1973

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

Parliamentary Standing Committee on Public Works

REPORT

relating to the proposed construction of

STAGE 6 EXTENSION

of the

Stokes Hill Power Station, Darwin

(NINTH REPORT OF 1973)

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PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

STAGE 6 EXTENSION OF STOKES HILL POWER STATION, DARWIN, NORTHERN TERRITORY

REPORT

By resolution on 15 October 1973, the House of Representatives referred to the Parliamentary Standing Committee on Public Works for investigation and report to the Parliament the proposed construction of stage 6 extension of the Stokes Hill Power Station, Darwin, Northern Territory.

The Committee have the honour to report as follows:

THE REFERENCE

1. The proposal referred to the Committee comprises:

- provision of two 23.5 Megawatt (MW) turbo alternator sets with associated oil fired boilers, auxiliary plant, switchgear, unit transformers and 66 kilo Volts (kV) switchyard;
- construction of one concrete chimney stack to take separate flues for the new boilers;
- construction of a 24,000 ton capacity oil tank; and
- supply and installation of two 66 kV underground cables linking the power station and city zone substation, together with modifications to the existing overhead 66 kV transmission system in the Frances Bay area.

2. The proposal will increase the installed capacity of the Stokes Hill Power Station from 94 MW to 141 MW and the firm capacity from 70.5 MW to 102.5 MW. Firm capacity is the generating capacity available to meet the load after due allowance has been made for part of the plant being out of service, either for planned maintenance or because of breakdowns.

3. The work when referred to the Committee was estimated to cost $10.6 million.

THE COMMITTEE'S INVESTIGATION

4. The Committee received written submissions and drawings from the Departments of the Northern Territory and Works and took evidence from their representatives at a public hearing in Canberra. A letter was also received from Mr. D.M. Drake of Darwin proposing an alternative scheme, but this was not considered to be a feasible proposition.

5. We inspected the site of the proposed work when in Darwin earlier in the year on other business.

6. The Committee's proceedings will be printed as Minutes of Evidence.

STOKES HILL POWER STATION

7. In 1958, the Committee reported on the first stage of the original proposal to establish a 45 MW capacity power station utilising oil fired boilers and steam turbine generating plant. Two 7.5 MW turbo alternator sets were installed at stage 1 of the development and subsequently stage 2 and 3 works were constructed to provide a total of four generators as the demand for electricity necessitated. Completion of the original power station proposal was realised in 1967 with the commissioning of the fourth generating set.

8. In that same year, the Committee reported on stage 4 works (No. 5 set) which involved a proposal to increase generating capacity to meet the steep increase in power demand for domestic use and the mining industry. This fifth generating set was commissioned late in 1971. However, a 23.5 MW turbo alternator was obtained instead of the 16 MW unit as originally proposed, at equivalent cost as a result of favourable tendering. At that time, the Committee were aware of the proposal to increase the power station's installed capacity to 141 MW in two further stages (5 and 6) to complete the development at the Stokes Hill site. Stage 5 extensions, incorporating a 23.5 MW turbo alternator were referred to the Committee and reported on in 1971.

9. Future Planning Full development potential of Stokes Hill Power Station will be reached with stage 6 works (sets 7 and 8) and investigations are proceeding for planning a second power station for Darwin to be operational by 1980. It is tentatively proposed that this new station be located on Quarantine Island, East Arm.

THE NEED FOR ADDITIONAL GENERATING CAPACITY

10. Increased demand for electricity in Darwin is evident from the population growth, expansion of Government services, developments in pastoral, mining and agricultural industries and the popularity of Darwin as a tourist centre. The demand for air conditioning in private buildings, public offices and schools is also a major factor supplementing the demand for electricity.

11. In the period 1970 to 1972, Darwin's population increased from 32,943 to some 41,500. Between 1966-67 and 1971-72, the number of electricity consumers rose from 5,287 to 9,788 and in the same period sales of electricity rose from 66 million kilowatt hours (kWh) to 148 million kWh. Based on present trends this figure is likely to grow to 340 million kWh in 1976-77.

12. The Committee were told that a review of load growth over the past few years has shown that it is increasing at an overall rate of 17% compounded annually. We believe this to be a realistic basis for planning load growth to 1980 unless there is a significant rate of increase in demand as would occur if the township planned for the Alligator River area is connected into the Darwin electricity supply system. In the Committee's report on stage 5, we noted that for some six months prior to commissioning No. 6 set, the demand for power is expected to exceed the assessed firm capacity of the existing five sets. During this period there may be occasions when power restrictions will be necessary.

13. A proposal to supply power to the Alligator River mining operations in 1975-76 would overburden the capacity of the Darwin Power Station until additional generating capacity is available but at this stage no decision has been made to connect into the Darwin system. The Committee were told that the additional power requirement could be met at relatively short notice by installing a gas turbine generator set at Stokes Hill.

14. Committee's Conclusions The Committee concluded that in the light of recent trends in the load growth, contributed to by existing and expected urban and industrial developments, increased demand for air conditioning and other factors, it is reasonable to plan for the future on the basis of a growth rate of 17% per annum. The Committee also concluded that there will be a need for additional generating plant to be operating at Stokes Hill Power Station by 1977 based on present predictions of load growth.

THE SITE

15. The site for the works proposed will be within the existing power station area. Generating sets 7 and 8 will be housed in the new southern extension to the station with associated works and chimney stack outside the

building. The new oil tank will be sited adjacent to No. 10 oil tank in the sunken area to the west of the station. The Committee agree that the present site is suitable for the final additions to the Stokes Hill Power Station.

METHOD OF GENERATION

16. In its 1958 report, the Committee considered the method of generating electricity at Darwin. The suitability of diesel generators, gas turbine, hydro-electric power, atomic energy and oil fired steam turbine plant was examined. It was agreed that the most economic and practicable generation method for Darwin at that stage of development was generation by oil fired boilers and steam turbine plant. It was noted that this type of boiler plant could be readily converted to use natural gas should it become commercially available.

17. While diesel fuelled gas turbine electricity generating plant is not economical for base load operation, it is useful for coping with short peak loads and for increasing the reserve capacity to maintain a satisfactory level of reliability.

THE PROPOSED WORK

18. Plant The plant proposed for the stage 6 extension includes two 23.5 MW turbo alternator sets with their associated outdoor oil fired boiler plant, auxiliaries, unit transformers and 66 kV switchgear equipment. This will bring the total installed capacity to the station's projected ultimate of 141 MW, and the firm capacity to 102.5 MW.

19. Construction The proposed two generating sets will be housed in an existing extension of the power station, and a new 230 ft high chimney stack will be constructed of reinforced concrete of similar appearance to the

existing one serving sets 5 and 6. To cope with the expected increase in fuel requirements when the station is operating at its ultimate capacity, additional fuel storage will be provided by construction of a 24,000 ton capacity oil tank and associated pipe work.

20. The work in this reference includes supply and installation of two 66 kV underground cables linking the power station with the city zone substation and also modification to overhead 66 kV transmission lines along Frances Bay to Dinah Beach.

21. Environment The Committee's report on stage 5 extensions in November 1971 recommended that continued care be exercised in operating the station to minimise smoke nuisance and that efforts be made to obtain fuel oil with a minimum sulphur content, preferably from Australian wells. We are therefore pleased to learn that despite a 60% increase in units of electricity generated over the past three years, no increase in sulphur dioxide levels has been detected. Nevertheless, the Government will act to obtain prices for low sulphur oils (including Australian) when next calling tenders for fuel.

22. Since set No. 5 was commissioned late in 1971 with improved boiler combustion controls, significant reductions in smoke and dust emissions have resulted. The new boiler plant included in this proposal will incorporate similar provisions and some older plant will be suitably modified as soon as possible as a separate project.

23. Committee's Recommendation The Committee recommend the construction of the work in this reference.

ESTIMATE OF COST

24. The estimated cost of the work when referred to the Committee was $10.6 million. The revised estimate at the time of the hearing was $10.8 million made up as follows:

	$
Two 23.5 MW turbo alternator sets, boilers, associated equipment and a concrete chimney stack	9,500,000
A 24,000 ton capacity fuel oil tank	480,000
Two 66 kV underground cables and associated transmission line modifications	820,000
	10,800,000

PROGRAMME

25. The programme proposed for the installation of stage 6 extensions is to include the project in the 1974-75 Works Programme and call tenders for the main plant in December 1973, and the remainder by April 1974. All the work could then be let by August 1974. This would enable commissioning of set No. 7 by March 1977 and set No. 8 by September 1977. The Committee recommend that the timetable be adhered to.

RECOMMENDATIONS AND CONCLUSIONS

26. 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.

		Paragraph
1.	IN THE LIGHT OF RECENT TRENDS AND THE LOAD GROWTH, IT IS REASONABLE TO PLAN FOR THE FUTURE ON THE BASIS OF A GROWTH RATE OF 17% PER ANNUM.	14

		Paragraph
2.	THERE IS A NEED FOR ADDITIONAL GENERATING PLANT TO BE OPERATING BY 1977.	14
3.	THE PRESENT SITE IS SUITABLE FOR THE FINAL ADDITIONS TO THE STOKES HILL POWER STATION.	15
4.	THE COMMITTEE RECOMMEND THE CONSTRUCTION OF THE WORK IN THIS REFERENCE.	23
5.	THE ESTIMATED COST OF THE WORK IS $10.8 MILLION.	24
6.	THE COMMITTEE RECOMMEND THAT THE PROPOSED TIMETABLE FOR THE WORK BE ADHERED TO.	25

(W.J. FULTON)
Chairman

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

15 November 1973.