HERITAGE COUNCIL OF WESTERN AUSTRALIA

REGISTER OF HERITAGE PLACES - ASSESSMENT DOCUMENTATION

11. ASSESSMENT OF CULTURAL HERITAGE SIGNIFICANCE

The criteria adopted by the Heritage Council in November, 1996 have been used to determine the cultural heritage significance of the place.

11. 1 AESTHETIC VALUE

The main power station building displays aesthetic value in the strong external expression of its structural form - as a utilitarian industrial building specifically designed to accommodate a process of electric power generation. (Criterion 1.1)

While the value of natural light is paramount to good design in the use of this building, the large expanses of unprotected clear glazing indicate a flawed design, the consequences of which are apparent in the attempts to reduce glare and heat through paint applied to glazing in the western aspect of the building. With the plant and equipment removed, the interiors have a specific aesthetic value due to their proportions and volume of space. (Criterion 1.2)

The power station by virtue of its size and form in a sparse marine landscape is a prominent building in the immediate vicinity, notwithstanding that loss of the smoke stacks has reduced the potential for high landmark quality. (Criterion 1.3)

The building remains a prominent element on the shoreline in the coastal sand dunes south of Fremantle; it is clearly visible from the north and south for some distance along the coast and from Owen Anchorage seawards. The recent clearing away of other structures and trees to the north, further exposes the rectilinear bulk of this large off-white building set in a clean but sparse marine environment. (Criterion 1.3)

11. 2. HISTORIC VALUE

South Fremantle Power Station influenced development in Western Australia through the formation of the Kwinana Industrial complex and in the Fremantle area through the development of the suburb of Hilton Park. (Criterion 2.1)

South Fremantle Power Station was an important step in the development of power generation in the State; as the second large thermal power station in Western Australia it contributed to the establishment of the interconnected power grid of the South West Power Scheme. (Criterion 2.2)

South Fremantle Power Station represents a significant technical achievement in the supply of electricty in Western Australia. (Criterion 2.4)

11. 3. SCIENTIFIC VALUE

The technology of *South Fremantle Power Station* at 50 cycles generation facilitated the upgrading of power generation in Western Australia and the establishment of the interconnected grid system. (Criterion 3.2)

11. 4. SOCIAL VALUE

The social value of a major public utility such as a power station and its influence on the whole community should be acknowledged. The involvement of the workforce which designed, built and operated South Fremantle should be acknowledged and respected. (Criterion 4.2)

12. DEGREE OF SIGNIFICANCE

12. 1. RARITY

South Fremantle Power Station is one of several power stations built around Australia in the early 1950s, but the only one of its kind in Western Australia. Some of the contemporary building forms survive in the Frequency Changer Building at East Perth. (Criterion 5.1)

12. 2 REPRESENTATIVENESS

One of several power stations built around Australia in the early 1950s, *South Fremantle Power Station* is typical of its period, of which some are still operational. (Criterion 6.2)

12. 3 CONDITION

The main building is structurally sound. The main boiler house and turbine room plant is largely intact and in reasonable condition. But all buildings on site have been vandalised and are in a deteriorated condition.

The external structural envelope, internal steel framing and concrete floors appear to be in reasonable condition. Most of the extensive area of glass in the external walls has been smashed by vandals; the original steel framed windows appear to be in reasonable condition although paintwork has deteriorated and there is evidence of corrosion. In some areas of the Administration Control Building, aluminium window frames replace the original fixed steel frames.

There is evidence of corrosion of steelwork and spalling of concrete to some few areas of the external faces of the building and paintwork is damaged and deteriorated. All doors have been vandalised, damaged or removed.

A number of major openings have been formed in the east and west walls of the Main Building, for the removal of plant and equipment.

The ceramic tiled floor and wall finishes to the Turbine Room are extensively damaged or missing.

Bitumastic sealants to all flat concrete roofs are now damaged and deteriorated; water intrusion could soon become a threat to the structure if the seals are not replaced.

Original metal railings, open mesh floor decking and the few surviving steel service stairways are now in a damaged and corroded condition.

The building shell is in reasonable condition and is amendable to rehabilitation. The place is not safe for public access due to extensive unprotected openings in decking and concrete floors and walls, and unprotected pits, floor channels, basins and tanks, many deep and partly filled with water.

The perimeter link mesh fence appears to be in reasonable condition but is not a serious deterrent to unauthorised entry to the site.

12. 4 INTEGRITY

The integrity of *South Fremantle Power Station* has been eroded by the removal of the precipitators and chimney stacks from the roof, the coal tipler and crushing house and the coal conveyor system and all internal plant and equipment.

12. 5 AUTHENTICITY

What remains of the original buildings is an authentic shell which demonstrates little change in form during the operational life of the power station. The building retains a high degree of authenticity.

13. SUPPORTING EVIDENCE

13. 1 DOCUMENTARY EVIDENCE

Records relating to the power station are held at Western Power head office, library and archives, Wellington Street, Perth and at the SECWA Energy Museum, Fremantle. It is possible that records exist in the archive storage building at the East Perth Power Station site, but this resource has not been accessed. Public records include photographs at the Battye Library and the historic photos collection of West Australian Newspapers. Drawings for the construction of the building and its plant have not been discovered. No approach has been made to former engineers or workers who operated the power station to record oral history of the place.

The history of the power station at South Fremantle is summarised as follows.

The history of the establishment of the Western Australian Government Electricity Supply, the degree of standardisation which came with the one supply system for Perth and the adoption of 40 cycle frequency are recorded in the Conservation Plan for the East Perth Power Station. Work commenced on the construction of the power station at East Perth in 1913, followed by power generation from the first unit in 1916.

A number of suburban and country town power stations were in operation for local electricity requirements and continued together with the upgrading of East Perth beyond the commencement of discussion in 1932 concerning the requirement for a power station at South Fremantle.

The Royal Commission completed its investigation into a proposed South West Power Scheme in 1940. The proposal was rejected. In 1943 the Government asked the Electricity Advisory Committee to undertake a further much broader inquiry into the proposal to establish the South West Power Scheme, under the chairmanship of Russell Dumas. V.J.F. Brain, Chief Electrical Engineer of the PWD in NSW was commissioned to advise on the feasibility of converting power supply from 40 to 50 cycles. His report *Standardisation of Electricity Supply in Western Australia - 1943* recommended immediate conversion to 50 cycles.

The Dumas report was completed in 1945 to be followed by the letting in September 1945 of a contract for the first two 25,000 kW (50 Hertz) power generating units at a new power station at South Fremantle.

Construction of the power station at South Fremantle commenced in January 1946. The South Fremantle site was chosen for its relatively close metropolitan population, its proximity to nearby railway facilities for the delivery of coal and the ease with which sea-water could be utilised for the cooling system.[1] The four boilers 1, 2, 3 & 4 of 'A' Station were fired up in January 1951; the first 25 MW turbo-alternator came on line in May of that

---

1 Reid, S, (ed), *Power Station Lives: a multimedia exhibition on the South Fremantle Powerhouse*, State Energy Commission, Municipal Officers Association in conjunction with the Trades and Labour Council, funded by the Commonwealth Arts Board, the Visual Arts Board and the State Electricity Commission, 1985, p. 1.

year prior to the official opening of the Power Station on 27 June 1951 by the Hon. David Brand, Minister for Electricity.

The opening plaque records W. H. Taylor (MIEE., MIE. Aust.) as the General Manager of the WA Government Electricity Supply (1914-1946) and General Manager of the Metropolitan Systems of the State Electricity Commission (1946 to 1948).

In September 1951, the second 25 MW turbo alternator came on line.

When the decision was made to build a new power station at South Fremantle with a greater capacity than that of East Perth Power Station, the question of continuing with 40 cycle frequency came under scrutiny. By the early 1940s 40 Hertz was non-standard in Australia as well as overseas. In England and on the east coast of Australian the standard was 50 cycle; in the USA 60 cycles. The cost to convert all existing electrical equipment and appliances to operate on the higher frequency would entail a huge cost beyond the resources of the State. When the Federal Government agreed to contribute to the cost in order to achieve a national standard, the new frequency was adopted with the commissioning of the power station at South Fremantle. A frequency changer unit was installed in a specially constructed building at East Perth to allow the two stations to operate in conjunction in supplying the metropolitan area. The new frequency changer building at East Perth was designed in the same mode as the power station at South Fremantle and was constructed simultaneously with South Fremantle and completed in 1951. The conversion of the existing Metropolitan electricity system from 40 to 50 cycles and the task of adapting appliances and equipment was undertaken by the SEC until completion in 1960. All metropolitan supplies were generated at the East Perth Power Station until 1951 when the power station at South Fremantle came on load. The No. 3 turbo alternator came on load in 'B' Station at South Fremantle in January 1954, and the No. 4 turbo alternator in December 1954. The station at South Fremantle was then complete with a total capacity of 100 MW.

As much of the plant was designed and manufactured in England, skilled contractors were sent out to South Fremantle from England to assemble the plant on site. Many of these contractors, and their families, stayed in Western Australia and were employed by the State Electricity Commission. Other workers at the Station were ex-goldfields men with first class steam tickets seeking post-war employment. The first SEC men at South Fremantle Power Station were volunteers from the East Perth Station - these arrived on site in late 1948 and formed the nucleus of the tradesmen. The SEC encouraged the recruitment of staff by providing housing in the Hilton Park area, and the new suburb soon had many community amenities. A bus service from the Power Station to Hilton and Fremantle provided a welcome service for shift workers. Over 250 workers were employed at South Fremantle during the 1950s, the majority of whom were men.[2] The female minority were employed in the canteen or on the switchboard.

The workers were represented by various trade unions and there was generally good trade relations at South Fremantle. Only one strike came

---

2 *Fremantle Gazette*, 20 February 1985, p. 11.

directly out of South Fremantle Power Station. This occurred in April 1971 when workers went out over wages.[3]

There was excellent camaraderie and a strong team spirit amongst the workers at South Fremantle. A quick game of soccer or water polo at lunch time was not uncommon; others fished or swam. The SEC had the State's first local credit union, which was started at South Fremantle Power Station in 1962. Staffed by volunteers, the credit union provided great assistance for workers in financial trouble. There was also a strong social club and the monthly special events were usually well attended; the Christmas parties were a social highlight. After retirement, many workers continued to meet and socialise at the Hilton Park Bowling Club or at the Point Walter Golf Club.[4]

In 1954, a major fire at South Fremantle in the coal conveyor from the crusher house caused structural damage and resulted in a switch to oil fuel for the boilers. A photograph dated 1980 at the Energy Museum shows coal on site at South Fremantle. Conversion back to coal, as happened at East Perth, also occurred at South Fremantle in the mid-1970s and coal then fuelled this station until its closure in 1985.

In 1956 the Wellington Dam Hydro-electric Generating Station was commissioned and Collie Power Station interconnected with East Perth and South Fremantle. With the start of the development of the South West Power Scheme, the building of an interconnected power grid became necessary. Due to the high cost of transport of coal from the Collie coalfields to the Metropolitan area, considerable savings could be effected by building the next major power station at Bunbury, where an adequate supply of sea-water was available for cooling. In May 1957, the new Bunbury Power Station commenced operation with one 30 MW-turbine and two 15 MW boilers, and the metropolitan and south west power systems were connected in the same year with first of two the Bunbury to Cannington 132 kV lines. Bunbury, Collie, South Fremantle and East Perth power stations were thus linked to form the interconnected grid.

The second and third 30 MW units came on line in Bunbury in 1959 and 1960, and the fourth in 1961.

Later, when an alternative method of cooling became available with considerably reduced requirements of cooling water, the third major power station was built at Muja on the Collie coalfields. The location of this station, alongside the major open-cut coal seam, again greatly reduced the cost of conveying coal from the mine to the face of the station bunkers. The decision to construct Muja power station stage A with two 60 MW coal fired generating units was taken in 1960; the second stage B at Muja was decided in 1963. The first unit came into operation in 1965 with interconnection into the Bunbury grid. The second unit came into operation in 1966 when the Muja Power Station was opened by the Premier David Brand. Muja units 3 & 4 came into operation in 1968 and 1969.

---

3 Reid, S., op. cit., pp. 1-2.

4 ibid, p. 2

At Kwinana in September 1970, the first 120 MW unit of a new oil-fired power station came on line, prior to the official opening by Sir David Brand in November of that year.

In November 1971, the second 120 MW at Kwinana came on line; the No. 3 120 MW and gas turbine in October 1972; and the No. 4 unit in December 1973. In that year, the Power System Control Centre at East Perth Power Station became operational.

The No. 5 unit, 200 MW turbine at Kwinana Power Station came on line in March 1976, and the No. 6 in April 1978. Conversion of Kwinana to coal commenced in 1978 and was completed in 1979.

Each new power station with its larger machines operating at higher steam pressures and temperatures, together with a reduction of operating and maintenance staff per kilowatt hour generated, resulted in higher generation efficiencies which gradually phased out the operation of the older stations as 'base load stations'.

Further extensions to Muja Power Station were completed in 1980 and 1982. Power generation ceased at East Perth in December 1981, bringing to an end 65 years of continuous power generation at that station. Further stages at Muja Power station were officially opened in 1985, and in September that year, the *South Fremantle Power Station* was closed and approximately 70 workers laid off.[5] The production of electricity at South Fremantle had become uneconomical. The interconnected grid then was supplied from the power stations with more up-to-date machinery and closer to the coal source at Collie - Bunbury, Kwinana and Muja. *South Fremantle Power Station* was the second thermal power station to be constructed in the metropolitan area and is to be noted for signalling the beginning of a totally new venture at the time, the inter-connected system that functions today in the south west sector of the State.

Since August 1994, action on the site has included the documentation, contracting and completion of asbestos removal, the clearing out of all plant and equipment from the entire building and the complete removal of the Workshops and Stores, Amenities Building, Canteen and Ash Pump Chamber and associated structures and services.

13. 2 PHYSICAL EVIDENCE

The *South Fremantle Power Station* is constructed on coastal dunes on the foreshore of Cockburn Sound. The main power station building is a high volume, industrial building designed specifically for the function of power generation. It comprises the following elements:

Station A Boiler House - A high-volume, steel framed building with the internal steel framing exposed and two main floor levels plus upper intermediary levels of open-meshed steel flooring and interconnecting steel stairways. The concrete flooring on the main levels is ceramic tile finished. The external steel frame is clad in concrete rendered and painted with a predominantly vertical window treatment continuous between levels in the recessed bays between columns. Steel window frames throughout are clear

5 *Fremantle Gazette*, 20 February 1985, p. 11.

glazed. A strong system of columns and beams expresses the structural frame of the building on the external face, uncompromisingly indicating high and low volumes throughout the complex. The roof is concrete.

Station A formerly housed four 125/150,000 lb. per hour coal-fired boilers designed and constructed by International Combustion Ltd, London and Derby. Combustion gases were released through two chimneys on the roof of the Boiler House, dust being cleaned by four electro static precipitators also housed on the roof. The precipitators and chimneys and all plant and equipment have now been removed.

Station A Turbine Room - An open, high volume, two-level steel framed building free of intermediate columns, with a concrete roof supported on a parallel chord steel truss system exposed within the Turbine Room. The external steel frame, as for the Boiler House, is clad in concrete rendered and painted with a predominantly vertical expression of steel-framed windows in the recessed bays between columns. Floors were finished formerly in quarry tiles or open-mesh steel flooring; the walls are finished to dado height in glazed ceramic tiles. Station A housed two Metropolitan Vickers steam turbines powering two 25 MW direct coupling alternators, now completely removed.

Station B Boiler House and Station B Turbine Room - are continuous duplications of Station A and house a repeat of the same plant. The power generating capacity of the power station was 100 MW. The Boiler House runs N-S on the site, along the eastern side of the building and is divided by a full height concrete wall from the Turbine Room which runs the full length of the western face of the Boiler House.

An overhead crane remains in place to service the full length of the Turbine Room; this is a product of the Perry Overhead Engineering Crane Co., Adelaide, with a 70 ton load capacity and 10 tons auxiliary. The former turbo alternators and condensing plant, now removed entirely, were designed and produced by Metropolitan Vickers Electrical Export Co. Manchester, together with the 22 kV switchgear, 66 kV switchgear and main transformers.

The 3000V switchgear was designed and constructed by Ferguson Pailin Ltd, Manchester and the 440V switchgear by Australian General Electric Pty Ltd. The condensing plant was designed and constructed by CA Parsons, England and Morts Dock and Engineering Pty, Sydney. All of this plant and equipment has been removed.

The main building was designed specified and the construction supervised by the State Electricity Commission of WA. The foundation was designed by the SEC and constructed by the Public Works Department. Steelwork for the main building was designed and constructed by Structural Engineering Co. Ltd., Welshpool; and the concrete constructed by W. Fairweather & Son, Perth.

Coal Handling - Collie coal was transported to the eastern boundary of the site by railway. Trucks passed through a rotary tippler which emptied coal into a hopper beneath to be elevated by means of a skip to the top of the crushing house where the coal passed over screens to separate small and large coal. Inclined conveyors fed from the crusher across to the Boiler

House. Coal was stockpiled in a large yard capable of holding 25,000 tons at a higher level than the Power Station on the eastern side and contained within a concrete perimeter wall. The tippler, crusher house and coal conveyor system have been removed.

Ash Disposal - At the southern end of the Boiler House, a steel framed Ash Pump Chamber, clad in corrugated asbestos cement sheeting, collected ash carried from the boilers in underground sluice channels and pipework, to be pumped to the southern end of the site to settling pits. The ash disposal plant has been removed.

Switch House, Control Room, and Transformers - These functions were housed in a two-level northern extension of the Power Station, of similar construction, and as part of the same mode of design. All plant and equipment has been removed.

Administration Offices and Laboratories The connection between the Turbine Room and the Switch House is a 2/3 level administration building, also of similar construction and design. The main entrance Hall is a single high-volume chamber housing an impressive, if inappropriately grand, surviving terrazzo staircase which rises in a single flight towards the western wall, then divides each side to the main and intermediary floors. The design of the staircase, balustrading and lighting fittings are characteristic of the immediate post-war period, reflecting the carry-over of design motifs from the 1930s.

Workshops and Stores - A separate steel framed workshop and store building was formerly located immediately south of the Turbine Room. This was a single-storied industrial building of 5 bays of sawtooth steel trussed roofing clad in corrugated asbestos cement sheeting. The walls and floor of the building were reinforced concrete. The building, formerly in a deteriorated condition due directly to vandalism and lack of maintenance, has been completely removed.

Amenities Building - A separate single storied timber-framed amenities building with masonry dado was formerly located south of the Boiler House and east of the Workshops. The seven-bay building had a hipped roof clad in asbestos cement sheeting. The building formerly in a deteriorated and heavily vandalised condition, has been completely removed.

Canteen - Located south from the Amenities Building, the Canteen was formerly a single storied timber-framed building sheeted externally with weatherboarding, over a masonry dado. The gable ended pitched roof is clad in corrugated asbestos cement sheeting. The building formerly heavily vandalised, has been completely removed.

The switchyard and groynes for circulating water intake do not fall within the scope of this assessment. The switchyard is operational. The groynes and water basin are now in a deteriorated and partly silted condition.

13. 3 REFERENCES

Bodycoat, R., 'South Fremantle Power Station: Heritage Assessment', commissioned by the Department of Commerce and Trade, August 1994.

Bodycoat, R., 'South Fremantle Power Station, Heritage Assessment Review' prepared for the Heritage Council of Western Australia, July 1997.

13.4 FURTHER RESEARCH

Oral histories of former Station engineers and staff.

Cockburn Industrial Area.