

~ *Unbounded Growth* ~
 1946–1986

Thomas Playford's Vision

Thomas Playford was a man with a vision. In the late 1930s, as Premier of South Australia, Playford was driven by his perception of the need for South Australian industry and agriculture to grow in diversity and size. The major factor in supporting this growth, he reasoned, was the availability of an adequate, centrally planned electricity supply system serving the entire State. His objective was a secure electricity supply fuelled by South Australian coal and run by South Australian expertise – all under the close watch, if not control, of the State Government. Yet, inherent in all this, there was conflict with the already established private provider of electricity, the Adelaide Electric Supply Company (AESCo), who preferred to use the high quality New South Wales coal for the generation of electricity for South Australia, rather than experiment with the low quality coals of South Australia.

Indeed, Playford's vision for the future of South Australia did not sit easily with the views of AESCo's Board of Directors. The initial issue of contention surrounded use of coal from Leigh Creek for fuelling the Osborne Power Station. The boilers at this particular power station had not been designed for the low quality coal mined from the northern



TOM PLAYFORD, LONG-SERVING PREMIER OF SOUTH AUSTRALIA, HAD A DIVERSE AND BROAD VISION OF HOW STATE-CONTROLLED ELECTRICITY SUPPLY COULD ASSIST THE GROWTH OF INDUSTRY. HE IS SHOWN HERE AT LEIGH CREEK, A SPOT FOR WHICH HE HAD GREAT AFFECTION
 ELECTRA.NET SA

regions of South Australia. AESCo asserted that this coal was uneconomic; Playford argued that its utilisation was essential to South Australia's post-war survival and subsequent independent development.

By 1942, in the midst of a painful and debilitating world war, AESCo and Playford were locked in a power struggle of their own. Playford, maintaining his belief that there was a need for a central electricity supply and generation authority, established the South Australian Electricity Commission in 1943. Within a year, this fledgling organisation, under the guidance of Jim Harrod, proved active and influential in the State Government planning process.

Although AESCo was determined to survive as an independent private entity, a Royal Commission into its corporate affairs was initiated by an also determined State Government. Restrictive Government Bills were threatened and strong public sentiment was in favour of Playford. All these factors counted against the company at a time when the community was experiencing many electricity disruptions caused by a shortage of coal supplies from New South Wales.¹ Consequently, it was not to be long before Playford was able to achieve one of his main objectives to assist the State's future development.

On 1 September 1946, the Playford Government, through an Act of Parliament, created a new entity named the Electricity Trust of South Australia (ETSA), to co-ordinate, control and operate the electricity processes in South Australia for the benefit of the State. This manoeuvre effectively put into the hands of Government, all of AESCo's assets and staff.² A bold move on every front, it anticipated and then paved the way for an amazing period of growth in generation, transmission and in the sophistication of power system control and planning. The formation of ETSA was seen at that time as the opening of a window of opportunity for South Australians – the herald of a frontier of post-war change and growth.

Empowerment of ETSA

At the time of the launch of the Electricity Trust of South Australia in September 1946, the South Australian transmission network had already



By DECEMBER 1946, THE TRANSMISSION SYSTEM HAD ALREADY MOVED INTO A LARGE NUMBER OF RURAL AREAS AND WAS PLANNED TO SPREAD AT A MUCH GREATER PACE AND INTENSITY. A COMPARISON WITH THE EARLIER MAP WILL CLEARLY SHOW THE DEVELOPMENTS ACHIEVED

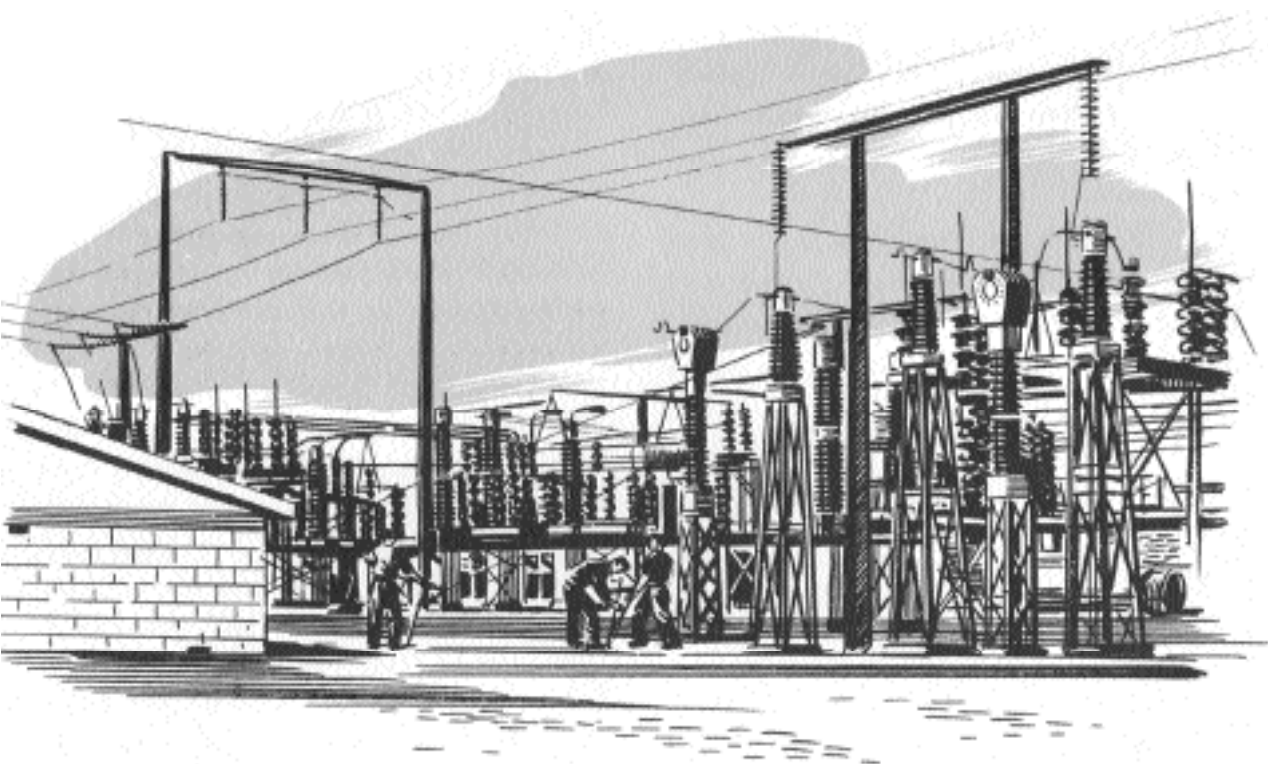
ADELECT MAGAZINE

etched its way across countryside from Booleroo Centre in the north, to Rapid Bay in the south, and from Port Wakefield in the west, to Morgan in the east. This network had effectively addressed the electricity requirements for the Fleurieu Peninsula, the Adelaide metropolitan area and the prosperous farming communities of the mid-north. However, it had not progressed nor expanded into the rural and mining areas at a rate satisfactory to the State Government, anxious to see South Australia move rapidly from a concentration on the war effort, into development as a successful agricultural and industrial producer.

AN ARTIST'S SKETCH OF
ONE OF THE
SUBSTATIONS EN ROUTE
FROM THE PORT
AUGUSTA POWER
STATION
PORT AUGUSTA POWER
STATION, OFFICIAL
OPENING, 23RD JULY,
1954

By taking over AESCo and retaining its staff, Playford gained an effective team with a determined organisation that, under State Government arrangements, had access to the necessary financial resources to back the planned rapid expansion of the electricity system, and which could cut through any frustrating bureaucratic delays.

Hence, at the time of ETSA's first annual report in 1947, the members of the Electricity Trust could already report that electricity

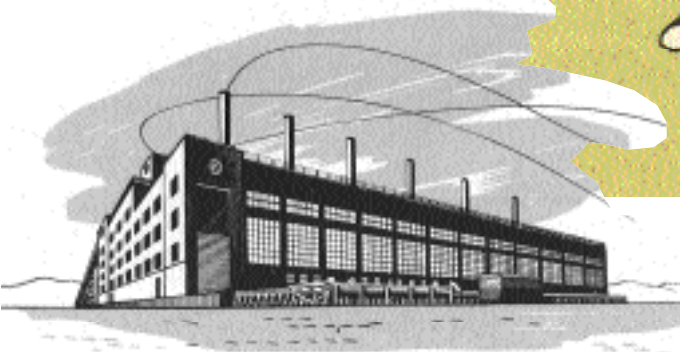


supply had been extended to a number of new areas and that 13.3 kilometres of 66kV, 35.4 kilometres of 33kV and 19.3 kilometres of 7.6kV transmission and distribution lines had been erected in the previous nine months.³ This was a significant achievement in itself; during a period of post-war rationing and restriction, the very scale of ETSA's new forward planning was daunting. At the insistence of the State Government, local and regional electricity supply companies in many of the country areas were being progressively purchased and placed under ETSA's control; and, being rapidly extended into all rural areas, were the high voltage transmission lines which, in time, would dispense with the need for small rural power generation and supply systems located in the main country towns. Indeed, the enhanced transmission network was very quickly developing throughout the State, under central control and with an advanced communications system already being established to service all corners of the main network.

Rural and urban expansion during the 1950s to early 1960s

Just over a year after ETSA's first annual report had outlined the magnitude of the power system expansion that was planned, the Electricity Trust announced that many of its major projects were already under way and they even advised the community when these projects would be completed. This project list was testimony to the drive of those people involved. By the end of 1948, a substation at Clarence Gardens would be built; and a host of projects would be completed in the Riverland irrigation area, including a 33kV line between Loxton and Berri. In addition, by the end of the first quarter in 1949, there would be a new 33kV substation at Kilburn, a further transmission line from the Osborne Power Station, and 33kV lines from Blyth to Clare, from Kilburn to Croydon, and from Port Wakefield to Ardrossan on Yorke Peninsula. On and on went the project list, with completion dates for projects provided up to the end of 1952: a Kilburn to Northfield 66kV line; Bungama to Port Pirie 33kV line; new substations; new Mains Control supervisory systems; and a host of other initiatives. The continuance of the maintenance and

AN ARTIST'S SKETCH OF PORT AUGUSTA POWER STATION AND MAP OF THE MAIN TRANSMISSION ROUTES STRETCHING FROM THERE TO ADELAIDE AND OTHER IMPORTANT INDUSTRIAL OR RIVERLAND SITES PORT AUGUSTA POWER STATION, OFFICIAL OPENING, 23RD JULY, 1954



upgrading of the existing transmission network was an important inclusion as well.⁴ To

provide new generation to be connected to this planned enhanced network, and to meet the needs of all the new customers, there would be an Osborne “B” Power Station, with a fourth boiler designed to burn Leigh Creek coal, and a major regional power station at Port Augusta, whose boilers would exclusively burn Leigh Creek coal.⁵ With even further foresight, in December 1950, ETSA announced another future power station was being planned for the North Arm of the Port River, with a huge 500MW capacity to meet the expected growth in South Australian electricity demand in the 1960s and 1970s.⁶

The spread of the electricity transmission network throughout the late 1940s and 1950s was a time of vitality, camaraderie and accomplishment for those involved. Of great interest was the progress of the first 132kV high voltage transmission line between Adelaide and Port Pirie, which was to be further enhanced by another 132kV transmission line from Northfield to Waterloo and then on to Berri. In due course, it was planned that the new Port Augusta Power Station would re-link into this new backbone 132kV transmission system.⁷

The construction of these transmission lines provided employment for many people in South Australia. Construction teams working in remote rural areas were housed in prefabricated, transportable huts.⁸ Although conditions on these major construction sites could be trying, those involved felt a certain pride in the undertaking. In 1955, when a major transmission line was extended from the North West Bend substation near Morgan, to the uranium mining centre at Radium Hill in the State's north, it had to pass through some very inhospitable country. Yet, the spirit of the team there was excellent. Lloyd Bannister, who witnessed it first hand, wrote:

All associated with the transmission power line construction could feel the task of blazing this new trail across country, explored by few in the past, was related to the Atomic Age. A pioneering spirit was strongly evident and this created strong teamwork which carried the difficult project through.⁹

Others associated with these ventures agreed. Ex-employees Keith Shrubsole and Peter Burgess recall the many events that shaped the construction of the early 132kV transmission lines in South Australia's mid-north and Yorke Peninsula. There was an incident near Maitland, for example, when the twenty-three-metre-long 'Stobie' poles used for the line were not properly supported, and an entire stretch of electricity cable and poles fell like dominoes. There were tales of trying to raise the cables over 'stinking swamps', of seeing farmers' valuable sheep disappearing down the holes bored ready for the poles, and of battling the elements and



FOUR SCENES SHOWING THE SPREAD OF THE TRANSMISSION SYSTEM THROUGH THE MID NORTH AND YORKE PENINSULA IN THE EARLY 1950S. AN ETSA CREW AT ARDROSSAN, 1950; ERECTING POLES FOR THE TRANSMISSION LINE; AND TWO VIEWS OF THE MOVABLE TRANSMISSION CAMPS — ONE ON BOARD TRUCKS READY FOR THE JOURNEY AND THE OTHER ERECTED AT CRYSTAL BROOK IN 1955
KEITH SHRUBSOLE

the shortage of time to achieve the ambitious project goals.¹⁰ Keith Shrubsole embellishes:

From the day you joined you were a team – you all worked together. There was much pride in doing a job well and in the amount of work that could actually be completed. With this teamwork, it was only a matter of time before the whole system started to fall into place. The 132kV transmission system *really* opened the whole State up, especially the north, and particularly when the Port Augusta Power Station first came on line ... You had two transmission lines – one going through near Port Wakefield meeting up at Crystal Brook and then up to Port Augusta. The other line was over Waterloo side, coming in again at Port Pirie – what we call Bungama – and headed up to Port Augusta ... The transmission circuit that went to Waterloo supplied the entire upper Murray region. That was the start of the real major development in this State – the 132kV transmission system going in.¹¹

The rural community welcomed the ETSA teams and contractors with open arms and saw the advent of electricity in their region as a major sign of progress.¹² The presence of 66kV and 132kV transmission systems was seen as ample evidence of the actual dawn of a new era. Not only was life being simplified, but the entire fabric of rural households, farm management and urban living was forever changed. It is Keith Shrubsole, again, who puts the situation succinctly:

There were seldom any problems. People wanted us. People wanted electricity. I think we were very good with our public relations too. We didn't upset people ... If we wanted to cross a person's property we made sure that we had their permission, that we did the right thing, because, after all,



KEITH SHRUBSOLE
ELECTRANET SA



PETER BURGESS
ELECTRANET SA

you might be sent to Riverton to work, and those people would become your neighbours and your friends. Everything was growing fast within South Australia. Nothing was standing still. Everything seemed to be pushing ahead. There was plenty of work.¹³

Between June 1952 and June 1962, 596 kilometres of 275kV transmission line, 1285 kilometres of 132kV transmission lines, 625 kilometres of 66kV and 2314 kilometres of 33kV distribution line had been completed. These figures do not take into account the vast distance of SWER lines and 11kV and 7.6kV distribution lines that had also been installed.¹⁴

Late 1960s & 1970s: New Pathways

Thomas Playford's dream of a State, whose economy was sparked by industrial growth and agricultural wealth – supported by an extensive State-wide electricity network – was gradually being achieved.

By 1966, when a twenty-year comparison of ETSA's operations was undertaken, it was calculated that power consumption and transmission infrastructure had grown at the cumulative rate of 11% per annum.¹⁵ By that time, a total of 24,150 kilometres of high voltage lines had been built,

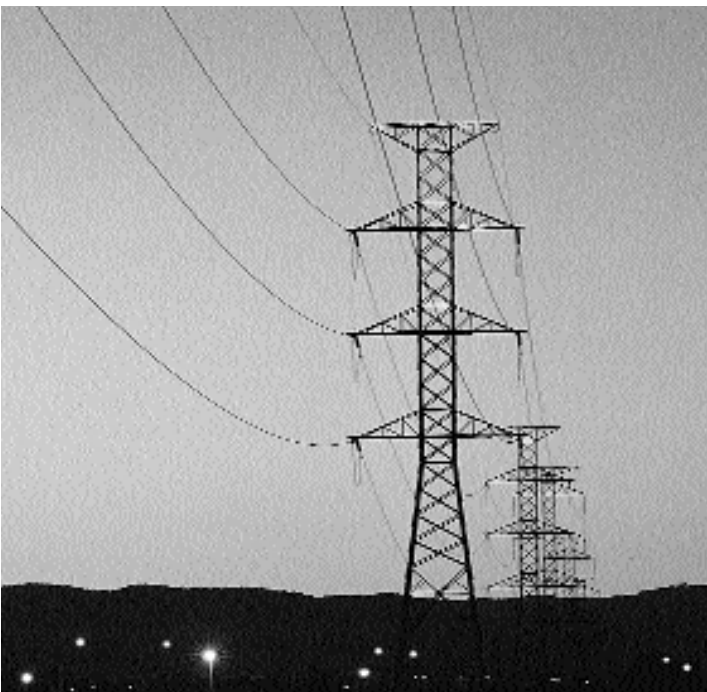
a figure, noted one writer, that would take a transmission line from South Australia to the United Kingdom and then twice around Scotland.¹⁶

The early 1960s had seen the major development of the 275kV transmission system, including the Para substation, necessary to transmit power from the new, large, gas fired Torrens Island Power Station, which commissioned its first unit in 1967 and the eighth in 1980.

Incredibly, more developments were to come. By this time, though, the attitudes

A LIVE LINE WORKING
PARTY ON CALL
ELECTRANET SA





DOUBLE CIRCUIT 275kV
TRANSMISSION LINES AT
SUNRISE, NEAR
SALISBURY HIGHWAY
ELECTRANET SA

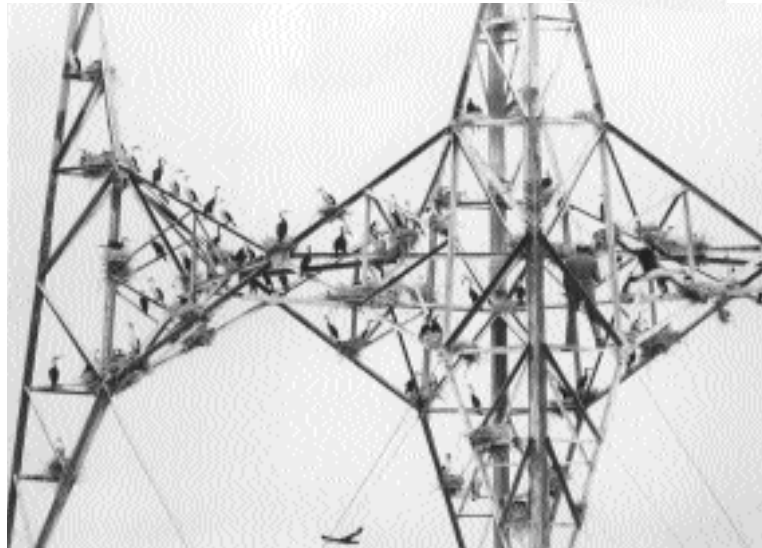
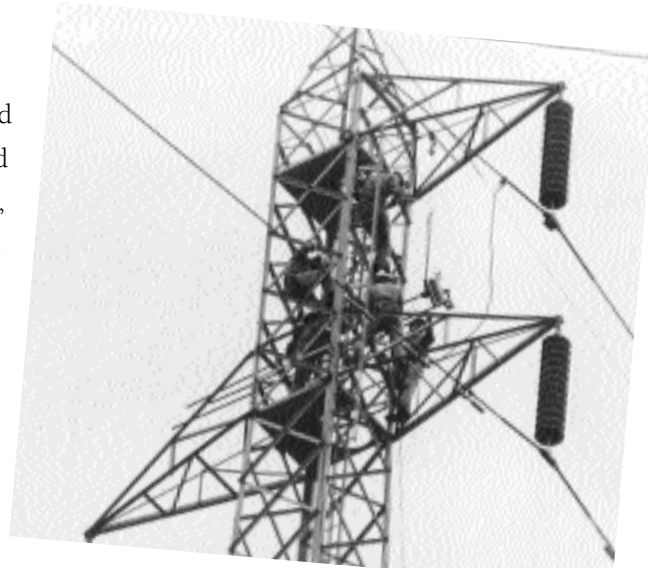
of the South Australian community, originally welcoming the introduction and subsequent development of electricity, had undergone some revision. Although the community generally was still convinced of the need for transmission lines to be taken from Whyalla to Port Lincoln, undersea to Kangaroo Island and to the site of the ill-fated Chowilla Dam on the River Murray above Renmark, there were disagreements about which routes these lines should span. With urban spread on the

increase, much debate had occurred between ETSA and the affected communities, regarding the necessary new transmission routes. Although a Transmission Aesthetics Committee had been set up within ETSA to advise on matters that would affect public perception of ETSA's policies, there was a steady growth in public opposition to transmission easements. During the 1960s, the fate of a line through the well populated Para Valley was much influenced by public protest.¹⁷ From this point on, the planning, survey and construction of transmission lines proceeded with a far greater amount of public consultation, which was a precursor to subsequent environmental impact studies. Without doubt, it was a time of rapid development and dramatic change in ETSA's approach to development, as the following excerpt notes:

In the 1970s the actual transmission line construction work was fairly quiet, but there was a lot of ground work being done for new lines for the new Northern Power Station at Port Augusta. Certainly [this was the time of] the beginnings of the environmental studies which were initially done in-house.¹⁸

There was little doubt that ETSA had set high standards for the design and construction of transmission lines. As well, techniques for maintaining these lines were continually upgraded and updated. So, in 1969, for example, an innovation of helicopter contracting was used to string conductors between pylons over a deep gorge in the Adelaide Hills.¹⁹ Interestingly, a cartoon in an issue of ETSA's internal *Adelect Magazine*, some twenty-five years earlier, had predicted such an occurrence.

In 1972, after a study tour to the USA, Keith Shrubsole brought back new equipment to all linesmen to carry out work on live high voltage wires. The main part of this equipment was a range of epoxy-glass insulated operating sticks – or 'hot sticks' as the Americans called them, for working and manipulating the live high voltage lines. Crews were soon trained in the use of this equipment.²⁰ Then in 1978, when the 66kV transmission lines between Osborne and Torrens Island required sophisticated radiography, to measure the effect of conductor vibration in the wind, some amazing innovative work occurred on these wires stretched some 100 metres above the ground.²¹ Also, in the late 1970s, a technique for using high pressure water hoses to clean dirty insulators on live transmission lines was devised and proved exceptionally successful (and is still used).²²



INSTALLING ONTARIO RECORDERS, TO MEASURE AEOLIAN VIBRATION – THE CORMORANTS HAD ESTABLISHED NESTS ON THE TOWER. WOE BETIDE THE FIRST LINESMEN WHO JUMPED ON TO THE TOWER FROM THE BOAT, FOR THE BIRDS LEFT THEIR MARK ELECTRA NET SA

In all phases of transmission – from design to survey, from construction to maintenance, from substation work to the control of the network – it seemed that there was nothing too difficult for ETSA to tackle.

Between 1969 and 1979, an additional 44,000 kilometres of high voltage transmission and distribution lines had been constructed, although an unexpected freak storm in the mid-north, in November 1979, caused major destruction of transmission lines and towers in that area, and created the need for extensive repairs.

Communications systems development

The planning and the designs for attaining the goals of the expansion of the transmission system were well thought out. Often there was a significant degree of creative innovation involved. The way in which the communication system was initially established, then developed across ETSA's transmission network, was one example of this inventive practice.

From the birth of ETSA in 1946, there had been an awareness of the need to communicate between field officers, construction and maintenance teams, Mains Control and headquarters. In those early days, there were people like Maurie Phillips and John Bulling who actually built ETSA's radio equipment for mobile radio trucks. The objective was to provide a State-wide radio network of these vehicles with radio systems. Their innovative work was pioneering and preceded even the creation of a police radio network in South Australia. During the early 1960s, the existing mobile radio system was gradually superseded by plant of commercial manufacture, because the early frequencies used by ETSA landed right in the middle of those subsequently allocated for the development of television.

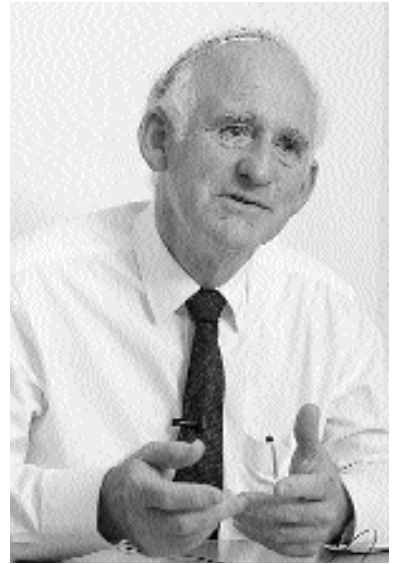
There were only three places in South Australia where mobile radio towers were located in those early days. One was at Mount Lofty to service ETSA's radios in the metropolitan area, one on the historical centenary tower at Mount Gambier, and one up on the hill at the rear of Port Lincoln. In comparison, today's radio communication network covers and

permits a person to communicate from a car in Adelaide to almost anywhere in the State.²³

Ex-employee Graham Vincent (previously ElectraNet SA's Manager Telecommunications) spent his early years with ETSA assisting with the upgrade of ETSA's original mobile radio network, into a widespread, modern system. Within about twelve years, on extremely tight budgets, nearly all of the working areas of ETSA were covered by this enhanced radio network. It was an absolutely essential part of ETSA's work; for line construction and maintenance gangs needed to be able to converse with their supervisors and those controlling the transmission network to enhance safety, time management and resources. Graham Vincent stresses, 'We were in this business of trying to spread the radio coverage as far as possible. We were utilising some very innovative techniques that, by and large, other people in Australia had not used.'²⁴

The second part of ETSA's communication network, and one that preceded the mobile radio system, was the development and use of the internal ETSA telephone exchange. From the days of AESCo, there had been limited use of this telephone system, to guide either those controlling generation or those engaged in line maintenance. Of course, a more expensive option than mobile radio, the telephone system was nevertheless a major component of a communication system that depended on the ability of individuals to keep in constant touch anywhere in the State. While it was updated on a regular basis, it was not until 1984, with the introduction of a state-of-the-art Ericsson system, that the telephone system within ETSA underwent an innovative change to directly link all physical operation locations.²⁵

The third phase of the communication system development within ETSA was the introduction of the specialist Power Line Carrier (PLC) communications equipment in the mid-1950s. At the time that ETSA was building its first 132kV network from the Playford Power Station at Port Augusta, there was a great need to provide a form of communication,



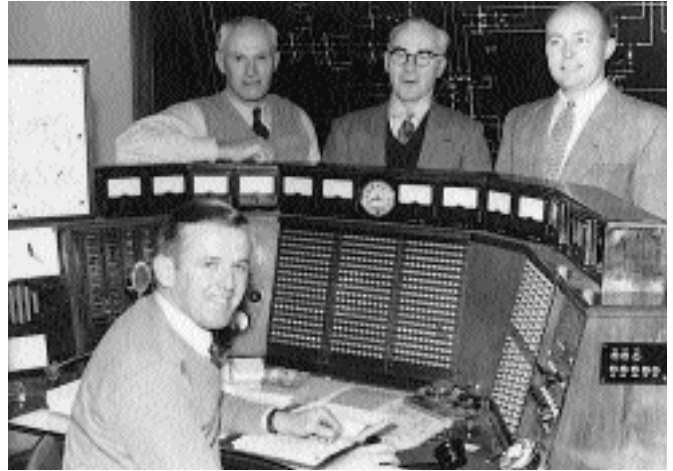
GRAHAM VINCENT
ELECTRANET SA



THREE MEANS OF COMMUNICATION FOR E.T.S.A. MAINTENANCE AND TRANSMISSION CREWS OVER THE YEARS. THE FIRST SHOWS A LINESMAN USING RADIO TELEPHONE; THE SECOND SHOWS COLIN BUCKLEY MANNING A FLYING DOCTOR RADIO DURING WORK ON THE RADIUM HILL LINE; AND THE THIRD SHOWS MORE UP-TO-DATE RADIO COMMUNICATION WITH TONY SOCHEL, CYRIL RUMBELOW, PETER DOLEY, BILL WILLIAMS AND MAL RICHTER AS PART OF THE TEAM REPAIRING CONDUCTORS ON THE NUMBER 1, 275kV LINE FROM PORT AUGUSTA TO MAGILL. KEITH SHRUBSOLE, ELECTRA.NET SA, E.T.S.A. MUSEUM



along the transmission line itself, that could assist in the automatic protection of the line. (PLC is a means of integrating a path for communication along the actual transmission line conductor. So, unlike a separate telephone system, the communications devices were actually linked to the physical transmission line itself). An efficient form of communication that had at that time been used overseas for just over a decade, PLC proved to be a success here in South Australia, also.



Used for the first time on 18 April 1955, to relay a conversation between Jim Burfield at Northfield substation and Max Wills at Port Augusta, the PLC system also enabled Mains Control, by this time situated at East Terrace, to remotely operate transmission line circuit-breakers at distant and remote substations.²⁶ It was during these years that ETSA expanded its drive towards developing and implementing state-of-the-art telecommunication and remote Supervisory Control and Data Acquisition (SCADA) systems, that brought the business much success and a reputation as a leader in the specialised area of power system control. Indeed, ETSA's transmission and distribution line crews had the utmost respect for the achievements of the original PLC radio and telephone communication processes managed by Mains Control. Keith Shrubsole and Peter Burgess again comment:

When you were in a small district with a large substation like Waterloo, events could become pretty interesting. Mains Control Officers would provide regular training – but linesmen can't become expert substation operators in half a day. We depended entirely on our communications with Mains Control, who effectively led us around by the hand

MAINS CONTROL, EAST TERRACE, 1955 – G. CHAMBERS, J. VINCENT, C. BARNETT, F RICHARDSON – THE MAIN CONTROL PANEL HAD BEEN MOVED TO THIS SITE FROM THE KELVIN BUILDING. MAINS CONTROL OFFICERS WERE AN INTEGRAL PART OF THE ETSA COMMUNICATIONS NETWORK ELECTRA NET SA

remotely, sometimes during tumultuous storms.

We have always had tremendous respect for the Mains Control Officers. We don't think the general community or even much of ETSA realised how good they were. Howard Marriott (Supervisor Mains Control), with his crew of operators. Names like Cliff Barnett, Merv Dingle and Jack Bond. Then there were the 'newer' staff like Geoff Chambers and Ted Whelan. They were all the backbone of the network operations and control activities.²⁷

Such obvious praise highlights how far the work of a communications system, with the guidance of Mains Control Officers, could provide assistance for the day-to-day occurrences in the widespread transmission and distribution system of South Australia.²⁸

BELOW: JAN CARROLL,
COMMUNICATIONS
OFFICER, EAST TCE,
MAINS CONTROL.
OPPOSITE PAGE: THE
OTHER VIEWS ARE OF
THE MAINS CONTROL
CENTRE, EAST TCE,
FIFTEEN YEARS APART,
1955 AND 1969
ELECTRANET SA,
ETSA MUSEUM

Mains Control to System Control – handling growth with technology

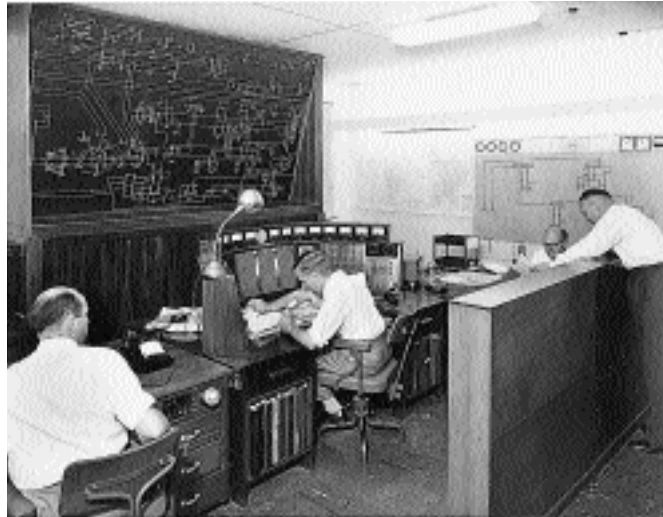
For some years after ETSA's inception, Mains Control remained in the Kelvin Building. In July 1949, at the height of severe electricity shortages in South Australia, Adelaide's Sunday newspaper, the *Mail*, wrote a feature article on the crucial work undertaken by Mains Control Officers.²⁹ As

demand for power increased with the rapid growth in population, coal supply shortages for the Osborne Power Station occurred, resulting in a number of 'black outs'. In order to explain how this situation developed, the *Mail's* journalist explained that when the power was cut, 'An efficient behind the scenes load shedding plan is operated by Electricity Trust officials. One minute after the black-out order is given at Osborne powerhouse, power is cut off in selected districts.



Areas to be blacked out are pre-determined on a roster system'.³⁰ Photographs in the article depicted Mains Control Officers sitting in front of the massive system board entitled 'The Organ', and carrying out the necessary substation and line switching. Although a positive article, it was somewhat simplistic, especially as the Mains Control activity was becoming an increasingly sophisticated application.

By 1952, ETSA reports were noting that 'With the growth of our system over the years, the problem of restoration of supply and the control of switching has progressively become more complicated'.³¹ As the Port Augusta (Playford) Power Station came on line, and was then expanded in the late 1950s, and as the web of transmission lines spread across the State, the complexity of Mains Control was further increased.



The demand for electricity more than doubled in the 1950s and again during the 1960s. The accompanying diversity of fuel supplies and sizes of generating units, and the complexity of high voltage transmission, were to lead to a rapid evolution in the processes for the monitoring and control of the supply of power from generators, to match the demands of the customers and the transmission and distribution delivery systems.

Ex-employee Ern Broughton describes the evolution that he witnessed:

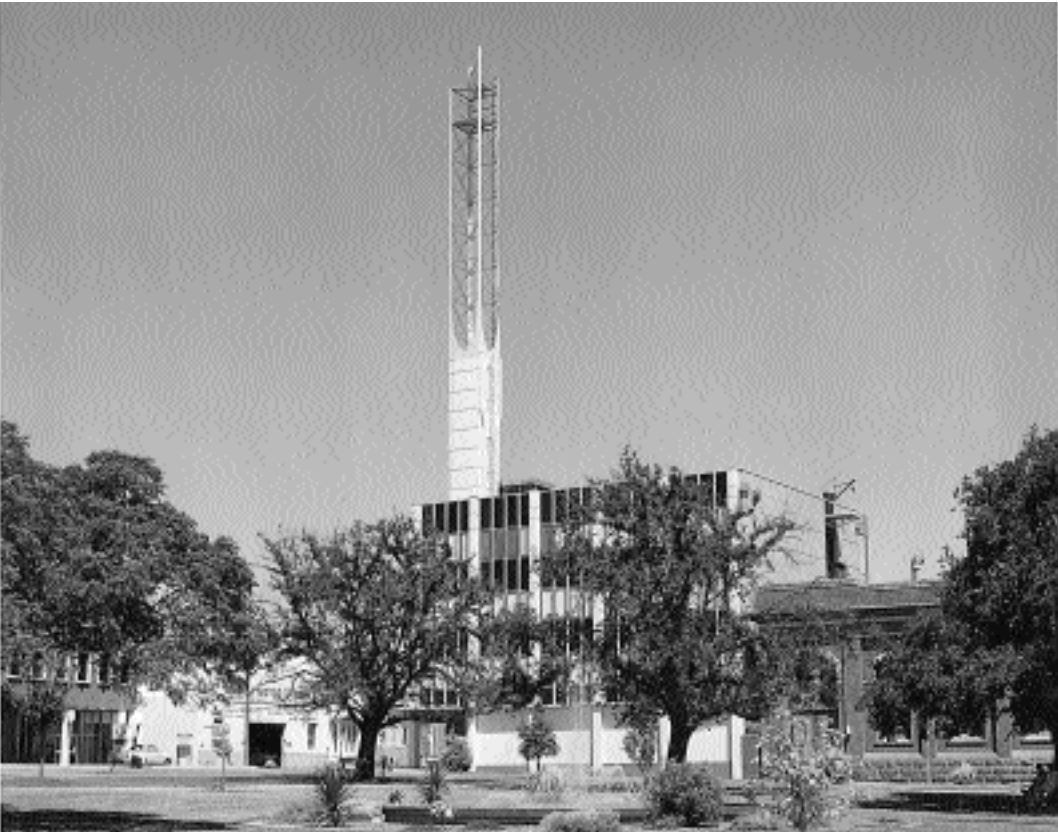
Mains Control was originally a part-time job for two or three people in the Kelvin Building on North Terrace, because the actual electrical power system at that time was not particularly large. Originally a lot of the work in dispatching the generating plant was co-ordinated at the power stations. Mains Control Officers worked part time for five days a week, with one Officer required for each of the two shifts. If overtime was required, Officers were often contacted at home from where they would resolve any problems. As the workload and electricity network increased, two full-time Mains Control Officers were appointed on day shift and one on night duty, and were all subsequently moved to the East Terrace substation backyard during 1955. A third shift was then added to the original two, ensuring around the clock continuous oversight and management of the South Australian transmission and distribution network.³²

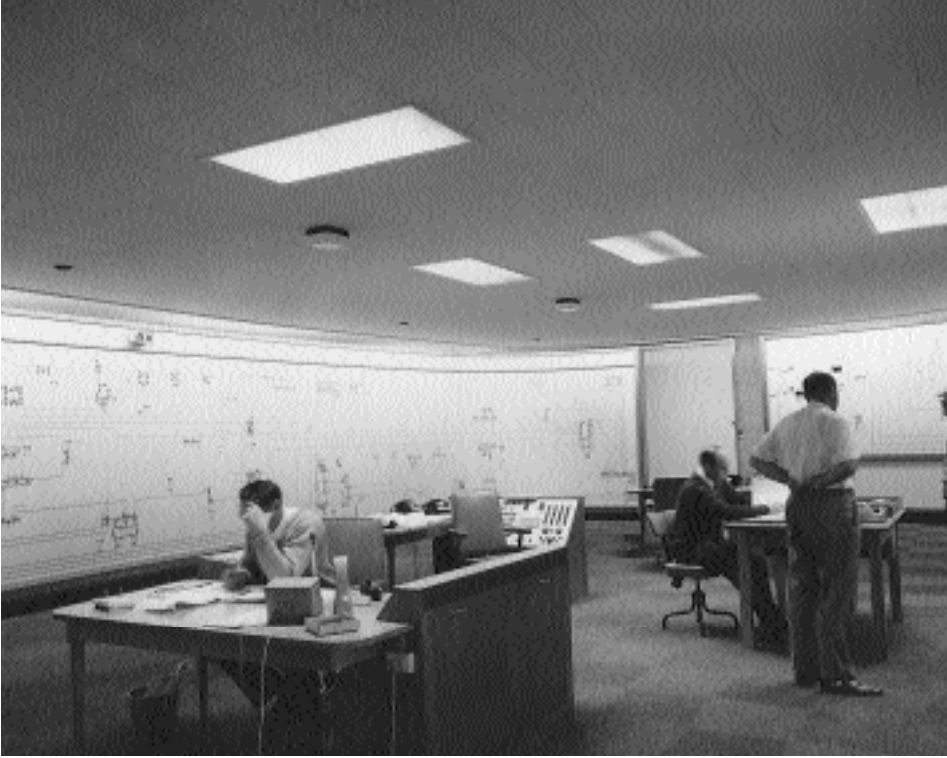
Remote supervisory control technology was to take a major step forward, when, during the mid-1960s, the Para substation began to assume a major role in the high voltage transmission system (being connected directly to both Playford Power Station at Port Augusta and the new Torrens Island Power Station). An innovative electronic remote supervisory system was installed to monitor and control the Para substation and commissioned in 1968. This highly effective monitoring and supervisory system was the foundation for the technology used to

interface substation equipment to the Control Centre and enable the development of the complex system control capabilities needed for the operation of a modern power system.

In early 1969, Mains Control moved to a new, purpose-built facility at Pirie Street, Adelaide. Later that year, the generator load despatch, production planning and co-ordination and power system security functions that had previously been attached to the Osborne Power Station, also came within the ambit of Mains Control. With this change, Mains Control effectively became the System Control Centre for the whole of the South Australian power system. System Control Officers were recruited from across the entire ETSA organisation, mostly with experience in power station plant operation and/or substation

THE NEW, PURPOSE-BUILT SYSTEM CONTROL FACILITY, IN ADELAIDE – AN INTERIOR VIEW (PAGE 50) SHOWS GEORGE BURGESS, FRANK RICHARDSON AND JACK BOND AT WORK
ELECTRANET SA





maintenance. Training programmes were initiated, including site visits to supplement experience and maintain a working knowledge of all new equipment installed on the power system. New recruits were closely supervised for up to twelve months and spent extensive periods in the field interfacing with maintenance and operations personnel, or co-ordinating network outages. System Control Officers were also providing training for ETSA's regional line workers in the methods of safe switching of field equipment. This led to social interaction and friendship, and in times of crisis, these personal contacts meant that people could go into potentially dangerous situations with confidence in the capabilities of all involved.³³

Ex-employee John Thomson, and Ern Broughton mentioned earlier, who were involved with ETSA's System Control Centre operations for many years, insist that its function was all about 'co-ordination'³⁴ –

co-ordination of a power system running from Leigh Creek coal production, through steam generated electricity production at the power stations, and on to the remainder of the South Australian transmission and distribution systems. Almost the only part of ETSA that wasn't touched or co-ordinated by System Control, they claim, was the team of people who read the electricity meters! They recall the move of Mains Control from the Kelvin Building, to a small two-storey building at the rear of the East Terrace substation in Adelaide during 1955, and finally to its present site with the creation of System Control in 1969. Moreover, they consider that Laurie Ellison, the original System Control Engineer, was the person who, through the 1950s and 1960s, was responsible for the initiative to establish world-class processes, involving extensive remote control of substations from a centralised Control Centre. Current ElectraNet SA employees Barry Foster (previously Executive Manager Transmission Operations) and Phillip Webb (Executive Manager Operations) agree that Laurie's 'vision for a centralised co-ordination of operations, combined with remote monitoring and control capability', was really on the leading edge for the whole of Australia.³⁵



LEFT TO RIGHT: ERN
BROUGHTON AND JOHN
THOMSON
ELECTRANET SA

Both Thomson and Broughton again comment that the 1970s was, probably, the 'finest hour' of the System Control Centre. At that time, as summer demand for electricity grew rapidly, through increased numbers of airconditioning units being introduced into households, control of the power system required all equipment to be operating at maximum efficiency, with generation and transmission outages being kept to a minimum.

As the South Australian electricity demand growth continued, additional high voltage transmission lines were built and other substations were considered for supervisory control installations during the period 1969 to 1974. These state-of-the-art supervisory systems were installed at approximately fifty-five Adelaide metropolitan substations and others in

the Adelaide Hills and country areas including Cherry Gardens, Mount Barker, Templers, Kincaig, Blanchetown, Tailem Bend, Mount Gambier – as well as in the Playford Power Station switchyard, to increase power system reliability performance.

Also in this period, the slide rule and the comptometrist machines employed in the early days in the power station load despatch section of System Control, were replaced with the first generation of desktop computers. In addition, specialist computer programmers were employed to develop production planning software, as the ETSA power station fuel budget began to exceed \$100 million per annum. The installation of a new generation of control interfacing facilities at the System Control Centre, during the latter part of the 1970s, allowed the System Control Centre to effectively monitor and remotely control most of the South Australian main transmission and distribution substations, including the remotely operated Dry Creek Power Station gas turbines, commissioned in the mid-1970s. Three new gas turbine powered generators at Snuggery in the south-east also came under remote control by the System Control Centre. At the furthest ends of the network, at Port Lincoln and Mount Gambier, the System Control Operations were assisted by local operating facilities, known as Zone Control centres. These centres continued to provide local assistance in co-ordination of the high voltage distribution system, until driven by cost efficiency measures to close, during the reform and restructuring of the industry at the beginning of the 1990s.

The 1970s, however, saw a number of unforgettable power system disturbances in South Australia: outback floods which affected coal and natural gas fuel supplies to the power stations; commissioning tests and delays of major new power station generators; industrial action which almost shut down the entire Torrens Island Power Station; severe storms which severed the 275kV connections to Adelaide from the Playford Power Station; and a poplar tree which had grown into a 275kV line from Torrens Island, which almost blacked out the State. However, most concede that the day that really tested System Control occurred on 30 June 1980, when all generation at the huge Torrens Island Power Station

suddenly stopped, because there was no natural gas fuel to fire the Torrens Island boilers. The natural gas pipelines supplying the Power Station were both shut off through a mistake during a routine test by the gas supplier. Without this supply System Control Officers were thus forced to disconnect almost all of the State's electricity customers, as the remaining generation at Port Augusta could not meet the huge customer demand shortfall. This scenario is aptly named a 'black start'.

The Torrens Island Power Station had come on line in early 1968 and in some ways provided the confirmation of that early planning of ETSA in its first few years of existence. This Power Station was considered the most important at that time for providing for South Australia's growing electricity needs during the late 1960s and 1970s. While there had been initial problems switching the fuel for the steam generating boilers, from oil to natural gas (after large quantities of gas had been found at Moomba), this Power Station was ultimately very successful. The day of the 1980 'black start' was, however, a frightening scenario, and as John Thomson recalls, was the longest day of his life:

It was horrible. Operations to bring the 1,280MW Torrens Island Power Station back on line and to reconnect supply to customers after the total shutdown occupied several hours, with huge media attention and public outcry. This disaster tested ETSA employees right to the utmost rivet of their ability, in terms of contingency planning and ensuring backup systems were in place.

In hindsight, it is considered that ETSA personnel managed the situation extremely well, and the experience was pivotal to the life of System Control.³⁶

Barry Foster agrees:

that the outstanding performance of ETSA during the black start incident was a reflection of the quality of ETSA's employees and a testimony to their competence. From a State blackout condition occurring at about 10.00am, System Control had co-ordinated the recovery of most of the

State's power supply and delivery systems within four hours, with full restoration achieved later that same afternoon.³⁷

By the early 1980s, the System Control Centre had become a unit capable of maintaining the balance within a complex and diverse network of electricity supply, with transmission and distribution elements. At the forefront of technological advance and with the ability to guide those working throughout the whole electrical power system, System Control Officers made an important contribution to the success of the South Australian electricity industry.

This claim was realised in part when, on Good Friday 1985, a serious cable tunnel fire at Torrens Island shut down the whole of the newest section of that Power Station, damaging important control equipment and some of the major turbine plant. This disaster could have had a very serious impact on the availability of electricity to South Australian consumers. As it eventuated, the full power demands of the community were met over that Easter period, and urgent repairs were completed to allow some of the affected generating plant to be brought back into service a few days later, just in time to meet the electricity demands of the customers when everyone returned to work after the Easter break.

The 1980s and planning for interconnection with Victoria

The growth of electricity demand in the thriving Adelaide business district, during the 1980s, was addressed by the construction of an underground 275kV cable from the Magill substation in the eastern foothills at the edge of the metropolitan area, to a newly constructed 275kV section of an East Terrace substation, adjacent to the main business district. This major work was completed in 1984.

Major reinforcement of the 275kV transmission system between Adelaide and Port Augusta then occurred in the early 1980s, in preparation for the new Leigh Creek coal fired Northern Power Station, due to be commissioned in 1985 and 1986.

This Power Station included a significant number of new features. As normal, in the commissioning of power station plant, a number of

major teething problems occurred with the Northern Power Station, which, during 1985 and early 1986, caused significant challenges in managing production planning and power system security, and resulted in frequent load shedding of Adelaide electricity customers. The impact of the loss of either of the large Northern generating units on the power system was a new experience in ETSA and often a second generating unit would trip in sympathy, causing widespread customer disruption. Of course, all of the problems were systematically addressed by ETSA during the testing phase, and the Northern Power Station subsequently became one of Australia's most reliable coal fired power stations.

During the mid-1980s, another major focus for transmission personnel was in developing the proposals for an interconnection between the two separate electricity transmission systems of Victoria and South Australia. The 1980 Zeidler Committee of Inquiry into 'Electricity Generation and Sharing of Power Resources in Southern Eastern Australia' had recommended that electricity providers in New South Wales, Victoria and South Australia place a premium on the provision of an interconnection to the latter State.³⁸

The first phase of this interconnection commenced with the planning of particulars for individual State electricity systems, to allow the import of a maximum of 500MW of power into South Australia and to export up to 250MW back to Victoria if required. Although the culmination of this project was years away, many saw its benefits. It was seen as a positive step towards the future; a harbinger of those who claimed that Australia needed to see its energy resources and power supply systems more from a national point of view.

During the 1980s, ETSA, particularly in relation to the cost of producing electricity in South Australia, had been profoundly affected by circumstances largely beyond control. The spiralling cost of fuel supplies for the South Australian power stations, and the effects of the disastrous 1983 bushfires (to name but two of the major challenges), were coupled with the more active involvement of the State Government in ETSA activities. Even the interconnection project, itself, was being eagerly

promoted by the Commonwealth Government, as a way to reduce costs to electricity customers in South Australia. The latter period of the 1980s began to look like yet another time of challenge and change.