australia staff have provided contributions to this issue and their efforts are gratefully acknowledged. In particular, I would like to thank Bruce Wilson, current Officer-in-Charge at Shepparton who did so much research in locating photographs and providing background information.

JACK ROSS, Editor

Front Cover:
Modulator Tube, Radio Australia, Shepparton.

Contributors to this issue:
Leon Sebire, Giff Hatfield, West Hatfield, Jim Wilkinson, Peter Homfray, Keith Synnott, Fred Chapple, Bruce Wilson, Graham Stead, Richard Womack, Barry Morton, Jack Ross.



THREE GENERATIONS

FAMILY TRADITION

There are many examples of a son following in the footsteps of his father in the various engineering sections of the Postmaster General's Department and more recently Telecom, but one example of particular interest to us in the field of broadcast engineering is that of West Hatfield, son Giff, and grandson Lindsey, because of their association with Radio Australia.

West commenced work in the Postmaster General's Department in 1926 and began his association with the National Broadcasting Service in 1934 when he worked on the design of tall half wave radiators then being developed with high power transmitters. In 1939, he was a member of the team given responsibility for the design and construction of the Shepparton Station, then known as the International High Frequency Broadcasting Station. When West retired in 1977 he was a member of the Australian Broadcasting Control Board. Giff joined the Postmaster General's Department in 1954 and has been associated with a wide range of MF, HF, and TV projects as a member of the National Office carrying on a family tradition in broadcast engineering extending over more than 55 years.

Both father and son have contributed articles in this issue of *The Broadcaster*. West outlines his involvement in the original Shepparton installation in the 1940's, while Giff has provided an interesting article on the Carnarvon project installed at short notice to bridge the program gap left by the cessation of transmissions from the Cox Peninsula Station following damage caused by Cyclone Tracy in 1974.

Later, Giff was involved in the upgrading of the Shepparton Station with which his father had been associated some 30 years previously. Time and spare parts problems had taken their toll with the original water cooled transmitters which had given sterling service over such a long period. They bowed out gracefully and made way for modern state-of-the-art vapor cooled models but it was a sad day for many retired staff who returned to the station to participate in the last day of transmission with the old transmitters.

However, not all of the original transmitters were replaced. The RCA 50 kW transmitter, the very first to go on air, is still providing valuable service. It says a lot for those transmitter designs developed by RCA so long ago. When RCA produced a range of 50 kW transmitters in 1931, the water cooled output tube was enormous compared with modern designs. It was over 4 feet (1.2m) high.

Lindsey, who is Giff's son, the third generation of the Hatfields to work on Radio Australia, was involved in work associated with adapting and commissioning of new frequency synthesizers for the station.

JACK ROSS



Leon Sebire.

FROM THE DIRECTOR'S DESK

Shortwave (High Frequency) broadcasting is one of the oldest forms of radio communication and it has endured because of its ability to provide service over very long distances. A number of developing countries still rely solely on shortwave broadcasts to meet their needs for news of current events from both within and from outside their boundaries. It is largely these countries that provide the target audiences for international broadcasters, many of whom are intent on conveying their social values and lifestyles to the somewhat captive audiences. Additionally, many countries feel that the need to provide broadcasting services to expatriates abroad and a lesser number maintain a desire to dominate the international airwaves with propaganda broadcasting.

It is not surprising that some countries regard these practices as an intrusion and apply substantial resource to mounting transmissions solely aimed at blocking (jamming) programs considered inappropriate for their people.

For a short time a few international broadcasters applied planning effort to adapting satellite direct broadcasting technology to provide a service via simple receivers operating in the portion of the HF spectrum above 20MHz. However, under international agreement, it now seems this proposal has been set aside and it is unlikely to proceed further.

Major international broadcasters such as Voice of America, BBC, Radio Netherlands and Deutsche Welle are currently expending hundreds of millions of dollars in the expansion of their world broadcasting facilities. Radio Australia, by comparison, remains a regional broadcaster, its main targets being the Pacific, South East Asia and East Asia.

In recent times, our government has expressed the desire for an upgrading of our transmissions to China. It has been pointed out that this location is too distant to receive an adequate service from Australia and that transmission facilities closer to the target would be an essential prerequisite to providing a better service. However, at this stage, no definite plan for us to establish "offshore" transmitting facilities has received approval.

This will be our last edition of *The Broadcaster* for 1989 and I take the opportunity to wish all of our readers a Happy Christmas and prosperous New Year.

LEON SEBIRE.



West (L) holding one of the original 100kW transmitter tubes while Giff holds one of more recent design.

**VISIT BY VOICE OF AMERICA
EXECUTIVES FINDS RADIO AUSTRALIA
TRANSMITTER OPERATIONS
IN GOOD SHAPE**

Earlier this year the Department of Transport and Communications arranged for a team from the prestigious international broadcaster "Voice of America" to visit Australia to discuss ways in which the VOA might help the Department in planning the modernisation of Radio Australia transmitting facilities. At the same time, the VOA team, which comprised Dr. Robert Frese, Senior Technical Advisor, Mr. Dean Bartelt, Senior Engineer and Ms Rebecca Michels, Technical Assistant, held discussions at our National Office and visited all of the Radio Australia transmission installations.

Not surprisingly, the VOA team reported that the transmitting facilities inspected were somewhat older and underpowered when compared with those used by their organisation. Their report also added weight to the position we have been promoting in relation to the Shepparton station that much of the antenna plant and the antenna switching matrix are long overdue for replacement.

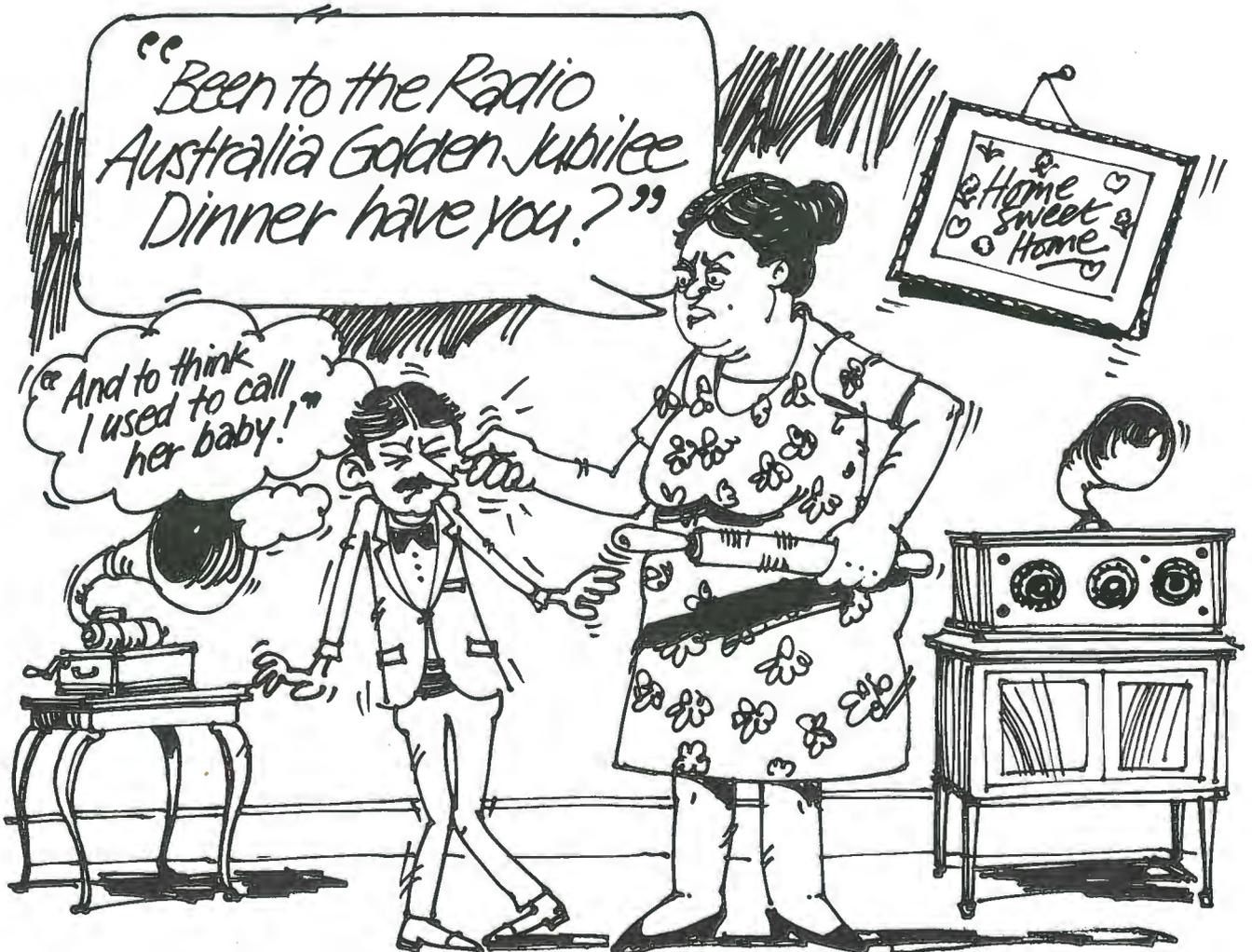
The most gratifying aspects of the VOA report were acknowledgement of the cooperation and hospitality received from Broadcasting staff during the visit and favourable comment on the high standard of maintenance and the condition of stations found during the visit. The team also reported that they found our technical staff well qualified and extremely competent and that in several areas the technical results being obtained by us exceeded those being experienced by VOA.

At this stage, advice on the outcome of recommendations to the Department on planning aspects for upgrading the service is still awaited.

LEON SEBIRE



Dr. Robert Frese (L) and Director Leon Sebire.



EIGHTEEN YEARS AT THE TOP

My eighteen years as Director of Radio Australia in the Australian Broadcasting Commission from 1957 to 1975 were marked by steady progress and development, and acceptance of the Service by an ever increasing audience.

On taking up appointment on 1st July, 1957 Radio Australia programs were being broadcast for 30¹/₄ hours daily in five languages – English, Indonesian, Mandarin, Thai and French. When I left, not only had the English, Indonesian and Mandarin transmissions been extended, but additional services in Japanese, Cantonese, Vietnamese and Pidgin had been included in a daily transmission time totalling 54 hours.

The ability to add to or increase the language services was directly related to the availability of transmitting facilities. In 1957, the facilities comprised two 100 kW and two 50 kW transmitters at Shepparton and one 10 kW unit at Lyndhurst. Following major work at Shepparton, the outlets available there by 1961 comprised four 100 kW, three 50 kW and two 10 kW units. By 1970, after commissioning of the Cox Peninsula station near Darwin, the Radio Australia outlets were increased by three 250 kW transmitters.

Unfortunately Cyclone Tracy caused massive damage at Cox Peninsula on 24th December 1974 putting the station out of operation for 10 years before rehabilitation was effected.

Radio Australia has often been described as the Cinderella Service of the ABC. There are no votes in overseas broadcasting and the fortunes of Radio Australia have waxed and waned as a direct result of the interest and/or support of both ABC Commissioners and individual Ministers. We were, indeed, fortunate in having the combination of the late Sir Richard Boyer, Chairman of the ABC and the late Lord Casey, Minister for External Affairs at the time when the new language services of Japanese, Vietnamese and Cantonese were introduced.

The Service also had subsequent support from Sir James Darling, Chairman and Sir John Reid, Vice-Chairman with Sir James describing Radio Australia in a report to parliament as "the jewel in the crown of the ABC". These were the good times, but were brought to a sudden halt when Cyclone Tracy caused the shut down of the Cox Peninsula transmitters, wiping out the achievements of 14 years of ceaseless effort. It was still out of commission when I retired. My other disappointment was the fact that the Christmas Island Relay Station proposed in 1973 was never built – again, a political decision.

Since I left in 1975, no new language service has been introduced and the transmitting facilities at Shepparton, Cox Peninsula and Carnarvon are all probably in need of upgrading or replacement. The Brandon Station has taken a long time to come on stream even with old 10 kW transmitters recovered from Lyndhurst. This is a far cry from what I proposed as early as 1974.

The operation of the Radio Australia Service was, and still is not possible without the cooperation and effort of staff of the Postmaster General's Department (now Telecom) and it has been my good fortune to have worked with many dedicated people. Some who were particularly helpful in my struggle to push the case from Radio Australia include Jim Wilkinson, Doug Brooke, Bill Beard, Bill Davidson and his Shepparton staff, Jack Ross, Reg Boyle and the late Evan Sawkins, Deputy Director General.

Without additional and more powerful transmitters and aerial systems and the introduction of modern technology, Radio Australia cannot hope to compete with the BBC and the VOA relay station outlets in Asia. There is also the need to combat the increasing use of medium-wave broadcasting in those countries where short wave broadcasting was more prevalent some years ago and, of course, the spread of television. All amount to a real challenge to the supporters of Radio Australia but as always, before funds can be made available, there must be political will.

PETER HOMFRAY



Damaged aerial facilities Cox Peninsula as a result of onslaught by Cyclone Tracy, 1974.

FIRST TRANSMISSION

Norm Park remembers the inaugural transmission from Shepparton with clarity and reports that it was the first "on air", and the first fault report.

The opening day was May 1st, 1944 and the transmission commenced at 3.30 p.m. local time on 15315kHz, beamed towards the Pacific and USA.

The official party consisting of Mr & Mrs Jack Hargraves, Mr & Mrs Alan McIntosh, Fred Chapple, Mel Kirwood-Jones, Phil Keon, Norm Park and others were all gathered near the RCA, 50kW transmitter awaiting proceedings.

Just prior to the actual transmission, a fault took place and a loud bang emanated from the equipment. Mrs McIntosh gave a yell and broke the silence!

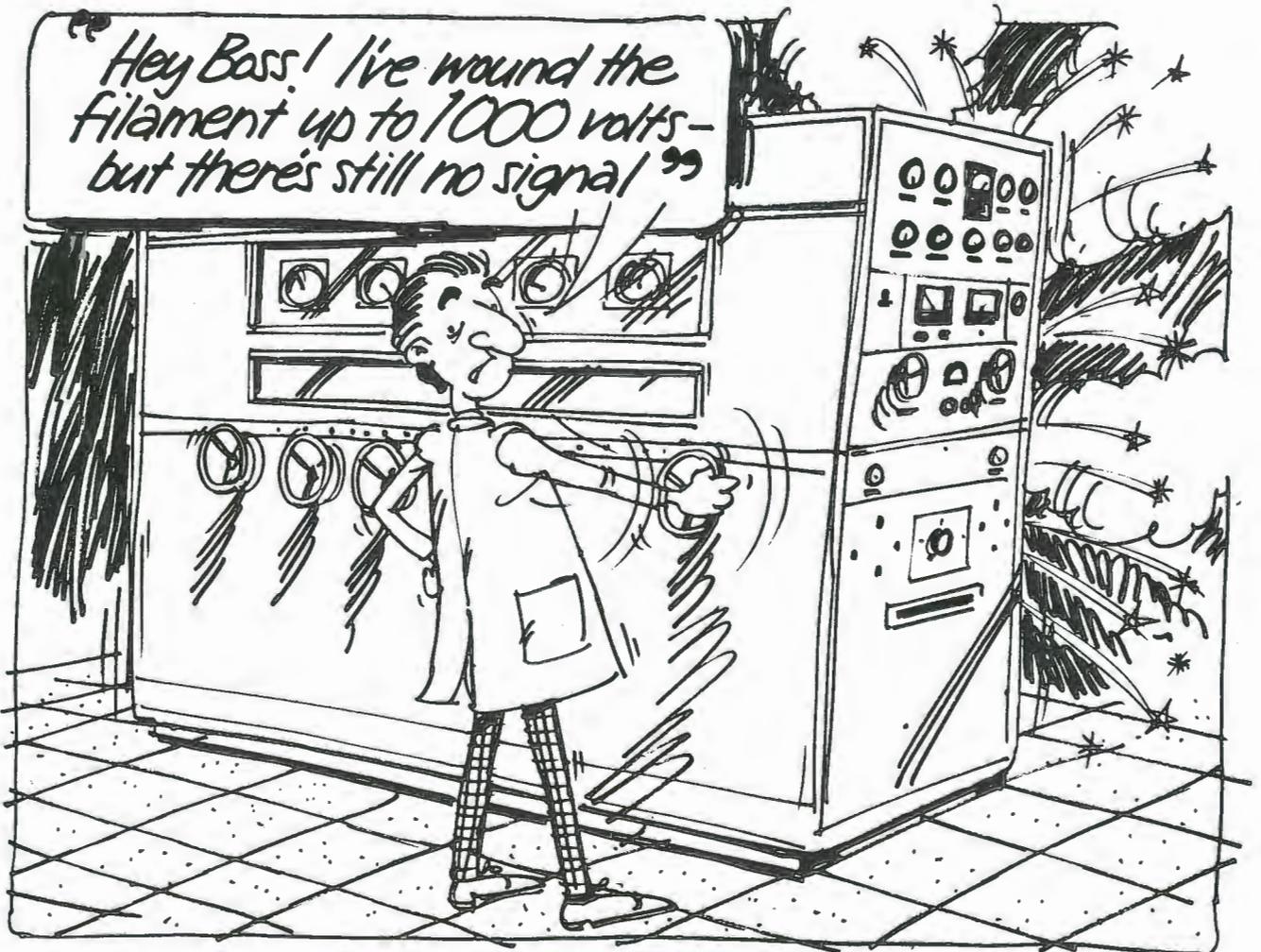
Norm states that the transmission was conducted without further incident. The Shepparton International High Frequency Transmitting Station, or Radio Australia as it was later called ... was on air.

Forty five years later, that original 50kW transmitter, continues to broadcast program to the world and must surely be amongst the oldest operating short wave broadcast transmitters in the world today.

BRUCE WILSON



Right: Artwork by Ralph Denison, Drafting Group, Darwin.



INITIAL DESIGN AND CONSTRUCTION

The International High Frequency Station, Shepparton, as it was initially known, had its origin in the dire peril facing Great Britain, centre of the far-flung British Empire, in 1940, the early years of the Second World War.

There was concern that if the British High Frequency Station at Daventry was destroyed by bombs, then the British voice to the world would be silenced.

Accordingly, the British War Cabinet requested Australia to provide a powerful world ranging station to meet that possible emergency.

The site chosen is four miles north of the town of Shepparton, Victoria, on the very flat flood plains of the Goulburn River. Responsibility for the detailed design of the station was given to the Research Laboratories of the then Postmaster General's Department, and as well, due to the urgency of the project, it was decided the design team should also be responsible for the construction of the station.

Three engineers from the Laboratories were chosen for the task; Bruce Mair, Alec McKenzie and myself became responsible for the detailed design, preparation and calling of tenders, letting contracts and their subsequent administration, supervision of construction and the final commissioning of the station.

The transmitter building and emergency power building were located at the centre of the western boundary of the site with 19 aerials in a semi-circle around them in four directions and supported on 14 masts.

All the aerials were curtain arrays with reflectors, four elements long, two pairs, each pair fed at the centre. In the interests of rapid completion all the masts were of the one height and the design of the aerials arranged around this characteristic, hence the lower frequency aerials were two

elements high, the medium frequency three elements and the higher frequencies four elements high.

The design of the European aerials with provision for slewing the main beam $\pm 13^\circ$, achieved electrically, was a particularly unusual and interesting feature at that time.

A major feature of the station design was the arrangement of the connection of the three transmitters to the various aerials. At Daventry, this was achieved manually, out in the field. At Shepparton, this was done electrically and controlled from a panel in the transmitter hall.

The construction of the transmission lines and aerials was done by the Victoria line staff, under the guidance of Engineer, Jack Kyne. It was a major work involving provision of 1700 poles supporting 12 miles of 4 wire – 600lb copper wire transmission lines and 12 miles of underground cable.

A major and time-consuming work was the matching of lines to aerials, accurately ensuring the slewing and evening out the standing waves along the lines.

All this work was carried out by Jim Wilkinson, then of the Victorian staff, later of course, to achieve high distinction at Central Office and beyond.

The original equipment of the station was two 100kW transmitters and one 50kW transmitter, each having two high power stages and a modulator stage.

The 100kW transmitters were jointly supplied by AWA Ltd., who provided the modulator units and STC Ltd., who provided the high power stages, assembled on the site under the supervision of their engineer, Tony Brettingham-Moore.

The 50kW transmitter, which is still in service, is an RCA unit imported from the USA and installed by Postmaster-General's Department staff.

Although we had priority orders, it was far from all plain sailing – shortage of materials and pressure on suppliers to meet other war commitments were a constant threat to progress.

Total cost of the project including site, buildings, radio equipment, line and aerial plant and emergency power was 547,000 pounds.

WEST HATFIELD



L to R: West Hatfield, Tony Brettingham-Moore, Engineer STC Ltd, Sid Witt, Head Research Laboratories, T. N. Bore, Director STC Ltd., inspecting transmission line switching facilities.

COX PENINSULA N.T.

For many years Radio Australia programs were broadcast into the South East Asian target areas from transmitters located at Shepparton.

With the increase in high frequency broadcasts into these areas from other countries it became necessary to increase the strength of Radio Australia transmissions if this service was to maintain its influence in the South East Asian community.

To achieve this, a decision was made to construct a high power booster station on a site near Darwin to relay transmissions from Shepparton into selected target areas with greatly enhanced signal strength.

Parliamentary approval was given for the project in 1964 and site works commenced in 1965. First transmissions from Darwin took place in 1969 and the station came into full operation in 1971.



Masts and wideband curtain arrays.

The total cost of providing the station was approximately \$9 million with building and site works and power services accounting for a little over half of this amount.

The station complex is established on Cox Peninsula which forms the western seabord of Darwin Harbour.

The transmitting station is located on the north western tip of the peninsula.

Until 1974, program for the station transmitters was provided by "off air" signals from a receiving station built specifically for this purpose and located on Cox Peninsula some 15 kilometres to the east. With the extension of the broadband telecommunications network to Darwin in 1974, it was possible to have direct program from the Melbourne studios to the transmitting station and so the receiving station complex was closed down.

The transmitting station is situated on 3000 hectares of crown land on Cox Peninsula.

Approximately 450 hectares of land is cleared for the operation of the transmitting antenna system.

The site for the station was selected on Cox Peninsula because of its remoteness from areas of general population. The potential dangers to the public of high voltages and high power radiation fields are ever present at broadcasting stations. There is a continuing requirement for station managers to ensure that no members of the general public enter the area, unescorted, for their own safety.

As the station is transmitting primarily to the South East Asian area, all transmissions are beamed in a northerly and westerly direction from the site, well away from any populated areas.

On December 24th, 1974, Cyclone Tracy destroyed the five transmitting antennas. Superficial building damage allowed massive ingress of water, flooding the transmitter equipment. The jetty at Mandorah, used for daily transport of staff to the station, was extensively damaged and two PMG launches sank with the loss of one crew member.

Power to the stations was supplied from the Darwin generating station via two submarine power cable.



Tube 4CV 100000 and boiler as used in power amplifier and modulator stages.

Both cables failed subsequently, believed to have been damaged by ships' anchors during the cyclone.

In 1980, Parliament approved the rehabilitation of the facility at an estimated cost of \$10 million. The major items were:

- New wharf, new submarine cables, repairs and upgrading to buildings.
- New curtain array antenna system, new computer control system, repairs and upgrading to HF transmitters.

The rehabilitated transmitting station was officially opened on 30th October, 1984 by the Minister for Communications, Michael Duffy.

The transmitting schedule at present comprises 37 transmission hours daily over a 16-hour period and utilises all three transmitters.

A total of 19 technical and 5 support staff are employed to operate this transmission schedule and maintain all technical equipment at the station.

Staff commute across Darwin Harbour daily by contract charter vessel.

BARRY MORTON

STATION MANAGERS

OFFICERS IN CHARGE AT SHEPPARTON

Jack Hargraves ISM, transferred from Lyndhurst in 1944 to become the first OIC of the new International HF Transmitting Station at Shepparton.

He was a man who "set the scene" at Shepparton and was a strong manager with definite views on life and station administration, but at the same time he was a gentleman and a respected member of the Shepparton community.

Jack was responsible for the original tree plantings on the Shepparton site and these bear witness to his interest in nature and his membership of the Society For Growing Australian Plants.

The 18 years of Jack's management and contribution at Shepparton will not be forgotten. He was truly a pioneer in Australian Shortwave Broadcasting.

In April, 1962, Bill Davidson, BEM became the second OIC of the station. He occupied this position for 18 years and retired in March, 1980.

Bill came to Shepparton as a Lineman and worked on the original antenna installation. His transfer to the technical area saw him qualify at Technician and Senior Technician levels and then gain promotion to Supervising Technician – Shift Leader.

He was responsible for much of the station rebuilding in the late '50s-early '60s and in particular provided installation management of the largest transmitter rebuilding project ever undertaken in Australia.

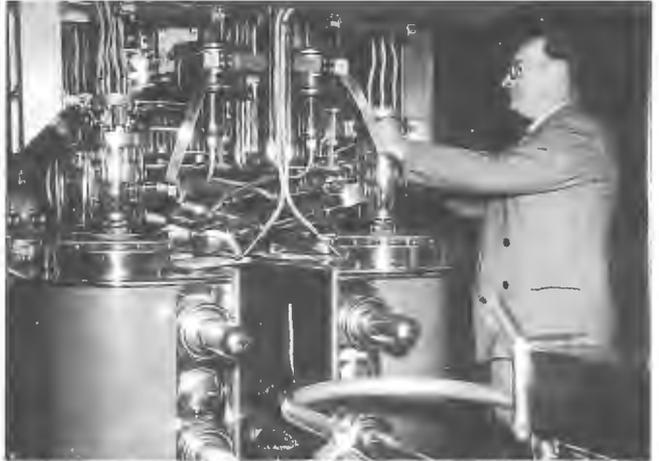
Bill is a quiet achiever, and a person who instills friendship, dignity and decorum with a fair and balanced approach to all. He is a family man, a churchman and has a keen interest in recreational bowling.

The 18 years of Bill's management saw beginnings of change and important industrial relations development. Bill always applied a quiet and fair approach and will long be remembered for his dedicated and sincere contribution to management and efficient operation of the station facilities.

Bruce Wilson JP took over the reins of management in March 1980 as the third and present OIC.

The '80s have been a time of change and Bruce has had the difficult task of introducing new approaches both in HF broadcasting and administration within the Shepparton District.

He holds administrative qualifications and has a range of interests from private flying to family history research.



Jack Hargraves ISM, first OIC Shepparton inside STC 100kW power amplifier unit.

Bruce has spent many years involved with community activities including 12 years as City Councillor and past Mayor of the City of Shepparton.

He was responsible for the installation of the first two Harris transmitters and had the task of co-ordinating design and interface into the existing station.

Bruce has travelled widely overseas and has received several study awards in recognition of his service. A report on his visits to Argentina and Guam appeared in the November 1988 issue of The Broadcaster.

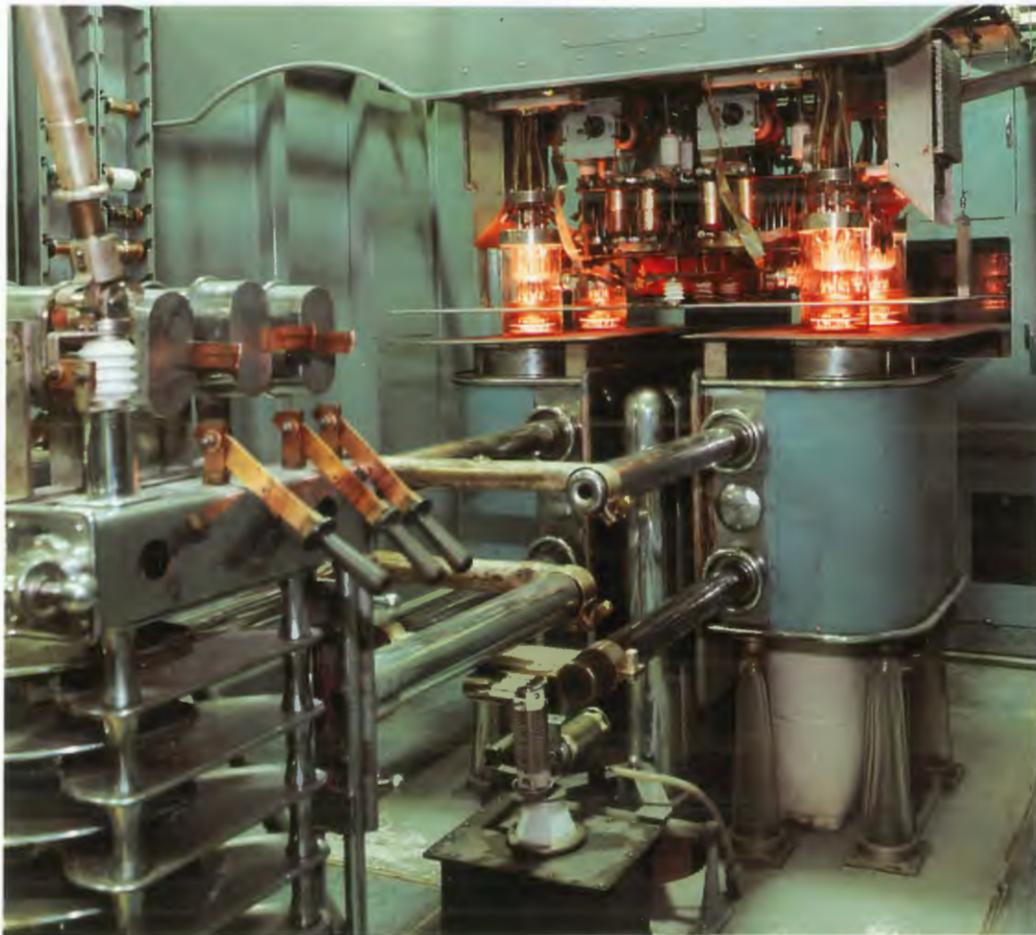
He is particularly interested in high frequency antenna design construction and looks forward to the challenge of new antenna and line switching plant at Shepparton.

JACK ROSS.



OIC – "Did you just drop a transmitting tube?"

OPERATOR – "No! haven't you heard of Newton's law of gravity?"



STC 100kW power amplifier showing tank circuit and F124A tubes – Shepparton.



Control room – Cox Peninsula.

RADIO AUSTRALIA

INTERNATIONAL SHORT WAVE BROADCASTING

Regular international short wave broadcasting commenced in 1924 in the USA.

In Australia, Amalgamated Wireless (A/asia) Ltd., operated an experimental station from September 1927 with a studio in Melbourne. The station using call sign VK3ME operated on 9510 kHz and fed 1.5kW into a half wave vertically polarised antenna arranged for low angle uniform radiation.

The company later began transmissions from installations at Sydney with VK2ME and Perth with VK6ME. Station 2ME, the most powerful transmitter in Australia at the time, was known as The Voice of Australia and started and concluded transmissions with a recording of a laughing Kookaburra.

Regular involvement in shortwave broadcasting by the Government began in March, 1934 with the commissioning at Lyndhurst in Victoria of VK3LR on 9580kHz with 1kW as part of the National Broadcasting Service for the purpose of providing transmissions into the remoter areas of the country. The station had been operating on an experimental basis since 1928.

In 1938 the service was extended with an increase in transmitter power and was followed by installation of VLW near Perth to cater for Western Australia and Northern Territory listeners.

At the outbreak of the Second World War there was no Government owned system providing an international broadcasting service. The AWA experimental licence was cancelled.

Following a conference attended by officers of the Department of Information, the Australian Broadcasting Commission and the Postmaster General's Department, and Cabinet approval on 18th October, 1939, an overseas broadcasting service known as "Australia Calling" commenced on 20th December, 1939.

Programs were transmitted from Lyndhurst and from Sydney transmitters leased from AWA. In April, 1940, a transmitter in Perth was brought into service for broadcasts to South Africa. In June 1941, a second Lyndhurst transmitter of 10kW output was added to the service.

It soon became evident that the powers of the stations were too low to permit the transmissions being heard reliably and clearly against the increasingly intense competition of high power stations in other countries.

A plan was quickly developed for the construction of a station at Shepparton to consist initially of three high power transmitters with sufficient directional antennas to cover important target areas.

A proposal was submitted to Cabinet on 11th March, 1941 and subsequent submissions in relation to site, placement of orders for transmitting equipment and financial aspects were approved. The final cost was almost double the original estimate.

Three transmitters were installed comprising one of 50kW manufactured by Radio Corporation of America and two each of 100kW manufactured in Australia by joint contractors Standard Telephone Cables and Amalgamated Wireless (A/Asia).

The RCA 50kW unit began transmissions on 1st May, 1944, the first 100kW unit on 14th August, 1945 and the second 100kW unit in early 1946.

In November 1945 the service became known as Radio Australia.

The service at Shepparton was progressively extended and by the early 1960s, there were four 100kW, three 50kW and three 10kW transmitters in service. The present installation includes State-of-the-Art 100kW transmitters using vapour cooling techniques which replaced the original water cooled STC transmitters after 39 years service.

Australia's overseas broadcasting outlets have been considerably expanded since commencement 50 years ago, and today there are high power stations at Cox Peninsula in Northern Territory and Carnarvon in Western Australia. The original Lyndhurst complex has since been closed down and transmitters from there were relocated at Brandon in Queensland where transmissions commenced this year.

JACK ROSS



Front of new Harris 100kW transmitters 1 and 2 just after installation – Shepparton.



Original Harris transmitter – Carnarvon.

MY EARLY DAYS

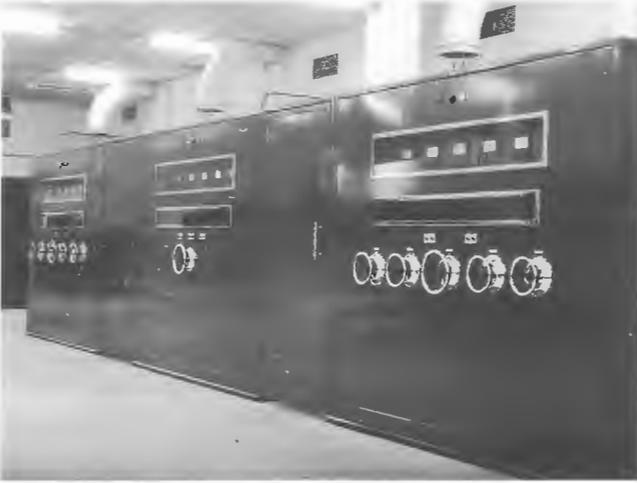
I first heard of Radio Australia while working with Bill Nankervis in Trunk and Carrier Installation.

He told me of the train loads of equipment going to Shepparton.

He did not tell me that it was mainly poles and ironwork and that actually very little radio equipment at that time was involved.

However, it caused me to request a transfer to Lyndhurst to learn something of shortwave broadcasting.

Bill Nankervis was instrumental in sending Tom Walsh and Arthur Wilson to Sydenham to do the installation work in connection with the two transmitters there.



Front panels of one of the 100kW transmitters.

Tom Walsh then became the logical man to do the installation work of the 50kW, RCA transmitter at Shepparton.

He brought with him Tom Lelliot and Joe Alexander.

I had already been some months at Shepparton helping on the stubbing of the transmission lines for matching and directional switching of transmissions.

I joined Tom Walsh in the installation of the RCA, 50kW transmitter, two on-site studios and the speech input equipment which at that time was all installed upstairs.

The main guiding lights that I remember were Bruce Mair and Alec McKenzie from Research.

Alec was responsible for the insulators where the transmission lines left the building.

His initial testing to determine their suitability was done at Lyndhurst where he created a certain amount of turmoil by proceeding to put stubs on the line where he had these insulators under test to provide very high voltages.

He used to come in with his fingers absolutely smoking with r.f. burns from altering these stubs.

The transportation of Lines staff was done by a 4 ton truck on which a loose box was placed to bring staff from Shepparton and return them.

This was highly dangerous and resulted in Lines staff bracing themselves everytime the truck was forced off the centre of the road to prevent the box from sliding off and them with it!

I objected to being transported in that manner and was told that my career in the Department was finished if I persisted.

I told the OIC, Jack Hargraves that he could tear up the memo, but everybody at the station knew that I had written the note and he couldn't tear that up!

During the installation, Tony Brettingham-Moore, of STC, who while testing for parasitics managed to have the d.c. follow him and arc down to his body.

It was a bit of touch and go at one stage of the game, but he was one casualty of the testing procedure.

At the time, he was using a piece of hardwood dowling with a wire stuck in the end of it and the wood not being a perfect insulator, and the voltages being extremely high made the work very dangerous.

I stayed on after the installation work was completed to take care of a shift.

Phil Keon, Mal Kirwood-Jones took on another one and Norm Park appeared from Lyndhurst.

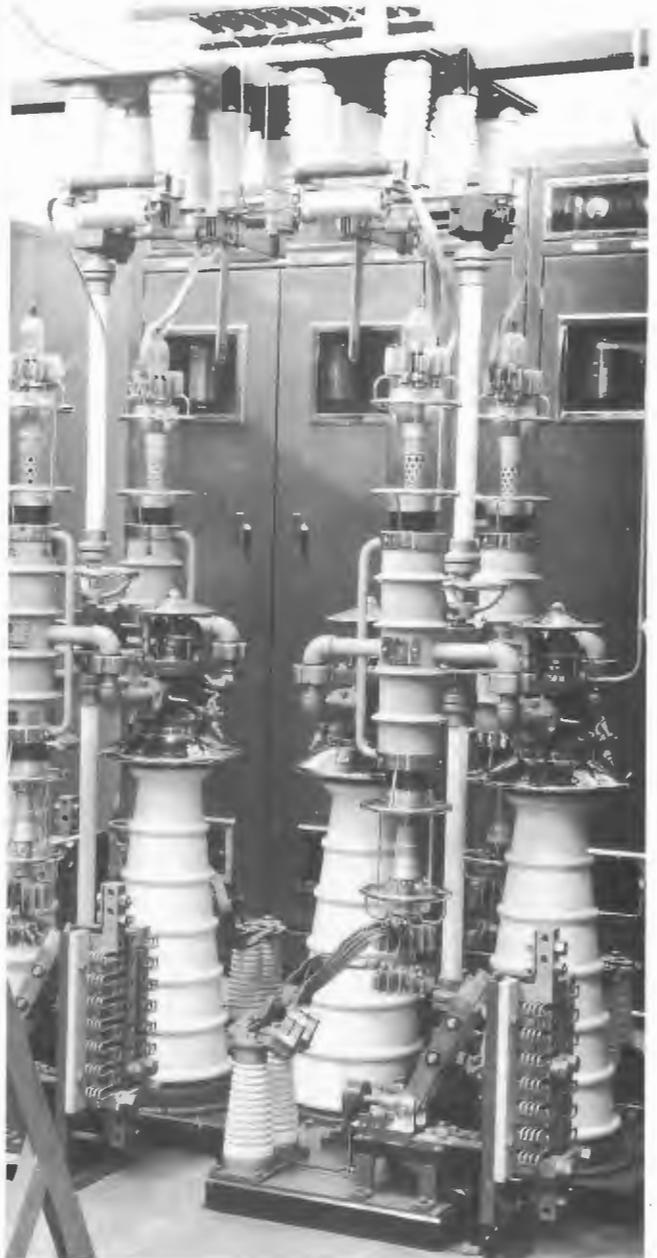
When we first started operating the 100kW transmitters, we had no circuits and no information whatsoever which made the whole thing a very difficult task, and it was only later on when one of our staff who later became an engineer – a young lad by the name of Alan Hart – managed to correlate all the circuits together and shall we say, check on the correctness of the circuits that we were really able to do anything much in the way of correcting certain faults that had been left with us.

One of the problems with one transmitter was the difficulty in obtaining more than 3dB of negative feedback on the audio modulator until an engineer arrived from STC.

He said, "Never mind about trying for 6dB. Let's go for 30dB of feedback".

He then proceeded to successfully bring up 26dB of feedback. That made a big difference in the transmitter performance.

FRED CHAPPLE.



Working and spare 4030C modulator tubes.

CARNARVON W.A.

Similar to the mythical Phoenix rising from its own ashes, RACAR effectively rose from the destruction of the Radio Australia Darwin antennas by Cyclone Tracy on 24th December 1974.

We were fortunate in being able to obtain the former NASA satellite tracking station near Carnarvon, and a 250kW Brown Boveri transmitter with a four antenna radiating system because of delays in building availability of another broadcaster.

Also, 100kW Gates/Harris transmitters ordered for Darwin had been delayed, so missing the cyclone. One was diverted to Carnarvon to provide a second transmitter. The other two were later installed at Shepparton when I had the pleasure of being in charge of upgrading the station my father had been involved in building some 30 years before.

The fortuitous availability of site and equipment, combined with close project control and the dedicated efforts of the installation teams, enabled RACAR to commence transmission less than a year after Cyclone Tracy and on the anniversary of the commencement of Radio Australia on 20th December, 1939 and of the first transmission from Darwin on 20th December, 1968.

Installation and commissioning involved a mixture of contractors and Telecom people. In the attempt to be on air within a year, there was great co-operation and camaraderie between the various groups, minimising the hassles from interruptions which can so easily occur with such arrangements.

It did however require dedicated efforts at times and I recall Murray Little and Trevor Chapman working with me throughout nights keeping up with both the Brown Boveri and Harris specialists when they happened to be on site together.

The antennas available were modern wide band curtain arrays. These are based on thick half wave dipoles enabling use over 3 or 4 bands (e.g. 11, 13, 15, 17 MHz), and large angles of slew, with 22° being used to cover Japan and to East and India to the West. "Bore sight" covers Indonesia on the first ionospheric reflection, then on to SE Asia and China on further hops.

Two major factors of concern for antennas at Carnarvon are:

- that it is, like Darwin, a cyclone prone area,
- the prevalence of severe saline corrosion.

In the time scale it was not possible to obtain heavy duty insulators suitable for cyclonic conditions, so counterweights for the antenna support catenaries were fitted with winches to enable the antennas to be lowered to the ground. The towers were however designed to withstand cyclonic winds with the antennas still in position.

The Carnarvon coastal area is subject to breezes heavily saturated with a strong saline solution. These breezes can persist over some months from late spring through mid summer, and when they reach the coast they deposit thick layers of moist salt. A moist salt layer makes insulators conducting so care is needed when commencing transmissions in the early morning, requiring a period on low power to dry the salt.

This moist salt is highly corrosive as was evident from the remains of the NASA structures. Particular care was therefore needed in design to minimise dissimilar metal contact, to choose suitable grades of stainless steel, and to apply appropriate protective coatings – greasing wire ropes as well as applying an appropriate paint system to galvanised steel.

The construction of RACAR enabled Radio Australia to rapidly regain a strong voice in Indonesia and other important target areas.

RACAR remains in important link in the Radio Australia service, and has been enhanced by the addition of a Thomson-CSF 300kW transmitter commissioned in 1984.

GIFF HATFIELD.



Antennas and transmission lines.

CHANGES OVER THE YEARS

The Shepparton station commenced service with an RCA, 50kW transmitter and two 100kW units. Today, a visitor from the 40's would notice considerable change. Although the original RCA, 50kW transmitter remains, it has in fact been turned into two 50kW units by using the spare power amplifier and an additional modulator/power supply.

The remainder of the main hall now includes six, Harris 100kW transmitters and these occupy considerably less space than the old 100kW units.

The Harris transmitters have the capacity to change frequency bands and select preset tuning points in less than 20 seconds. Unfortunately the antenna switching system has a longer operating time and full use of the fast-tune time cannot be realised.

The transmitter annexe built in 1955-56 still houses the RCA 50kW transmitter installed for the Melbourne Olympic Games as well as two STC, 10kW units.

A 600kW Brown Boveri artificial load is installed at the far end of the annexe to provide for transmitter testing, as necessary.

Some will remember the old 10kW transmitter located in the annexe which operated under the callsign VLY using a

switch still remains in service. Unfortunately, 28 years of service means a lot of aging and as a result, the switch is now in need of replacement.

The matrix switch has performed a formidable task over the years and although it has been the subject of modification and much maintenance, it has provided flexibility of switching which has been appreciated by station technical staff.



Modified STC 100kW transmitters. Transmitters 3 & 4 in foreground and RCA 50kW unit on right. TO Roman Jakob at controls.



Transmitter hall early 1960s. On RHS is old AWA 7.5-10kW RF driver and at this time being used as emergency 10kW transmitter. Operator is Russell Rolls, currently OIC 3LO/3AR.

frequency of 25 735kHz. This transmitter operated day in and day out for many years, and was coupled into a fixed two element array.

A number of changes have taken place within the antenna farm, however, in basic form the antenna systems haven't altered very much.

The Japanese group remains much as it was, although 17 and 21MHz curtains have replaced the old 7MHz array. The American/African group retains all the old antennas plus some new ones – mainly 6MHz.

The European group was physically moved in the early '60s and now has main transmission bearings of 308/128 degrees. Of note, is the use of re-vamped switches from the old north/south switching group for use in directional/stub switching.

The alternative Japanese antennas were relocated to a bearing of 320 degrees in the '50s and became the South East Asian arrays. With the advent of Darwin and Carnarvon, the SE Asian antennas now receive little use. Rhombic antennas JR and AR were relocated and rebuilt using lattice masts in 1978, however, the old ER still remains as a reminder of early days.

Most people would be aware that the old line switching system was replaced by a matrix switch in 1961-62 and that the

The on-site buildings have seen many changes. Former staff will remember the old speech input equipment located upstairs on the mezzanine floor. However, today, this area is all office space. The old OIC's office on the ground floor houses speech input and frequency synthesisers while the adjacent PABX and 50V battery area now houses a shielded service facility.

The former emergency studios are now offices, and the monitoring room has become a small meeting room.

The building is also the headquarters for the Shepparton Broadcasting District and a suitable work area for TV service staff has been located in the annexe.

The original on-site houses have been sold and the area returned to its natural state. The station entrance has been modified and now includes a coded access boom gate for security purposes.

BRUCE WILSON



50kW RCA transmitter type BH50B installed 1956 and still operating. Tech Vic Bruce at desk and TO Lloyd Arho reading meters.

BRANDON Q.

The most recent of the RadioAustralia outlets was established this year at Brandon in North Queensland on the site occupied by 4QN.

The project was designed to proceed in two stages using a combination of material transferred from other sites and the purchase of an overseas curtain array system.

The initial stage involved the removal from Lyndhurst in Victoria and re-installation at Brandon of three 10kW high frequency transmitters and a rotatable log-periodic antenna.

The second stage comprised the provision of two curtain arrays fed via locally constructed transmission lines.

Scheduled program transmission commenced on 7th May 1989 on a frequency of 6020 kHz beamed to Papua New Guinea using the log-periodic antenna. The curtain systems will be commissioned by the end of the year.

Two STC transmitters type 4SU-48B are utilised in a main/standby configuration for the Papua New Guinea Service and a third unit operates on the Coral Sea Service. The transmitters cover the range 3 to 28 MHz and employ A3 high level class B modulation. Output impedance is 300ohms balanced and the transmitters feed into 300 ohm boxed lines in the building.

The log-periodic antenna is fed by a tapered line to match the antenna 130 ohm input impedance while the curtain arrays are fed via 300 ohm lines.

The log-periodic which is locked in position is beamed towards Papua New Guinea. It is 32m high, covers the frequency range 4.2 to 30MHz and has a gain greater than 8dB.

Erection of two curtain antennas commenced during July using antenna types HR 2/2/0.4 and HR 2/2/0.6 manufactured by TCI of USA and 50m high EPT square section support masts recovered from the original log-periodic antennas at Radio Australia, Cox Peninsula.

One curtain is beamed on Papua New Guinea while the

other is beamed on the Coral Sea region. The antennas cover the 6/7/9/11 MHz bands and have carrier rating of 250kW with 100% sinusoidal amplitude modulation.

They consist of four horizontal half wave folded dipoles spaced half wavelength centre-to-centre both horizontally and

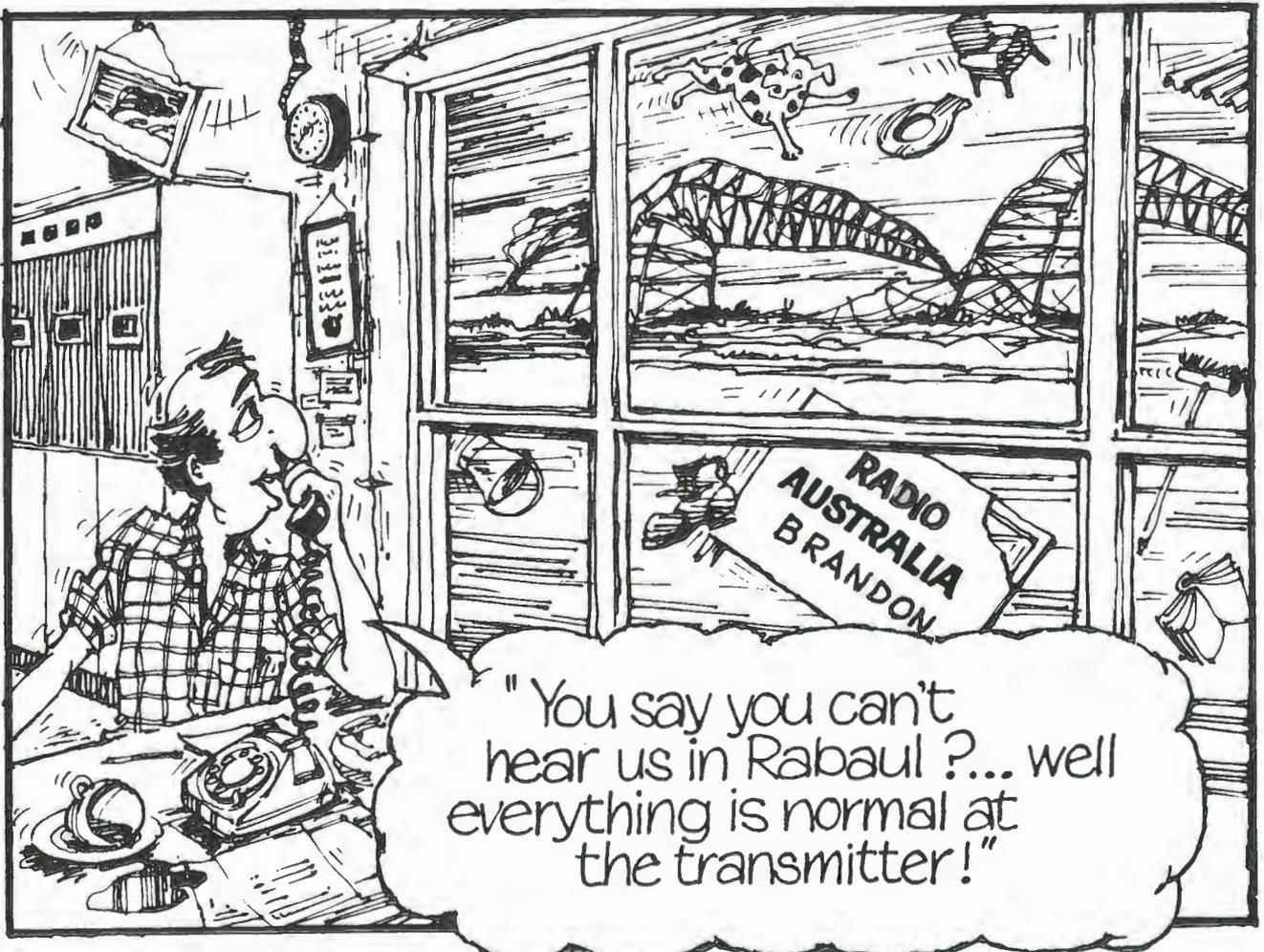


The log periodic antenna.

vertically. Back radiation is suppressed by an aperiodic reflecting screen behind the dipoles. Each column of two dipoles has its own vertical feed system. The vertical feeds are interconnected by a horizontal feed system placed a few metres above ground. A three section balanced Chebyshev transformer converts the 150 ohm parallel impedance of the two columns to 300 ohms.

The broad bandwidth of the array is achieved by using folded dipoles as the radiating elements. Each dipole is a flat cage of eight wires and is slightly less than half wavelength tip-to-tip. To maximise the dipole's impedance bandwidth, its length-to-diameter ratio is made as small as practical by making the cages electrically "flat".

GRAHAM STEAD/RICHARD WOMACK



UNFORGETTABLE YEARS SHEPPARTON 1941-1946

My association with the Shepparton station began in the early months of 1941. I had completed my course as a Junior Mechanic-in-Training and had also gained passes in Transmission and Natural Science subjects in the Open Engineer's Examination. This led to posting to the office of the Divisional Engineer, Radio, Victoria as an assistant to the engineering staff.

The Divisional Engineer was Harold Robertson who in later years retired as Director, Posts and Telegraphs, Victoria. Harold identified me as "that young fellow who spends all his time reading technical books".

Soon after becoming established in the D.E.'s office, I was allotted tasks on the new International High Frequency Transmitting Station. The title Radio Australia came along much later. My first task was establishing the cabling diagrams and jumpering schedules for the control circuits associated with the automatic transmitter to antenna switching and for the antenna reversing and slewing schemes.

The basic design work for the project was being undertaken by the PMG Research Laboratories staff who were located only a short tram ride from the D.E. Radio's office.

At that time, there was no Central Office Radio Section. It did not become established until after the war when Horrie Hyett was put in charge at Jolimont. Prior to the formation of the Central Office Radio Section, all Central Office radio engineering was carried out by the Research Laboratories staff, then led by Sid Witt.

The Shepparton project was the responsibility of Bruce Mair's group. Bruce later became a Member of the Australian Broadcasting Control Board (ABCB). My contacts with the group were Alec McKenzie, Bill Waterworth, John Champion and West Hatfield of the Central Office Drafting Section. Alec McKenzie, inventor of the armature top loaded MF radiator later joined the ABCB and West Hatfield who after qualifying as an Engineer also moved to the ABCB.

Later in 1941, I paid my first visits to the project site and early in 1942 moved to Shepparton with only occasional visits to Melbourne. As I had now gained passes in the remaining subjects of the Open Engineer's Examination I was advanced as Acting Engineer and assigned to the field work concerned with the tuning of the antennas, testing of transmission lines and the commissioning of the outdoor plants.

I was nominally under Jack Kyne a Lines Engineer responsible for outdoor plant but on the antenna work, I answered directly to Alec McKenzie. On occasions of "great trouble" particularly with the first antennas – Alec was able to add Rudolf Buring of the Research Laboratories to the commissioning team.

Jack Kyne had a very large team of Linesmen, many of whom were recent graduates of the Victorian Lineman-in-Training Scheme. One claimed to have graduated Ph.D. (Post Hole Digger) and helped with the hundreds of tuning, reversing and slewing stubs which had to be installed.

Line Foreman Jack Laydon certainly had his hands full but did a magnificent job. Alan McIntosh, a radio engineer who had left broadcasting to work in the Ararat Country Divisional Office transferred to Shepparton with responsibility for the indoor equipment work and was later to become the first Resident Engineer.

Alan had Jack Hargraves as his Supervising Technician (or was he then still called Foreman Mechanic?). Jack had been transferred from Lyndhurst where he had taken part in the first overseas high frequency broadcasting transmissions from Australia and was the real pioneer technical expert in the team. His offsider was Phil Keon from Sydenham and Lyndhurst. Jack and Phil became the first resident technical staff.

The Department's indoor construction technical team was led by Tom Walsh who was recruited from Long Line Equipment Construction. Tom's team included Fred Chapple who stayed on as Shift Leader after completion of the installation work

(was it ever finished?) before taking over as Officer-in-Charge at 3AR/3LO Sydenham.

Of course, the largest indoor installation team was that of the joint supplier – STC and AWA. A listing of engineering staff who worked on the Shepparton project would have represented a "Who's Who" of the radio engineering industry in Australia at that time. The STC leaders were Bert Wood and David Abercrombie.

"Abber" spent many months on the site despite his many



Jack Laydon project Line Foreman.

other responsibilities within STC. His Resident Engineer was Tony Brettingham-Moore (later an engineer with the ABCB) and a list of STC staff who contributed at various stages of the project included Bob Long, David Hutchinson and Jack Tremlett. AWA had George Nolfe as Resident Engineer and his team included Drake Brockman of Marconi U.K. and Ron Blades.

On both the Government and Industry side, Shepparton acted as a magnet for technical people who wished to become associated with such an exciting and massive radio engineering project.

Those drawn to the project included Bob Stainsby – later mine host at the Shepparton Terminus Hotel – and Roy Spratt. Roy joined Jack Kyne's Lines team and later moved to Radio Section in Melbourne with responsibility for Shepparton operations.

I could go on! Memories fade after 50 years like a filament burning out slowly. However, one memory which remains clear is the excitement and ultimate satisfaction gained as a raw young engineer as a result of association with the people involved in the project. Not the least of my great pleasure and satisfaction is being part of such a large team of skilled and dedicated people from a wide range of organisations with an even wider range of technical specialities and skills who combined to undertake such an unusual and complex task and who achieved success in record time.

Although the Shepparton project was my first, it remains the most memorable of the many projects with which it has been my good fortune to be associated over many years in radio engineering.

JIM WILKINSON.

JAPAN'S VERSION OF RADIO AUSTRALIA

The first attempt in Japan at International broadcasting using a short wave transmitter took place in August, 1929 with the arrival of the German Airship Zeppelin in the country. The broadcast was a failure when the program link failed. The first successful broadcast was carried out on 27th October, 1930 with the re-broadcast of a ceremony in London ratifying the Disarmament Treaty between Great Britain, United States and Japan. Eleven years later, all three countries were involved in the Pacific War.

The overseas service of Nippon Hoso Kyokai (NHK) known as Radio Tokyo was inaugurated on 1st June, 1935, using a 20kW transmitter located at Nazaki. The service was initially aimed at providing information on Japan and entertainment for foreign nationals of Japanese ancestry and Japanese listening abroad. Later, more importance began to be attached to spreading knowledge of Japan throughout the world through the introduction of cultural and other attainments in Japan.

As the international situation developed from the war in China to the Pacific War, broadcasting was taken under the wings of the government's information and propaganda agencies and it began to be used as a means of psychological warfare against the Allies. In the South Pacific areas occupied by Japanese troops during the early stages of the Pacific War broadcasting stations were constructed one after another under military administration for presenting programs for Japanese servicemen and the local people. These areas were also brought under the umbrella of NHK's overseas service.

Broadcasts originating in Tokyo were titled "Calling to Greater East Asia" and were relayed by all Japanese controlled transmitters in occupied countries. Initially, only one 10kW transmitter was used in Tokyo but with passage of time, power and outlets increased. By the end of 1942, two 20kW and three 10kW transmitters feeding into directional antennas were operational.

Stations through which the Japanese broadcast propaganda to Australia, as well as Tokyo, included Batavia, first heard in Melbourne in May 1942, Saigon in October, 1942, Shanghai in October, 1942 and Singapore in November, 1942.

By 1944, Radio Tokyo had reached the peak of expansion after both facilities and transmission periods had been increased year by year. The service broadcast into 15 target zones including Australia. The transmitters operated for a total of 90½ hours a day with programs being broadcast in 24 languages. The transmitters included four 50kW, two 20kW and three 10kW units with a 50kW relay station located at Singapore.

One of the most widely known programs was "Zero Hour" started in April 1942. The programs directed to Australia and the Pacific War front line areas were intended to discourage Allied servicemen through propaganda.

Servicemen nicknamed a female announcer, "Tokyo Rose". As the war situation became more and more unfavourable to Japan, materials for operation of the technical facilities became scarce. The vacuum tube manufacturing plant had been severely damaged by air raids and the production of large transmitting tubes became extremely difficult. As a result, Radio Tokyo was obliged to shorten transmission time, reduce output power and even close down some transmitters to obtain spare parts.

The Pacific War ended on 15th August, 1945 and on 1st September the General Headquarters of the Allied Powers issued a directive to close down the NHK overseas short wave service.

When the international service resumed in February 1952 with two 50kW transmitters, it was named Radio Japan – the previous call sign Radio Tokyo being dropped. Transmitter powers have been gradually increased and today the maximum power is 300kW.

It is of interest that wartime short wave broadcasts from Australia and other countries had little impact in Japan. The population had been prohibited by law from owning short wave receivers since the very beginning of broadcasting and enforcement of the law had become strict following the outbreak of war with China in 1937.

JACK ROSS.



Radio Japan Operations Room. Programs are sent from here by land lines to Yamata transmitting station 60km from Tokyo.

THE OLD BEDFORD

There are ex-Shepparton staff spread far and wide across Australia and I'm sure many have memories of the old staff transport arrangements, particularly motor drivers like Rupert Livingston, Alan Ritchie and others.

In the old days, there were seven staff houses on-site and each provided a home for a growing family.

There was no school bus service or other public transport, so everyone including wives and children were included within station transport arrangements.

The main vehicle in the late '50s was a large Post Office Red Bedford Van with opening out backdoors.

The doors always rattled with movement and were part of the staff transport environment.

Inside the van were two long forms screwed to the floor and this was the seating for families, shift staff, etc.

Mrs. Hargraves – wife of the station OIC – always sat up front next to the driver while those in the back enjoyed happy conversation amongst the boxes of groceries etc.

The driver often had the interesting challenge of finding missing school children and at the same time getting staff to work on time.

On Saturday, it was the shift task to collect newspapers, milk etc. for the on-site houses. There were other messages as well!

Gradually there was progress and change took place. The school bus service called, milk deliveries became the norm and modern transport evolved. Progress they call it.

Today, there are no staff houses, and an airconditioned bus is provided for staff transport.

Somehow the old days were special, the old red van provided a meeting place for staff and families – and, of course, the friendship of a kindly motor driver.

BRUCE WILSON.

UP THE GUY

One dark summer evening during the early sixties, a large semi-trailer truck carrying a load of safety matches failed to negotiate the Verney Road/Highway turn near the north western edge of the property and found itself on fire from end to end.

The shift staff on duty who were well aware of the hazard to the property smartly and efficiently "took off" in the old Morris crash box wagon to investigate.

They headed across the northern antenna paddock with eyes firmly fixed to the fire but, in the anxiousness of the moment, failed to see one of the steel guy ropes supporting the South East Asian Rhombic.

The vehicle simply travelled up the guy wire and remained perched in this position with headlights illuminating the sky.

The driver and passenger very gingerly exited the vehicle and surveyed the scene.

The story goes that many of the fire spectators found more interest in the truck perched up the guy rope at 45 degrees, than the fire itself.

The post script to the story is that the fire smouldered for several days and then with a wind change caught alight and set fire to the RA property where it burnt from one end to the other.

There are many stories of that fire but, of note was the fact that it took weeks to sort out the numerous volunteer fire brigade knapsacks and equipment etc.

For those who would like to know, all sheep were saved, but pasture was reduced for some time.

Fire still remains one of the high risk areas at Shepparton, and the situation is watched very carefully during the summer season.

BRUCE WILSON.

THE LISTENERS

"Radio Australia, Melbourne, Australia", is probably the best-known Australian address in the world. It's the destination of several thousand letters every week, a flow that continues undiminished from every corner of the globe year after year.

Listener reaction is important to any radio station, especially one whose audiences are overseas rather than around the corner! The letters which pour into Radio Australia are a welcome response to the work put into preparing programs intended to encourage awareness and understanding of Australia and Australians amongst its neighbours. The broadcasts are often the main – and sometimes only – source of regular news and information about Australia for listeners so it's important to know that people are hearing and liking them.

The programs with the greatest appeal are usually those which reflect the Australian way of life and give some insight into how people live, work and play.



Listening at home in Indonesia.

News bulletins and current affairs broadcasts are also highly regarded. Radio Australia's focus on Australian, Asian and Pacific affairs and its reputation for accurate, authoritative reporting make it a widely-listened-to station within and beyond its main target areas. The importance of such coverage is underlined in the appreciative letters from people thanking RA for keeping them in touch with and informed about the world around them.

Handling the incoming mail and sending replies keeps a number of staff fully occupied. While many of the letters can be dealt with quickly, others seek information on a range of topics and issues that require research before being answered. It seems that some people see Radio Australia as a vast storehouse of information about Australia and Australians just waiting to be tapped!

The greatest volume of mail comes from listeners to the Chinese and Indonesian Services. It's not unusual to have upwards of 5000 letters monthly in each language, with peaks in tens of thousands when Radio Australia's popular calendar is available or a competition is being run. The flow from Indonesians is such that a staff of three are being employed in Jakarta to handle the letters.

Chinese listeners are able to write to post office boxes in Beijing, Hong Kong and other Asian cities. When first established the Beijing box received over 70 000 letters in less than a month!

However, it may be – letter, telephone, telex – around 200,000 people a year are in touch with Radio Australia. The response compares favourably with that of other international broadcasters and shows that someone out there is listening!

KEITH SYNNOTT.

THOSE WERE THE DAYS

Very late in 1959 I travelled to Shepparton as a Trainee Technician to see first hand and to learn about the complexities of shortwave broadcasting.

It was an interesting trip in that the old car had some difficulty on the long climb up Pretty Sally, and the radiator approached boiling point.

We made it to Shepparton and settled down at the old guest house in Nixon Street, a street with large bluestone gutters and huge trees.

We arrived at the station and here we found a building riddled with tunnels and caverns. It was a place in which you could get lost.

VLA was operating full bore and half of VLB was undergoing preliminary re-building.

Earl Scoones was carefully painting panels and Bill Davidson was in a huddle with Fred Seligmann over circuit preparation.

It seemed that Fred had reams of paper from end to end of the office, and yet it all had some sense of direction.

Shift Super Techn Alan Finch was operating the transmitters that day, and Bruce Gillies was his No. 1 Assistant.

Failure of a transelector switch brought Ray Fitzsimmons and Lin Bamford, into the action to carry out repairs.

Newer staff at that time were Vin Smith, Max Johnston, Don Horsey and Kevin North who all seemed to be busy wiring up contactor panels etc. for transmitter conversion.

Overall, there was activity throughout the building and all were busy.

On the second day, I noticed an elderly gentleman walking up the stairs, complete with felt hat, moustache and a bunch of flowers.

On enquiry I was told, "That's old Jack, the boss. Do the right thing and you'll have no problems".

I was later introduced to Jack, and to office staff, Ron Stephens and Sheila Treacy.

As a trainee, I spent a short time in each work area and got to meet Jack Nicholas, Fred Barker, Frank Markham, Vic Bruce, Alan Dobson, Roman Jakob and other shift workers who tried their best to teach me the vagaries of transmitter tuning and operation and how to change large glass transmitting tubes without breaking them.

Those were the days when each transmitter had an operator who was responsible for the transmission log, transmitter set ups and tuning etc.

Operators like Graham Billings, Neville Maddern, Ormy Guy, Lloyd Arho were all names you ran into. Some stuck in your memory more than others. Ormond Wellesly Guy was a colourful character who had the nickname YUGWO (OWGUY – backwards).

It was also a nom de plume for his scouting notes published in the local newspaper. "Yugwo" always seemed to know where to borrow a cigarette (snout in his words).

His writing was often in the distinctive colour of peacock blue.

Lloyd Arho had the name of "YARHOO" (don't know why!) but there was often a shift combination of "YUGWO AND YARHOO".

Bob Haberfield and Lin Kelly were members of the Progressive Maintenance Section and often wrestled with the problems of tuning coil maintenance on old VLD transmitter 8.

Well those were the days, the days when Laurie Fitch would try to impart his learnings to the Exempt Techns of the days, the days when cleaner Bill English would encourage new trainees towards moral responsibility, the days when rapid changes were taking place, the days when Shepparton was a place to gain knowledge, friendship and experience.

It certainly is a rewarding place to be, a place to grow and a tribute to those who went before.

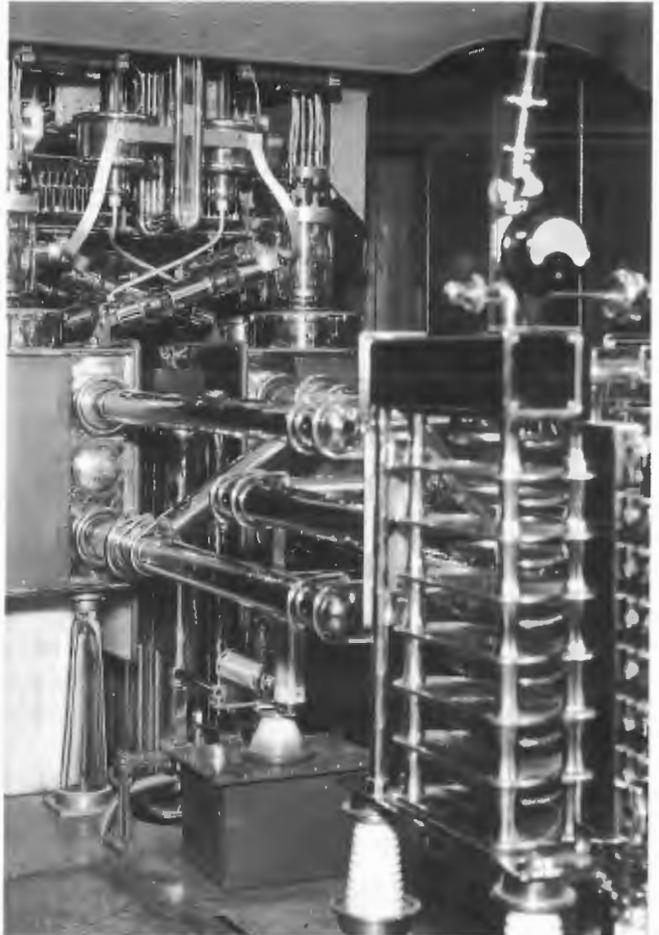
BRUCE WILSON.

THE MIGHTY F124A

The old STC transmitters at Shepparton which operated for some 39 years used a Federal/ITT power triode type F124A in the power amplifier stage to provide 100kW.

The F124A was a water cooled directly heated tube with 6 phase pure tungsten filament and had an average life of approx. 6,500 hours. Each transmitter used four F124A's in push pull parallel configuration to provide 100kW output.

Records indicate that each transmitter provided an average of 20hrs transmission per day.



The 100kW power amplifier stage which employed four F124A tubes in parallel push pull.

- For one year = $365 \times 20 = 7,300$ transmission hours.
- For 39 years the figure is $7,300 \times 39$ or 284,700 transmission hours per transmitter.
- Using 4 tubes per Tx then tube hours are $284,700 \times 4 = 1,138,800$ hrs.
- For 4 transmitters = $1,138,800 \times 4 = 4,552,000$ tube hours.
- Average life was 6,500 hours per tube.
Therefore $\frac{4,552,000}{6,500} = 700$ tubes used.
- This means that on at least 700 occasions, technical staff journeyed to the transmitter hall basement to drain the cooling system and similarly struggled and strained to remove filament connectors, bypass capacitors, neutralising connections, etc.

PROGRAM HOURS:

- Program hours per Tx for 39 years = 284,700.
- For four Tx's = 1,138,800 program hours.
- There are 8,760 hours in a year,
therefore $\frac{1,138,800}{8,760} = 130$ program years broadcast during

the life of the STC 100kW transmitters.
• If other transmitter hours are included, then it is reasonable to suggest at least 200 years of program have been broadcast from Shepparton transmitters since commencement.

Our Bi-centennial – in international broadcasting service!

BRUCE WILSON.

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END OF AN ERA AT SHEPPARTON



Last day of service for STC 100kW transmitters 10th October, 1983. Retired senior staff carrying out tuning. L to R: Bill Davidson retired OIC, Jack Nicholas retired STO2, Fred Barker retired STO2, Bruce Wilson present OIC.



Staff at aerial switching desk on last day of service of old STC 100kW transmitters. L to R: Bob Scowen (Driver), Lin Bamford (Tech retired), Pat O'Shannessy (STO2), Bill Tyquin (Electrician), Peter Hertwig (Tech), Jack Carnell (BOM retired), Jack Russell (Lines Officer), Pam Baldwin (CA4), Ken Bowey (FMO).