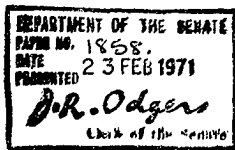


FOR SENATOR DITTMER



In accordance with the provisions of the Public Works  
Committee Act 1969, I present the report relating to the following  
proposed work

ELECTRICITY SUPPLY POWER STATION AT ALICE SPRINGS,  
NORTHERN TERRITORY.

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1971

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

*Parliamentary Standing Committee on Public Works*

REPORT

relating to the proposed construction of an

ELECTRICITY SUPPLY  
POWER STATION

at

Alice Springs, Northern Territory

(FIRST REPORT OF 1971)

COMMONWEALTH GOVERNMENT PRINTING OFFICE  
CANBERRA: 1971

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PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

ELECTRICITY SUPPLY POWER STATION  
ALICE SPRINGS, NORTHERN TERRITORY

R E P O R T

On 14 October 1970, the House of Representatives referred to the Parliamentary Standing Committee on Public Works for investigation and report to the Parliament, the proposal to construct an electricity supply power station at Alice Springs in the Northern Territory.

The Committee have the honour to report as follows:

THE REFERENCE

1. The proposal referred to the Committee involves the construction of a new power station and associated facilities on a site some 1,500 ft east of the existing station. The station will initially accommodate up to six generators and provide for future expansion as required. Also included in the work are two 5 MW generating sets, high voltage switchgear and a switchyard, ancillary mechanical equipment, an access road and building services, site works and associated works.
2. Initially, the new station will be run in parallel with the existing station, but as the demand increases the latter will be progressively phased out and the capacity of the new station built up.
3. The estimated cost of the work referred to the Committee was \$2.5 million.

THE COMMITTEE'S INVESTIGATION

4. The Committee received written submissions and drawings from the Northern Territory Administration late in November and from the Department of Works.

Public hearings were held in Sydney early in December when evidence was taken from representatives of these departments. A written submission was also received from Mr. B.F. Kilgariff, M.L.C.

5. The existing power station and the site for the new station were inspected when the Committee were in Alice Springs in August 1970.

THE EXISTING POWER STATION

6. The existing power station is located in a narrow valley less than a mile east of the town. The original installation was completed by the Allied Works Council in 1943 and the buildings had concrete floors and walls and galvanised iron roofs. Since then the main building has been extended twice for the installation of additional generating units. Due to its age, some structural defects are now apparent in the building. Natural ventilation only is provided and conditions are very cramped and noisy. However, the station is well located, being close to the load centre and the surrounding hills eliminate any noise nuisance to the town.

7. Electricity is supplied by seven diesel generating sets which together have an installed capacity of 9.70 MW and a firm capacity of 7.48 MW. A contract has been let for an eighth set of 2.03 MW capacity to bring the firm capacity to 9.51 MW. On present trends, it is thought that this capacity will be sufficient to meet maximum demands up to the winter of 1972, but will require augmentation for that of 1973.

8. Diesel fuel for the generators is brought to Alice Springs in bulk by rail and stored in a 60,000 gallon tank at the railway yards. It is then pumped through a 2-in underground fuel line to storage tanks adjacent to the power station.

9. In addition to supplying town requirements, the station also supplies electricity to the nearby Amooonguna Settlement, the Mereenie bore field and the airport.

#### THE NEED

10. Population Growth Alice Springs is the urban focus of Central Australia and has developed into a busy modern town as the regional centre for medical, education, government, social and business purposes. Factors particularly contributing to its growth are tourism, the transport, cattle and building industries and the establishment of the Joint Space Defence Research Facility near the town.

11. The population has grown from 6,390 in 1966 to 9,778 in 1970 which represents an average annual increase of 11.2%. However, that period saw the construction of the Space Research Facility and associated housing which boosted the figure in a manner unlikely to be repeated. Nevertheless, for planning purposes, a growth rate of 8% - 10% has been adopted by the Government and in the light of the major government and private building projects about to commence or planned, growth at this level seems assured.

12. Electricity Load Growth In the period 1954 to 1967, the peak load on the Alice Springs electricity supply system, which occurs during winter, increased by about 13% per annum. However, in each of the three years since then, the increase has been 27%, 6.2% and 41.5% per annum respectively. The latter figure, based on the 1970 peak, is considered exceptional due to the priority housing programme for the Space Research Facility.

13. The Committee were told that having regard to these factors and the known and expected developments in and around Alice Springs, the annual load growth to 1972 is expected to be at about 22% and that it will then revert to 13%.

We believe that in the circumstances this is a reasonable basis on which to plan future development of Alice Springs electricity supply.

14. On these estimates, the 1970 peak demand of 7.2 MW will increase to 7.6 MW for 1971, 9.3 MW for 1972 and 10.5 MW for 1973. The firm capacity of the existing power station of 9.51 MW is thus expected to be inadequate for the 1973 peak demand.

15. The Existing Power Station The station is hemmed in by steep, rocky hills and investigations have shown that further extensions would be uneconomical. Apart from the generally aged and cramped condition of the building, which would need to be remedied if continued occupancy occurs, extensions would involve costly excavations, the diversion of a creek and the relocation of a recently constructed workshop. In addition, much of the switchgear is old, heavily loaded and in need of replacement.

16. The station has reached the limit of its design capacity and any further generating plant would necessitate heavy expenditure on switchgear improvements and complete reorganization of the electrical system.

17. Committee's Conclusion Due to the condition of the existing station and its equipment, the future electricity load growth in Alice Springs and the unsuitability of the present resources for extension to meet those requirements, the Committee agreed there is a need for the work in this reference.

#### THE SITE

18. A number of possible locations for the new power station were investigated.

19. A site south of Heavitree Gap was rejected because of its distance from the load centre and the high cost of distribution. There is insufficient easement



space for overhead or underground transmission through the Gap, overhead transmission in that location would in any case be aesthetically unacceptable and power lines would have to be routed through the more distant Emily and Honeymoon Gaps. At these points, undergrounding would be necessary and together with the longer 66 kV transmission, would be relatively costly. Easements and increased maintenance would also be more expensive and the in-parallel operation with the existing station, which is necessary for some time, would be impracticable.

20. Location in the industrial area to the north of the town centre was not favoured because of the more profitable use that can be made of the area for further industrial development and the fact that the site affords the town no protection from noise. Once again, in-parallel operation with the existing station would not be practicable.

21. The location of the station near one of the Palm Valley gas wells, some 90 miles from Alice Springs, was considered. It was discounted, however, because natural gas is not yet available commercially and there is no certainty when and if it will be available. Furthermore, the management problems of staffing and maintaining the station in an isolated location would be more difficult.

22. Therefore, it is proposed that the station be constructed in the same valley, approximately 1,500 ft east of the existing station. The site is relatively flat, is suitable for subsequent extension and is surrounded by hills which form an effective noise barrier. No difficulties are foreseen regarding air pollution.

23. The Committee consider that the site selected for the erection of the new power station is suitable.

GENERATING PLANT

24. Method of Generation The Committee were told that as the installed capacity of stage 1 of the new station is only required to be about 14.44 MW, atomic or steam power, or gas turbines operating on fuel oils would be uneconomic. For that reason, it is proposed to instal diesel engines, operating initially on distillate, as in the present station. However, we noted the engines proposed will be suitable for conversion to heavy fuel or gas, if and when either of these fuels become commercially and economically available. This matter is discussed further in paragraphs 40 and 41.

25. Size A discounted cash flow exercise based on annual payments over the unit's economic life determined that generators of about 5 MW would be the most economic for Alice Springs' requirements. Accordingly, it is proposed to call tenders for generating units of 5 MW  $\pm$  0.5 MW.

26. Installation The work in this reference envisages, as the first stage of development of the new power station, the installation of four sets, each of about 5 MW capacity, and the transfer of two 2.2 MW Mirrlees sets from the existing station - a total of six sets. The plan foreshadows that by about the end of the first stage the existing station will be phased out and the sets now in use either transferred to the new station, relocated elsewhere in the Northern Territory or retired.

27. The timing of the various parts of the plan will ultimately depend upon the growth of the peak demand. As already mentioned in paragraph 14, it is fully expected that the firm capacity of the present station at 9.51 MW will be insufficient to meet the expected 1973 peak demand of 10.5 MW. There is therefore a need to have the first 5 MW set installed in the new station and operating in-parallel with the existing station before the winter peak demand of 1973 occurs.

28. The timing of the installation and operation of the second 5 MW set and the transfer of the two 2.2 MW Mirrlees sets will depend on circumstances including the contractual arrangements for the delivery of the new set. It is possible that both will take place concurrently during the summer of 1973/74. The third and fourth new sets are then expected to be required to be operating to meet the peaks of 1975 and 1977 respectively.

29. Electrical Distribution The Alice Springs town area is now fed at 6.6 kV and the more scattered development on the south side of the Heavitree Range is being supplied at 22 kV. Because of the increase in load density in the town, the distribution there is to be changed from 6.6 kV to 11.0 kV, concurrently with extensions and reinforcement of the system. These works are to be financed from funds provided annually for progressive improvement and extension of the reticulation.

30. The new generating plant will supply power at 11 kV and the 6.6 kV output of the existing sets is to be stepped up and fed into the system through the new power station switchboard. Recently installed 6.6 kV switchgear will be transferred to the new power station concurrently with the centralisation of the control of the power supply at that station. Increased transformer capacity is to be provided to meet the growing 22 kV load on the south side of Heavitree Range.

31. Power Station Building The power station building will be of steel frame construction with corrugated asbestos cement wall cladding and a brickwork dado to about 7 ft. The roof will be steel, windows steel-framed and floors, concrete with a granolithic finish except in offices and in the control room which will be covered with vinyl tiles.

32. The control room is to be air conditioned and all other areas in the building are to be evaporatively cooled.

33. A 60,000 gallon fuel storage tank will be sited adjacent to the building.

34. Committee's Conclusion Subject to the recommendations which follow, the Committee recommend construction of the work in this reference.

ESTIMATE OF COST

35. The estimated cost of the work when referred to the Committee was \$2.5 million and made up as follows:

	\$
Site preparation and civil works	715,000
Generating sets	1,030,000
H.V. switchgear and transformers	250,000
Mechanical auxiliaries	300,000
Electrical auxiliaries	<u>205,000</u>
	<u>2,500,000</u>

PROGRAMME

36. The Committee were informed that due to the urgency of the work, documentation commenced in October 1970, with the intention of calling tenders in February 1971 and letting a contract by July 1971.

37. Site preparation, civil building work and the supply, delivery, erection and commissioning of new and transferred generating plant is expected to take 28 months. However, as the first 5 MW set must be in operation in the new station before the 1973 winter, that phase of the work is required to be completed in 23 months.

OTHER OBSERVATIONS

38. Programming Obviously but unfortunately, the construction timetable is an extremely tight one and as it is by no means certain that the first new generating set will be in operation in time to meet the peak demand of the 1973 winter, we enquired into the events which preceded the reference of the work to the Committee. We discovered that the Department of Works reported to the Northern Territory Administration in September 1969 outlining the proposals and suggesting that the reference to the Committee should take place in April 1970 so that documentation of the project could commence in July 1970. Having regard to the nature of the project and the well documented forecasts on the continued growth of Alice Springs and the growing need for electric power, this timetable seemed reasonable and practicable. Nevertheless, the Government did not approve of the proposal proceeding until 27 August 1970. Another seven weeks then elapsed before the reference of the work to the Committee and it took a further six weeks for the Northern Territory Administration's written evidence to become available.

39. Although there was some delay on the part of the Committee in conducting this enquiry because of the Senate election, the facts are clear and once again we have been asked to consider a proposal whose timetable has lagged badly. As with the Avalon Airport development proposal on which the Committee reported in a similar vein on 21 October 1970, we were placed under pressure to approve the project. The Committee would have felt compelled to support the present proposal even if there had been a better alternative method of tackling the problem because Alice Springs may have been left without an adequate electricity supply. The Northern Territory Administration witness was not able to explain why it took 11 months between September 1969 and August 1970 to obtain Government approval to the work but a possible consequence of the ineffectual

management of the proposal might be that Alice Springs will have a shortage of electric power in the winter of 1973.

40. Method of Generation Against the background that there is still much doubt about the economic availability of natural gas for power generation at Alice Springs and that diesel fuel is currently more economic than heavy oil fuel, the Committee examined closely the proposal to instal diesel driven generators that are suitable for subsequent conversion to dual fuel operation with gas or heavy fuel. We noted that such a conversion could cost \$260,000. Evidence was presented that if dual fuel generators, rather than diesel, are installed from the outset, there would be an additional capital cost of \$135,000 but by eliminating the subsequent cost of conversion, there would be an overall saving of \$125,000.

41. The course of action to be adopted if natural gas were commercially available is clear but in view of the uncertainties, we recommend that if it becomes commercially and economically available in sufficient time to be planned for in the new power station, dual fuel generators should be installed from the outset.

#### RECOMMENDATIONS AND CONCLUSIONS

42. The summary of recommendations and conclusions of the Committee is set out below. Alongside each is shown the paragraph in the report to which it refers.

		<u>Paragraph</u>
1.	THERE IS A NEED FOR THE WORK IN THIS REFERENCE.	17
2.	THE SITE SELECTED FOR THE ERECTION OF THE NEW POWER STATION IS SUITABLE.	23
3.	SUBJECT TO THE RECOMMENDATIONS WHICH FOLLOW, THE COMMITTEE RECOMMEND CONSTRUCTION OF THE WORK IN THIS REFERENCE.	34

Paragraph

4. THE ESTIMATED COST OF THE WORK WHEN REFERRED TO  
THE COMMITTEE WAS \$2.5 MILLION. 35
5. A POSSIBLE CONSEQUENCE OF THE INEFFECTUAL  
MANAGEMENT OF THE PROPOSAL MIGHT BE THAT ALICE SPRINGS  
WILL HAVE A SHORTAGE OF ELECTRIC POWER IN THE WINTER OF  
1973. 39
6. IF NATURAL GAS BECOMES COMMERCIALY AND ECONOMICALLY  
AVAILABLE IN SUFFICIENT TIME TO BE PLANNED FOR IN THE  
NEW POWER STATION DUAL FUEL GENERATORS SHOULD BE  
INSTALLED FROM THE OUTSET. 41

  
(C.R. KELLY)  
Chairman

Parliamentary Standing Committee on Public Works,  
Parliament House,  
CANBERRA, A.C.T.

16 February 1971.