White Bay Power Station

Robert Street, ROZELLE, NSW 2039

CONSERVATION MANAGEMENT PLAN
VOLUME V
MACHINERY SURVEY INVENTORY
(& Conservation Strategy)

prepared for
The Sydney Harbour Foreshore Authority
by a team led by

Design 5 Architects Pty Ltd
5 Queen Street, Chippendale, NSW 2008
Phone: (02) 9319 1855

FINAL REPORT
SECOND EDITION JULY 2011
(Revised March 2013)

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Cover Image:	White Bay Power Station from Robert Street, July 2010 (Design 5 - Architects)

This report has been produced at Design 5 – Architects and is the compilation of work by the following team:

First Edition

Lead Consultant	Design 5 Architects
Primary areas of input:	
Conservation planning co-ordination, conservation analysis, conservation policy and maintenance	Design 5 Architects
Industrial and machinery heritage	Godden Mackay Logan
Engineering	Hughes Trueman
Planning and statutory considerations	JBA Urban Planning
Conservation analysis & conservation policy	Anne Warr Heritage Consultant
Social Significance	Context Pty Ltd
Social Significance and History	Meredith Walker Heritage Futures

Second Edition

Note: Volume V (this volume) is not updated since 2004 CMP

Lead Consultant	Design 5 Architects
Primary areas of input:	
Conservation planning co-ordination, conservation analysis, conservation policy and maintenance	Design 5 Architects
Engineering	Hughes Trueman Mott Macdonald
Client body and review	Sydney Harbour Foreshore Authority

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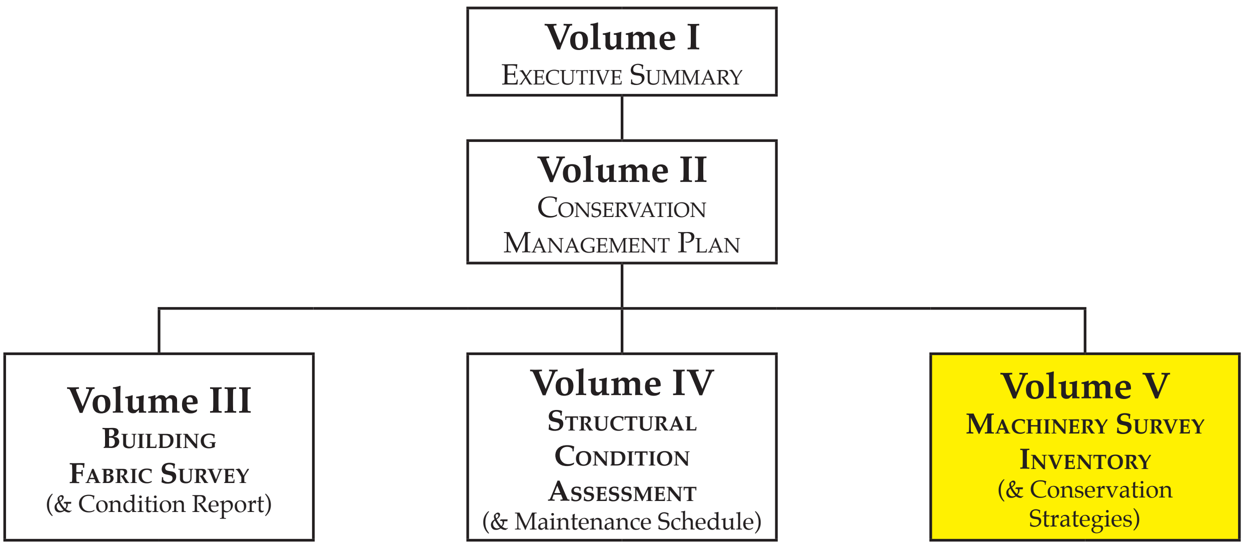
Structure of the Report

The White Bay Power Station Conservation Management Plan is arranged in Five Volumes in a hierarchy as demonstrated by the following diagram. The results of the investigations of the building fabric survey, structural condition assessment and machinery survey inventory and conservation strategy are contained in three Volumes (III - V).

The information in these three Volumes is summarised in Volume II and informs the Assessment of Cultural (Heritage) Significance and the Management Policies which result from these Assessments.

Volume I is the Executive Summary which gives a broad overview of the whole report and summarises the most important Policies for the conservation of the White Bay Power Station.

No strategies should be devised nor any work carried out relying solely on the information contained in Volume I. Reference must be made firstly to Volume II and then the volume containing the relevant detail. That reference should also be noted against any such strategy or work instruction.



This is Volume V

The following table shows each volume that has been amended/revised as part of each issue. Some volumes may not have been amended but are identified on the cover as belonging to an amended set.

CMP amendment date (issue):	Volumes amended as part of an amendment set					
	Volume I	Volume II	Volume III	Volume IV	Volume V	Appendices
January 2004 *Original Report*	✓	✓	✓	✓	✓	✓
Second Edition July 2011 *Revision and update*	✓	✓	✓	✓		
Second Edition July 2011 (Revised March 2013) *Minor amendments*	✓	✓				✓

Summary Contents of whole report

Volume V
Machinery Survey Inventory & Conservation Schedules

Appendices

Godden Mackay Logan
Heritage Consultants

Godden Mackay Logan is a leading provider of specialist advisory and research services in environmental heritage, planning and archaeology.

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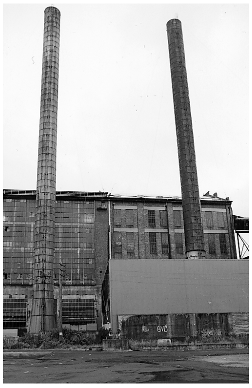

White Bay Power Station

Historic Machinery Inventory & Conservation Strategies

Report prepared for Design 5 Architects

May 2003

Report Register

The following report register documents the development and issue of this report titled White Bay Power Station Historic Machinery Inventory & Conservation Strategies undertaken by Godden Mackay Logan Pty Ltd in accordance with its Quality Assurance Procedures. Godden Mackay Logan operates under a quality system certified as complying with the Australian Standard for Quality Assurance AS/NZS ISO 9001:1994.

The term **Amended** means that specific sections of the report have been altered (and identified in the notes below) but the remainder of the report has not been completely reviewed and updated.

The term **Revised** means that the report has been completely reviewed and updated where necessary and contains information believed to be current as at the date of issue.

Our Reference	Issue No.	Notes	Issue Date
02-178	1	Draft Report	November 2002
02-178	2	Final Report	May 2003
02-178	3	Amended Report	October 2003

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1.0 Introduction

1.1 Preamble

The Sydney Harbour Foreshore Authority has commissioned Design 5 Architects to prepare a new Conservation Management Plan for White Bay Power Station. Godden Mackay Logan have been sub-contracted by Design 5 Architects to provide input into the Conservation Management Plan comprising Assessment of Significance, Conservation Strategies and Inventory Sheets for the historic machinery and equipment within the Power Station.

1.2 Background

White Bay Power Station was constructed in 1912–1917 by the Department of Railways, coming into service in 1917. The Station was transferred to the Electricity Commission of NSW in 1953 and remained in service until it was decommissioned in 1984.

1.3 Study Area

White Bay Power Station occupies P. 14742 Lot 2 DP598974 CTVO on the corner of Victoria Road and Robert Street, Rozelle, in the LGA of Leichhardt. It is adjacent to White Bay, approximately four kilometres west of Sydney CBD.

1.4 Heritage Listings

White Bay Power Station is listed on the NSW State Heritage Register (SHR). It is also included on the Sydney Harbour Foreshore Authority's Section 170 Heritage and Conservation Register. The site in its entirety is also identified as a heritage item on the Australian Heritage Commission's Register of the National Estate and is classified by the National Trust of Australia (NSW).

1.5 Methodology

This report assesses the heritage significance of the historic machinery at White Bay Power Station as a whole as well as the significance of the individual elements within the complex. It identifies relevant constraints and opportunities and sets out a conservation strategy for its appropriate management. The inventory includes priority conservation works and guidelines for future development.

This report has been prepared using the guidelines contained in James Kerr's *The Conservation Plan*, published by the National Trust of Australia, and the guidelines to the *Burra Charter* of Australia ICOMOS. The assessment of heritage significance has been made using the heritage assessment criteria contained in the *Heritage Act 1977* (NSW) and the methodology set out in the *NSW Heritage Manual*.

This report draws on an earlier significance assessment report, *The Significance of White Bay and Balmain Power Stations to Sydney's Industrial Heritage,* prepared by Don Godden and Associates, Heritage Consultants, in 1989.

1.6 Author Identification

This report was prepared by Don Godden, Consultant Industrial Archaeologist, with assistance from Jennie Lindbergh, Industrial Archaeologist, and Karina Waddell, Research Assistant, of Godden Mackay Logan. Tony Brassil, Senior Industrial Archaeologist, provided additional input and technical review and Sheridan Burke, Director of Godden Mackay Logan, managed the project and reviewed the report.

1.7 Terminology

In general, this report adopts no special terminology except where pertaining directly to the processes and equipment of electricity generation. As this terminology is specific to the subject matter and is widely understood by those familiar with electrical technology, no particular glossary of terms is included in this report.

Otherwise the terminology used in this report is consistent with the *NSW Heritage Manual* and the definitions contained in the (Australia ICOMOS) *Burra Charter*.

1.8 Limitations

Generally, the research and analysis undertaken for this study is considered comprehensive. Although many of the identified stakeholders were consulted as part of the preparation of this report, limited time and resources meant that a more thorough consultation process was not possible.

A number of site surveys were undertaken of the White Bay Power Station during June–July 2002 and February 2003 to identify the full extent of the extant machinery at the station and to assess the condition of its fabric. Some of these surveys were undertaken with former staff members, Alvils Paupe, Brian Haywood and Ron Acher, who added personal detail to the available documentary resource. Site visits only examined fabric that was safely accessible. No machinery was dismantled or operated and operational status has not been explored in this report. No destructive intervention of fabric was carried out. The interiors and upper level of some machinery and systems have not been inspected due to safety concerns.

1.9 Acknowledgements

Acknowledgement is made of the invaluable assistance of Ron Acher, Brian Haywood and Alvils Paupe.

2.0 Contextual History

2.1 Power Stations and Electrification in the Sydney Region

The commercial introduction of electricity supply began in the late 1870s. The earliest installations were almost exclusively for lighting, serving individual buildings or, at best, compact urban districts. The first urban power stations supplying both street lighting and private consumers opened in 1882, at Holborn Viaduct in London and Pearl Street, New York.

The high cost and low efficiency of electric lighting, which at first hampered competition against the well established coal gas system, was gradually overcome. The development of the electric motor in the 1880s and 1890s opened up new markets for electricity in industry and the railways, both of which had been dominated by the steam engine. Rapid worldwide progress in the technology of transmission in the same period allowed power stations to serve wider areas, resulting in a proliferation of urban power stations. Some supplied power only for traction, while others supplied the general market for power and light, with declining cost and increasing reliability, so that individual consumers in their supply areas gradually shut down their own small, inefficient plant in favour of purchasing electricity.

This worldwide pattern was repeated in Sydney. By the 1890s, a number of small, privately-owned power companies were supplying consumers with light and power in the central business district. There were also a handful of municipally-owned stations, the largest of them in Redfern, and several country towns had established town lighting schemes.

The construction of a large power station to serve Sydney's central area was delayed by political rather than technological circumstance. Between 1887 and 1896, the New South Wales parliament dealt with six competing bills for the right to reticulate electricity in Sydney, eventually giving approval to the Sydney Municipal Council (SMC).

The first major application of electrification, however, was for public transport. Between 1879 and 1899, Sydney's tramways had been powered by horse, steam or cable. In 1896, after seven years of experiments with electric traction including the electrification of North Sydney and Rose Bay lines, the NSW Railway Commissioners (RC) obtained parliamentary authorisation to construct an electric tramway along George Street to Harris Street, Ultimo and, in 1897, they commenced construction of a large power station at Ultimo. Ultimo Powerhouse came into service in December, 1899.

The SMC commenced construction of a powerhouse in The Rocks in 1897 but owing to the rapid development of technology, this building had to be abandoned during construction and an entirely new, much larger station was designed. Pyrmont Power Station, which supplied street lighting and a rapidly growing private clientele, came into service in July 1904.

Public ownership of electricity supply was becoming widely accepted but did not prevent the establishment of the Electric Light and Power Supply Corporation (ELPSC), which commissioned the original Balmain Power Station in September 1909. In 1912, the RC commenced construction of their second power station at White Bay, to serve the rapid expansion of the electric tramway system and the anticipated electrification of the city railway. White Bay Power Station came on line in late 1917.

These four power stations formed the backbone of the Sydney electricity supply system until 1930, when the SMC completed the first stage of Bunnerong Power Station. The SMC, ELPSC and RC systems expanded their production steadily and, except for limited energy exchanges between the RC and SMC in the 1920s, independently. The ELPSC secured the franchise to supply the five municipalities surrounding its power station by 1911, so reaching its maximum geographical extent. The growing traction load was reserved by legislation for the RC who, from 1923, also supplied in bulk to outlying municipalities in Sydney's south-west (four of which constituted the first St George County Council), commencing supply in March 1923. The SMC was the least constrained in the areas it could serve and its sales grew fastest of the three supply organisations.

The advantages of integrating the separate systems had been apparent since the First World War, when an emergency 12 MW link between the SMC and RC systems had enabled the former to keep expanding its sales despite the unobtainability of new plant. In 1925, the two organisations made a short-lived energy exchange agreement which was terminated soon after by the SMC in favour of building its own power station at Bunnerong and, in its view, keeping control of its own destiny.

In an attempt to achieve greater co-ordination in the development of electricity supply within Sydney and in the rest of the state, the government set up an Electricity Advisory Committee (EAC) in 1934. One of the first EAC recommendations to be taken up by the government was the transfer of the electricity undertaking of the SMC to a newly-constituted local government conglomerate, the Sydney County Council (SCC), in 1935.

It was defence rather than economic considerations that finally interconnected the different systems in 1940, after many false starts. During that year, new 15 MW links were completed between the RC and SCC systems, at St Leonards and Marrickville, and the first ever link between the SCC and the ELPSC, at Five Dock. Although no part of the system was ever subject to enemy bombardment, the interconnections proved invaluable during the postwar years, when the difficulty of obtaining plant and continual industrial action placed great stress on the Sydney electricity system.

In effect, regional interconnection took the Sydney electricity system to much of the rest of New South Wales. With the connection of the Public Works Department's Southern Electricity Supply (SES) system, the Sydney regional grid extended from Taree in the north to Canberra in the south and Griffith in the west. In 1946, over 84 per cent of New South Wales electricity was generated within the grid, 11 per cent in other public supply systems and 5 per cent in private plant. About 48 per cent of Sydney's electricity was generated by the SCC (at Bunnerong and Pyrmont), 38 per cent by the RC (at White Bay and Ultimo and at Newcastle and Lithgow) and about 7 per cent each by the ELPSC (at Balmain) and the SES (at Port Kembla and smaller inland stations).

In 1950, the postwar supply crisis in Sydney, together with the urgent need for electrification in the rest of the state, prompted the government of the day to establish a central electricity generating body, the Electricity Commission of New South Wales (ECNSW). The ECNSW took control of the generating assets of the SES in November 1950, the SCC in January 1952 and those of the RC in January 1953. In 1956, after an extended legal dispute over the basis of valuation for purchase, the ECNSW also took formal control of the assets of the ELPSC.

Even before the ECNSW acquired control of the four original Sydney power stations, the pressure of technological change was in the direction of electricity generation outside the city, closer to the coalfields. The cost of high-voltage electricity transmission was negligible in comparison to the cost of transport of fuel and this had been recognised by the RC which, of all the major generating organisations, had the most widespread transmission network and the greatest freedom in power station location. From the late 1940s, the RC had been planning to build three large coalfields stations, all of which were ultimately completed by the ECNSW and served as prototypes for a series of progressively larger coalfields stations.

It is probable that, if the ECNSW had been formed immediately before the war, the pattern of development of Sydney's power stations would have been quite different. As it was, the decisions made independently by each of the major generating organisations during the war resulted in the postwar rebuilding of Pyrmont, White Bay and Balmain power stations (and the installation of new equipment in Bunnerong and Ultimo). Earlier co-ordination may well have led to the earlier development of coalfields power stations and the historic patterns of power station building are as much the result of the industry organisation of the time as the technology.

Sydney was self-sufficient in electricity for the last time in 1954, in that outward and inward energy flows balanced over the cycle of the year. In 1958, it was still generating 75 per cent of its requirements, but by 1962 only 32 per cent, and by 1965 only 10 per cent. The combined output of the Sydney power stations in that year was barely one-fifth that of Vales Point, the ECNSW's newest and largest power station. With the progressive completion of four more coalfields power stations by 1987, the metropolitan stations contributed insignificant amounts of energy to the system, although they were retained as emergency plant until retired. Pyrmont and White Bay were the last of the five large stations to be decommissioned, in 1984.

White Bay was the longest serving power station in Sydney. It had 70 years of continuous generation within the one building (albeit extended and with new boiler houses) compared with 64 years at Ultimo and 60 years at Balmain A. Although the Pyrmont site was in longer service, from 1904 to 1983, the original power station building was completely superseded and replaced.

2.2 The White Bay Power Station

2.2.1 Establishment

The RC always had a more complex system to manage than either the SCC or the ELPSC. The normal lighting and motor loads of its own establishments (based on 240 volt 50 Hz AC supply) were superimposed on the 600 volt 25 Hz DC supply required by the tramways. Furthermore the system eventually selected for railway electrification in the early 1920s was based on 1500 volt 50 Hz DC supply and, after the First World War, the RC began high voltage 50 Hz AC bulk supply, first to the Sydney Municipal Council (SMC) and, from 1922, to the southwestern suburbs of Sydney. The RC also supplied power to other public authorities for such essential uses as sewer and water pumping and the operation of opening bridges.

The complementary patterns of the various loads allowed the RC to make efficient use of its generating plant, as electricity could be distributed with some flexibility across the various subsystems. This was accomplished by incorporating a large number of frequency changers (25 to 50 Hz or reverse) and rotary converters (AC to DC or reverse) into the system, in addition to the usual transformers. The presence of such plant in the power stations and substations distinguishes the RC electrical system from those of the ELPSC and the SCC. The latter rapidly became almost exclusively 50 Hz AC, after some initial DC development (though some parts of the City of Sydney first electrified by the SMC in the 1900s continued to be supplied by DC into the 1980s).

After the completion of Ultimo Powerhouse in 1899, electrical tramway operations increased rapidly and the RC's projections of further growth threatened to exceed the capacity of the power house. At about the same time, the Commissioners formed the view that electrification of the suburban railway, and the construction of a new, electric City underground railway system, were essential to keep up with the growth in rail traffic. In 1910, the RC's Chief Electrical Engineer, OW Brain, recommended that an additional source of power be established and, in keeping with the custom of the day, traveled to Europe and America to investigate the latest developments.

Brain considered and rejected hydro-power, on the basis that no reliable supplies (ie water flows) were available near Sydney. He also considered and rejected a location on the western coalfields, because at that time the unit cost of transmission marginally exceeded the cost of coal transport and the availability of cooling water was a major difficulty. The RC selected a site at White Bay, on the following criteria:

- it had sufficient area for a power station of 'well over 100' MW;
- it had both rail links and dock facilities for coal and plant delivery and ash disposal;
- it had unlimited circulating water, with the possibility of separating inlet and outlet to avoid local heating problems;
- it was low-lying, to reduce cooling water lift; and
- it was low cost.

2.2.2 First Phase

Construction commenced in June 1912, with the driving of piles to support the northeast corner of the building (the rest is on more solid foundation). The first boilers and the first turbo-altemator set were steam tested on site in July 1913, even before the buildings were completed. Construction was then 'allowed to progress quite slowly for some time', for a number of reasons. The First World War dramatically slowed the growth in tramway usage, delayed the electrification of the suburban railway and also created a shortage of materials and skilled manpower, making the completion of the power station both less urgent and more difficult. Another factor was technological development, which increased the ability of the Ultimo Powerhouse to accommodate growth. The Ultimo building was originally designed to house 11 MW of reciprocating engine-generators but, by 1918, a total of 36 MW of more compact and efficient turbo-altemators had been installed.

White Bay Power Station was planned to accommodate eight groups of boilers and ten turbines when fully developed. Coal was railed into the site at the east and conveyed to the top of the boiler house. Abutting the west of the boiler house was the pump gallery, the turbine hall and, separated by a gap for ventilation and lighting, the switch house. The channel taking cooling water to the condensers ran the length of the turbine hall: on the basis of experience at Ultimo, it had been designed with particular care to accommodate future turbines of greater power. Similarly, problems with ash handling at Ultimo led to the adoption of a suction system of boiler ash collection at White Bay.

The station was built in two stages. The first, in brickwork, consisted of the first half of the turbine hall and the switch house and one boiler house. This phase had room for five generators. It was not until May 1917 that it became fully operational, with 25 Hz, 66 kV turbo-alternators installed at positions 1,2 and 4 and a bank of four Babcock & Wilcox boilers occupying half the boiler house. Two of the generating sets were Willans & Robinson turbines coupled to Dick Kerr alternators, rated as 7 MW continuous and 10.5 MW overload (some sources give the rating as an average 8.75 MW). Three were ordered but, when industrial troubles in the UK delayed the delivery of the third, a 7.5 MW Curtis General Electric turbo-alternator was installed instead in the No. 4 position. The Willans Robinson Dick Kerr machine intended for the No. 3 spot was installed at Ultimo on arrival in 1914 but then transferred to the No. 3 position at White Bay in late 1918, giving a total station capacity of 28.5 MW.

The No. 4 Curtis General Electric turbine was removed some time before 1924, when a new 25 Hz, 6.6 kV, 8.75 MW English Electric turbo-alternator of largely local manufacture was commissioned. In 1925, a second English Electric set was installed and a second bank of boilers built inside the original boiler house. With this, the first stage of the White Bay Power Station reached its maximum capacity of five 25 Hz turbo-altemators, aggregating some 63.75 MW. At Ultimo, there was an additional 27.5 MW of 25 Hz plant and 14.3 MW of 50 Hz plant. The two stations were operated and controlled as a unified system.

2.2.3 Second Phase

After 1925, White Bay became the RC system's main station for 50 Hz generation (some 9.7 MW of 50 Hz plant installed at Ultimo was progressively removed between 1925 and 1928, some of it to smaller RC power stations at Newcastle and Lithgow, leaving Ultimo as a dedicated tramway supplier). With the growth of electric train traffic and bulk sales to the SMC and other councils, an additional 11 kV, 50 Hz Parsons turbo-alternator of 20 MW output (No. 9) was installed in 1928. This brought the total capacity of the second phase of the Station to its maximum of 86 MW.

The record 406 GWh of electricity generated at White Bay in 1928–29 declined to 224 GWh in 1933–34 for a number of reasons and was not exceeded until 1947–8. Bulk sales to the SMC ceased within nine months of the opening of the Council's Bunnerong Power Station in January 1929. Sales to other councils were then affected by the 1929 stockmarket crash and subsequent economic depression (the Depression), which also halted the growth in electricity demand for rail and tram working.

No new generating plant was installed at White Bay between 1928 and 1951. After the Depression, an increasing share of the tramway load was taken by Ultimo, where two 20 MW, 25 Hz AGE-BTH units had been installed in 1930 and 1931. In 1940, the 7.5 kVa frequency changer at White Bay was replaced with a 25,000 kVa unit, allowing more power generated at 50 Hz to be fed to the 25 Hz system. From then on, the 25 Hz generators at White Bay were used mainly for peak periods and for standby purposes. In 1944, the No. 1 alternator was disconnected from its turbine and placed in service as a synchronous condenser. This provided power factor correction for the frequency changer and enabled the plant at Ultimo to operate more efficiently.

Between 1939 and 1941, the RC systems in Sydney, Newcastle and Lithgow were interconnected. In 1940, 33 kV links were established between the RC and SCC systems at Marrickville and St Leonards and in 1941, a 33/66 kV link with the Public Works Department's system was completed, also at Marrickville. While originally intended as emergency links in the event of enemy bombardment, they proved invaluable after the war in combining the resources of the State's major electricity systems. Reinforced concrete shelters, blast walls and equipment covers were installed at White Bay in early 1942 as a precaution against air raids. They were progressively removed in the first half of 1944.

2.2.4 Third Phase

After 1945, the 50 Hz plant showed increasing signs of wear with the loss of blades from Nos. 6, 7 and 8 turbines. Work began on the third phase of development, the replacement of the original 25 Hz plant with new 50 Hz plant. Between 1945 and 1948, two 50 MW, 33 kV, 50 Hz Parsons turbo-altemators and four Babcock and Wilcox boilers were ordered from Britain (some boiler components were manufactured locally at Mort's Dock). To make way for the new plant, Nos. 1 and 2 turbo-alternators and Nos. 1 and 2 boilers (the oldest in the 25 Hz section of the power house) were removed and demolition of the original No. 1 Boiler House began.

The construction program was seriously delayed by the postwar shortages of steel and other materials and further difficulties were created by labour strikes in the coal industry in 1948 and 1949. The boilers were modified to burn up to 10 per cent oil to compensate for the poor quality and grading of the coal available and two 24,000-gallon oil tanks were installed. The efficiency of the 50 Hz plant fell from 16.5 per cent in 1947–48 to 14.87 per cent on 1948/9 because of poor coal, greater use of obsolete plant and excess loading. By 1950, the Nos. 6, 7 and 8 turbines again developed problems with loss of blades (and in some cases entire rings) and heavy load shedding became necessary. To make matters worse, the 25,000 kVa frequency changer exploded and burned in November 1950. After an unsuccessful repair attempt, it burned out again in May 1951 and did not re-enter service until April 1952.

The first Parsons 50 MW turbo-alternator (No. 1) and new boilers (Nos. 1 and 2) were finally placed in service on 8 April, 15 April and 16 June 1951 respectively, with the boilers occupying a new High Pressure (HP) Boiler House. The second Parsons 50 MW unit, already on site for a year, was to be installed the position of the original No. 4 turbo-alternator, which had been transferred to Ultimo to make way for it. The Nos. 3 and 4 boilers, the last remaining from the first phase of White Bay's development, were taken out of service on 18 July 1952 for transfer to the RC power station at Lithgow. Temporary arrangements were made to provide low pressure steam from the High Pressure (HP) Boiler House to the No. 5 turbo-alternator, which was the last remaining 25 Hz turbo-alternator. In late 1952, an additional floor was built on to the roof of the 11 kV Switchhouse south of the original Control Room to accommodate a new battery room and staff amenities.

On 1 January 1953, White Bay Power Station was transferred to the newly formed ECNSW, along with all other RC power stations and associated facilities. The ECNSW also acquired several power stations under construction and there were chronic shortages of materials and skilled labour. The completion of the next phase at White Bay was further delayed and the second 50 MW unit at White Bay was finally commissioned in the second half of 1955. Even so, it was able to function only as a standby for nearly three years, until the new Nos. 3 and 4 boilers came into service in April and June 1958.

The completion of the third phase of development followed the removal of the last 25 Hz generator, and brought the capacity of White Bay Power Station to its maximum of 186 MW. Of this, 86 MW was plant installed during the second development phase from 1925 to 1928. This was used only in emergencies after 1958, was decommissioned in 1975 and was subsequently removed, allowing demolition of the No. 2 Low Pressure Boiler House. The two 50 MW units remained in service for peak load and emergency purposes and were last used intensively in 1982, during plant shortages caused by the Liddell Power Station breakdowns. They were finally decommissioned in 1984.

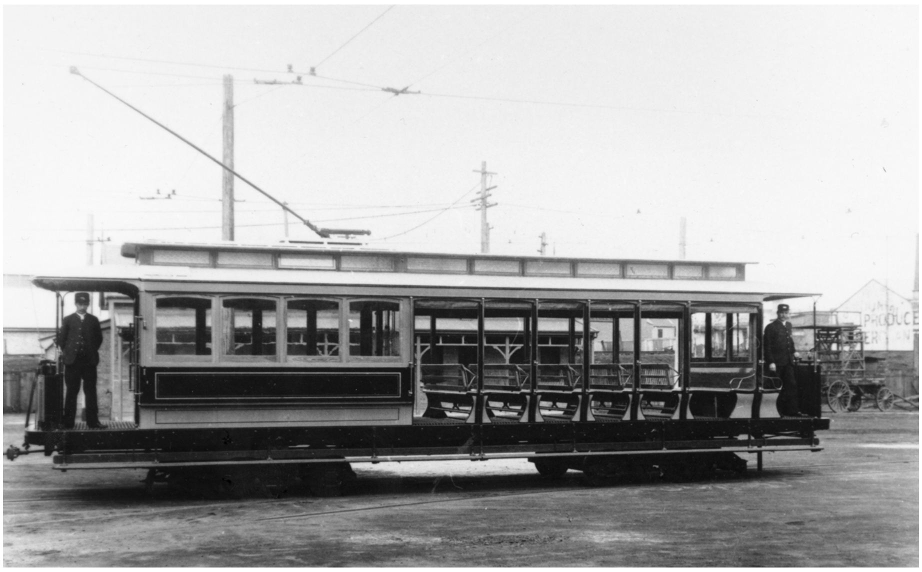
2.3 From Closure to the Present

White Bay Power Station remained static for a number of years after it was closed, while other issues preoccupied the ECNSW. The National Trust of Australia (NSW) began making representations to the ECNSW soon after it closed regarding the preservation of the station for historical reasons, particularly in view of the relatively good condition of much of the plant. For this reason, the options for preservation were reviewed and consultants appointed to consider the heritage value of the Station. As a result of these considerations, the ECNSW determined to mothball the Station for the immediate future and, unless a more immediate solution was forthcoming, to preserve at least a representative set of the installed equipment.

Difficulties with cost, public safety and ongoing maintenance meant that in the late 1980s and early 1990s, the Station was stripped of everything except those elements specifically identified for heritage conservation. Even these items were themselves heavily affected by the removal of all asbestos insulation and lagging, especially the surviving boiler.

In about 1998, ownership and control of White Bay Power Station was transferred to the Sydney Harbour Foreshore Authority, a New South Wales statutory authority responsible for the management and development of the government-owned parts of the harbour foreshores. From this time up to the present (2003), the vacant spaces of the Station have been regularly used for as a set location for film and video productions and for functions and events.

Figure 2.1 One of the first series of electric cars for full time electric use in New South Wales. Manufactured by the St Louis American car company.



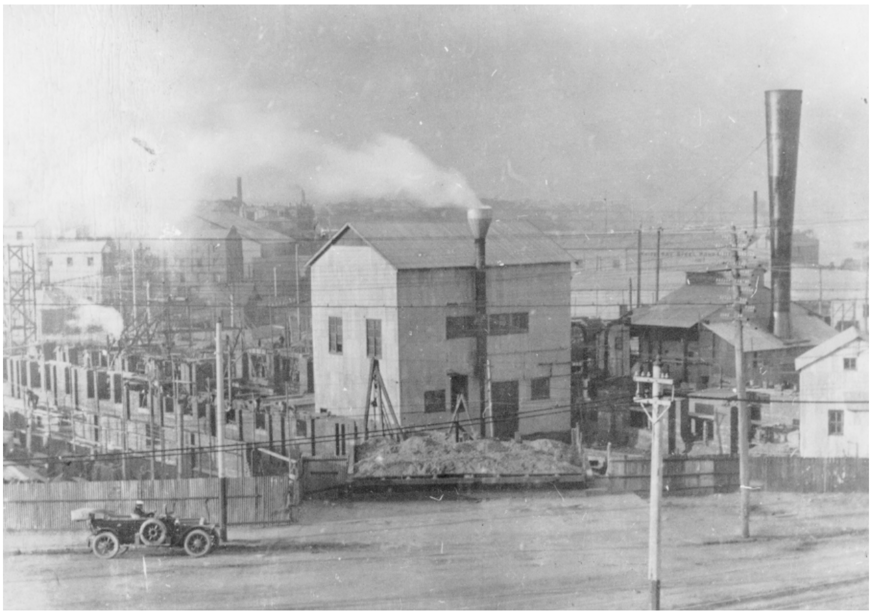


Figure 2.2
White Bay Power Station, July 1913. First day of operation.

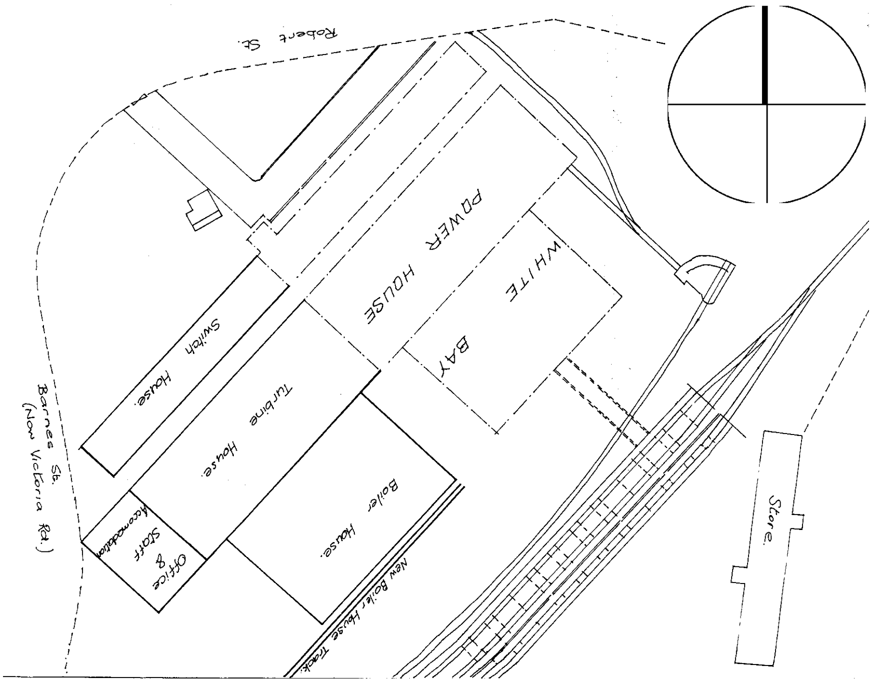


Figure 2.3
White Bay Power Station Building Extension Outline Arrangement, 1922.

Figure 2.4
White Bay Power Station 1923. Installation of turbine rotor during the second phase of development.

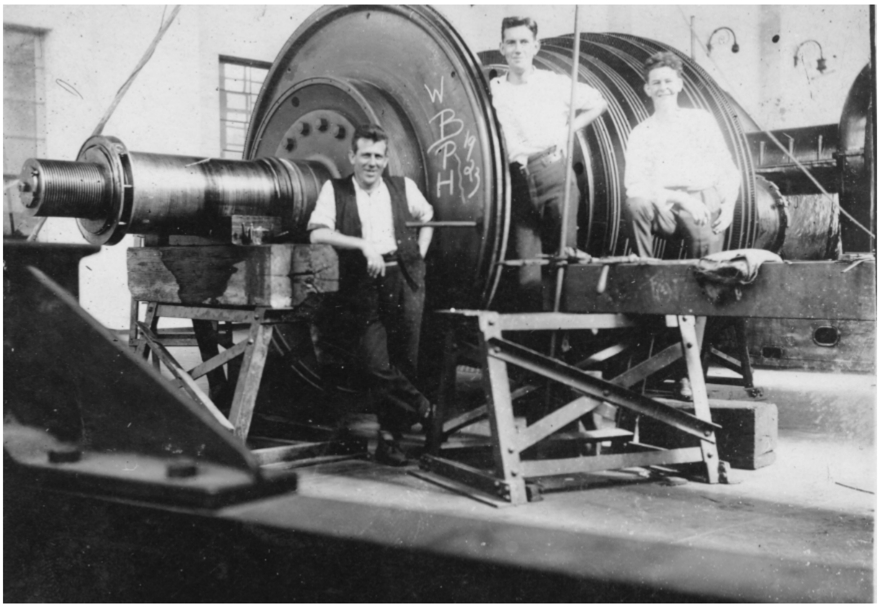


Figure 2.5
White Bay Power Station. The original Control Room at the south end of the turbine hall.

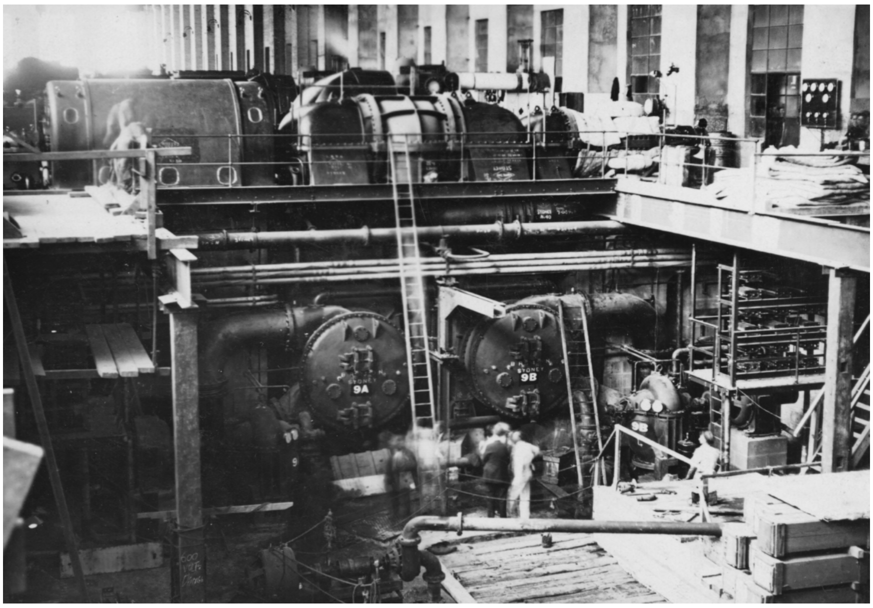


Figure 2.6
White Bay Power Station Turbine Hall 1928. The newly installed No. 9 turbo-alternator set with its condensers on the condenser floor below.

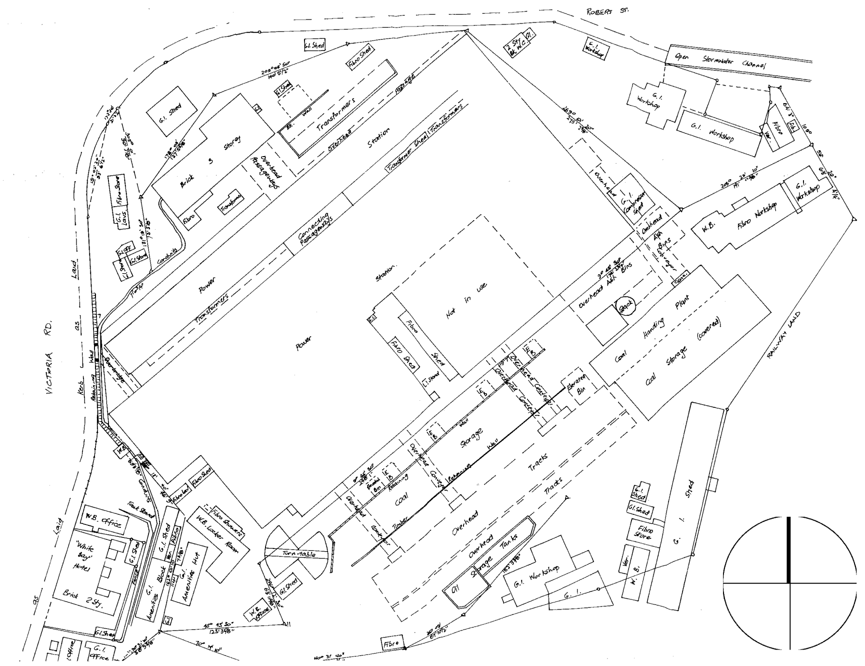


Figure 2.7
White Bay Power Station Detail Survey July 1953.

3.0 Description of Fabric

3.1 Preamble

3.1.1 Approach to Historic Machinery Analysis

This report is concerned specifically with the installed machinery and equipment of White Bay Power Station, rather than the buildings or landscape. Any analysis of machinery requires an understanding of the interrelationships between individual components and the role that any individual machine has both as part of a larger group of machines or as part of a process.

For this purpose, a number of specific terms are utilised in the following section which are essential criteria in assessing the physical condition, integrity and importance of machinery. These terms are identified and defined below:

An Individual Machine has no associated infrastructure or associated subsidiary machinery and, for management purposes, may be dealt with in isolation.

An Assemblage is a Individual Machine plus all the artefacts, tools and items normally associated with it when it was operating. For management purposes, this category of equipment must be considered as a whole, with potential impacts on the whole taken into consideration.

A Collection is a number of Individual Machines or Assemblages which belong to a group because they perform the same function or produce the same finished product. For management purposes, this category must be considered as a group and proposals must respect the relationships, qualities and significance of the group as a whole.

A Operational System is an operational group of related Individual Machines or Assemblages or Collections which cannot function effectively if any one is removed. For management purposes, this category must be considered as a group and proposals must respect the interdependent relationships, qualities and significance of the group as a whole.

An Operational Group consists of a number of Individual Machines or Assemblages or Collections or Operational Systems that normally operate as part of a sequential process. For management purposes, this category must be considered as a group and proposals must respect the relationships, qualities and significance of the group as a whole and take into account the group's spatial relationship and association with a particular area.

In this regard, then, White Bay Power Station is an Operational Group which comprises a set of Operational Systems working in conjunction to produce and deliver electricity. The process of the production of electricity in a coal-fired power station is illustrated in Figure 3.1.

3.1.2 Operational Systems at White Bay Power Station

Eight Operational Systems have been defined which relate to the remnant equipment at White Bay Power Station:

1. The Coal Handling System
2. The Steam Raising System
3. The Power Generating System
4. The Feedwater System
5. The Circulating water System
6. The Power Reticulation System
7. The Ash Handling System
8. The House Electrical and Auxiliary Power Supply System

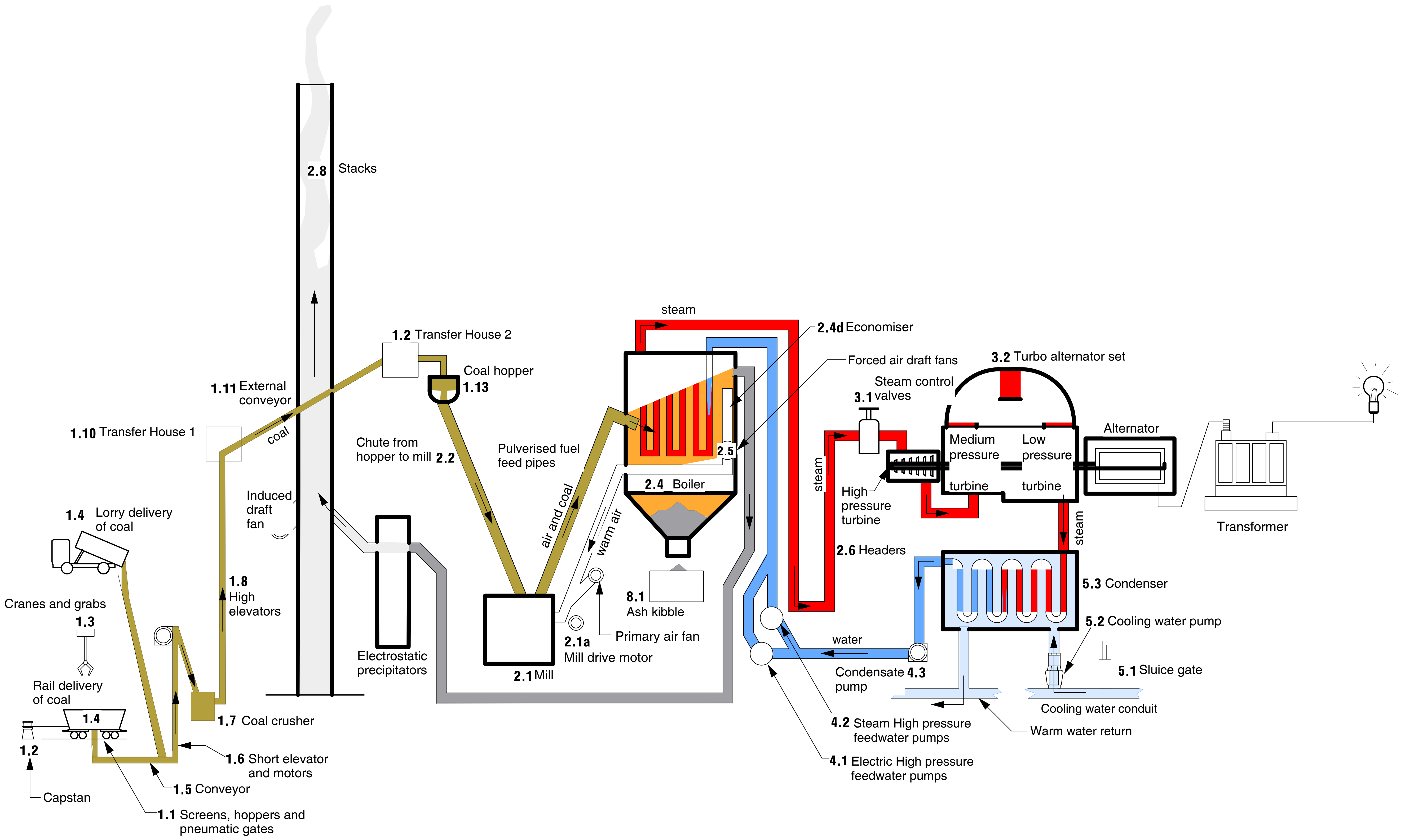
Each of these operational systems comprises individual machines or subsidiary systems (which themselves may comprise individual machines) and any of these individual machines may be themselves assemblages or collections when considered in isolation. These eight operational systems are examined and the surviving fabric described in the following sections.

3.2 Coal-handling System

The Coal Handling System functions to receive coal deliveries from railway or road transport, grade, clean and store the coal, then transfer the coal into the overhead coal bunkers in the Boiler House. At White Bay, the receiving coal stores comprised a large open area on the east side of the present Coal Handling Shed. An open-sided shelter attached to the eastern side of the Coal Handling Shed provided covered storage for a reserve of dry coal.

3.2.1 Operations in the Coal-handling System

The equipment associated with the coal-handling is housed in a steel-framed, gable-roofed shed with a corrugated-iron clad roof. It is about 50m long and 10m wide with a corrugated-iron west wall and a brick masonry wall to the east. The eastern masonry wall originally separated the shed from the dry coal store (now removed), built in the same style as the coal handling shed. The north and south ends of the coal-handling shed were originally open to allow the entry and exit of railway coal wagons.



White Bay Power Station - Schematic Diagram of Operation (not to scale).

The railway coal wagons were brought into the shed on a single set of tracks located close to the western wall. Originally, the rail tracks had run through the building but, at some stage, a series of heavy rails, which now form the motor lorry discharge screen, was laid transversely across the rail tracks, preventing through-travel. The rail tracks are themselves supported on massive steel plate girders which run the length of the building below ground level. All rail trucks were pushed through the shed by engine or by fettlers or they were dragged through by a cable turned on the capstan located on the south side of the shed.

On either side and between the rail tracks are large steel mesh screens which form a continuous floor at ground level running almost two-thirds of the building's length. The coal was unloaded by a pair of grab cranes or the wagons unloaded directly onto the screens.

Coal was dropped onto the screens and smaller pieces fell through into a series of concrete hoppers, Any very large pieces held on the screens were later broken down manually. These concrete hoppers are inverted square pyramids, their upper edges being clad in steel to prevent wear. Each hopper is equipped with a pneumatic gate which controlled the flow of coal onto the long conveyors below.

Beneath the screens, about two metres below ground level, were the main longitudinal conveyors which deposited coal onto short transverse conveyors which then fed the coal into two short elevators. It is not possible to see any of the workings beneath the screens because of the ingress of water which has covered the motors and all of the conveyor infrastructure.

As mentioned above, the two short elevators received the coal from the short transverse conveyors and main longitudinal conveyors. These elevators raised the coal to about four metres above the coal shed floor and then deposited it in a chute which could be set to deliver coal to the crushers.

From the crushers, the coal was transferred into the main, 40-foot (12m) elevators, to the transfer house located atop the coal handling shed. From here the crushed coal was transferred, via chute, to the conveyor located within the steel-framed, corrugated-iron clad overhead conveyor enclosure, to the second transfer house. From the second transfer house, attached to the north wall of the Boiler House, the coal was transferred to the high level hoppers in the Boiler House via the coal weighers. The automatic weighing machines measured the amount of coal being fed into the hoppers and provided a precise measure of coal to each of the hoppers for combustion. The crushed coal fell through the chute from the hoppers directly to the coal pulverising mills located on the Boiler House floor.

Alternatively, the coal could be directed, uncrushed, to a second transverse conveyor where it was raised again through the main hoppers, the main bucket conveyor and deposited in the dry coal store on the east side of the coal shed.

The following individual items have been identified and Inventory forms have been prepared (see Appendix A):

1.1 Hoppers and Pneumatic Feed Gates

1.2 The Capstan

1.3 The Cranes and Associated Grabs

1.4 Screens

1.5 Conveyors

1.6 Short Elevators and Motors

1.7 Coal Crushers

1.8 The 90 Foot Elevators

1.9 Transfer Houses and Equipment

1.10 External Conveyor

1.11 Coal Weigher

1.12 Coal Hoppers

1.13 Coal Handling Control Room

3.2.2 Individual Items

Hoppers and Pneumatic Feed Gates — 1.1

Coal was lifted from railway coal delivery wagons on a single set of tracks located close to the western wall and dropped onto the Screens through which smaller pieces fell into a series of Hoppers on the main longitudinal Conveyors which deposited coal on short transverse Conveyors which fed into the two Short Elevators. To the west of the tracks, there is another set of Screens, beneath which were much smaller Coal Hoppers. The ingress of water has covered the motors and associated infrastructure below ground level. The Hoppers were inverted square concrete pyramids with steel clad lips to prevent wear. Each Hopper was equipped with a pneumatic gate which controlled the flow of coal onto the long conveyors below. A Pneumatic Feed Gate controlled the flow of coal onto the long Conveyors from the Hoppers.

The Capstan — 1.2

The capstan is a massive cast-iron post mounted on a central shaft. The post itself is approximately 800mm diameter at the base, reducing to approximately 500mm at the collar below the standard cable reel. The capstan was powered by a shaft through a gearbox at its base, which is direct-coupled to a large General Electric motor of unknown voltage and type. The motor and gear box are mounted beneath the check plate. The cable for the capstan ran directly from the capstan around the pulley, located about a metre to the east of the easternmost rail line. The cable had a large hook on the end which would have hooked on to the towing eye of the hopper and dragged it into the correct location for the grab cranes to operate.

The Cranes and Associated Grabs — 1.3

The crane-rail beams are supported by twin 'I' beam columns (150mm by 200mm) joined at the base by plates measuring one by two feet, and attached at the edges of the 'I' beam. A further three, narrower, intermediate braces are spaced up the columns to a fixing bracket at the top. The 'I' beams were manufactured by the Lancashire Steel Company Limited of Scotland and the size is given as eight by six (inches). Both cranes were powered by electric power of unknown voltage (possibly 600 volts DC) by a series of four wires which ran over brown roller insulators attached to brackets on the western crane rail beam.

The two grab cranes were designed and manufactured in 1950 by Morrison and Bearby Ltd of Newcastle, Australia. Their maximum load is given as five tons main and there is no entry on the auxiliary maximum load. The registered number of the westernmost crane is E5229. The second crane is also by Morrison and Bearby and bears the registered number E5228. The cranes themselves consist of two large plate-web girders which support the total structure. The girders are approximately 1.5m apart and have external walkways, mounted on angle brackets. The carriage is mounted on four wheels, which run on rails mounted directly above the 'I' beams. The control cabin for the cranes is slung beneath the northern walkway and although it is fitted with windows on all four sides, the view from the cabin would have been limited.

It was not possible to get to cabin level. However, as with most cranes, it is believed it would hold three motor controllers operating the three motors of the crane — one for longitudinal movement, one for transverse movement of the carriage, and the third to operate the hoist. It appears that the hoist operated the grab at the same time. Operation of the grab entailed lowering it into a truck, closing the jaws of the grab on hoisting and then lifting the coal laden grab.

The Screens — 1.3

The Screens are located to either side of and between the north-south rail track and screened the coal which fell through to be collected by the hoppers above the Conveyors in the basement below. The screens, or "grizzlies", are manufactured from roughly squared sections of approximately 2 x 1.5m. steel strap frame (or bar frame), to which a series of transverse and longitudinal 25mm bars have been welded. The screens could be removed for repair and replacement and several sections are stored on the northern side of the tracks.

Conveyors — 1.5

The conveyors were of the fabric belt type about 800mm wide supported on steel rollers and powered by large electric motors acting through gearboxes. The longitudinal and transverse conveyors are now both under water and could not be inspected.

The Short Elevators and Motors — 1.6

The short elevator to the north is designated 'A' while the southern short elevator is designated 'B'. The short elevators consist of a series of buckets shaped like inverted rectangular prisms, measuring about 600mm wide, 300mm deep and 300mm across. These are attached by a shaft on the inner lip, to which two wheels running on a rail or guide then pass over a massive cog at the top. They are powered by large electric motors, horizontally mounted, which run into a worm gear box, then into a reduction gear box directly attached to the main shaft. The motors were manufactured by Crompton Parkinson; the main drive gear box has no markings, but the worm gear box was manufactured by CNJ. The main shaft of the elevator has a bearing on either side of the case which is lubricated by small oil bottles to each side.

Coal Crushers — 1.7

The coal crushers are massive, webbed, cast-iron constructions typical of pre-World War II crushing equipment, powered by large electric motors (now missing) through a series of five V-belts. These items, manufactured by British Jeffrey-Diamond Limited, Wakefield England (machine number A1842), represent an earlier stage of construction, being made completely from cast iron, rather than welded steel sections. The crushers are of the tooth-type with massive teeth to force the coal through heavy cast-iron fingers reducing to approximately 25mm.

On the third level of the space immediately above the crushers there are two small electric-driven hoists, powered by a small electric motor. The motor operates through an electromagnetic safety brake into a large gear box. The hoist drum, used for hoisting items from lower levels up to the third level, is approximately 400mm long and 300mm diameter.

The Ninety-foot Elevators — 1.8

The two ninety foot (28m) elevators are of the bucket type and are designated “A” and “B”. The buckets are attached to a pair of continuous flat link chains which passes over a pair of large pulleys driven by an electric motor through a worm gearbox. The elevator is fully enclosed within a rectangular column of riveted steel plate. These elevators raises the crushed coal from the crusher level up to the first transfer house where it is dropped onto the external conveyor belt and carried to the Boiler House.

Transfer Houses and Equipment — 1.9

The Transfer Houses are steel and timber framed corrugated iron structures located a the top of the coal shed and attached to the exterior of the north wall of the Boiler House. The Transfer Houses contain the motors of the Conveyor belts and the Chutes for transferring coal from the Elevators to the Conveyor belts or from one Conveyor to another.

The lower Transfer House surmounts the Coal Handling Shed at the northern end and contains the Motors and gearboxes for powering the 90 Foot Elevators plus the Chutes for transferring coal to the External Conveyor. The upper Transfer House, mounted on the north wall of the Boiler House contains the Motors and gearboxes for the Conveyors as well as the belt tensioning devices.

External Conveyor — 1.10

The External Conveyor is a steel and timber framed corrugated iron clad structure which runs from the lower coal shed Transfer House, to the upper Boiler House Transfer House. It supports the frame and roller system of the Conveyor. The floor of the External Conveyor is timber and steel and timber joists.

Coal Weigher — 1.11

From the second Transfer House, attached to the north wall of the Boiler House, the coal was transferred to the high level Hoppers in the Boiler House via the Coal Weighers. The automatic weighing machines measured the amount of coal being fed into the Hoppers and provided a precise measure of coal to each of the Hoppers for combustion.

Coal Hoppers — 1.12

The Hoppers are large welded steel tanks, parabolic in section, reinforced with gussets, supported by steel trusses high in the Boiler House. They are each equipped with a rectangular pyramidal chute, made in steel plates at their lower end which fed coal into the mill feed Chutes (Item No. 2.2). The delivery of coal was regulated by pneumatically controlled gates.

The Coal Handling Control Room — 1.13

The Coal Handling Control Room is located adjacent to the dry coal store to the east and behind the coal crushers in the coal handling shed. The small control panel is complete and consists of a single cabinet for controlling the conveyors and elevators with a second, smaller, panel which controlled the lighting and some of the auxiliary power systems. The main cabinet has what is known as the A-root system and the B-root system. Each consists of seven sets of stop/go buttons, a series of indicator lights and, a series of seven ammeters to measure the current passing into the various motors. This control panel, which was separate from the rest of the control panels throughout the station, simply ran the coal handling system.

Mounted in one corner of the control room is a motor generator, which obviously produced power for some of the DC motors within the system and was manufactured by the Machine and Electrical Company Pty Ltd, Sydney. The manufacturers specifications are — Volts 220 – No.5359, KW5 CONT, rpm 1440 July 1948.

3.3 The Steam Raising System

The Steam Raising System was centred in the Boiler House and functioned to provide steam at specified temperature and pressure to the turbines in the Turbine Hall, where it was utilised to produce electricity by the Power Generation System. Steam was raised in boilers which burned coal and produced ash. The steam was manufactured from water provided by the Feedwater System. Steam was condensed back into water in condensers, located below the turbines, which were cooled by the Circulating water System. Ash was disposed of by the Ash Handling System.

3.3.1 Operations in the Steam Raising System

The primary fuel used in the second-generation boilers at White Bay Power Station was pulverised coal. Heavy Fuel Oil would also be used as the start-up fuel when the boilers were being fired from cold.

Coal stored in the overhead bunkers in the Boiler House drops through a square chute to three Pulverising Mills for each boiler located at basement level. The Mills are arranged so that two only are in service at any time, with the central mill able to substitute for the mill on either side. Powdered coal is blown out of the mills into the furnace injectors located at the upper corners of the furnace at Firing Floor level. Burnt coal ash either follows the hot flue gas out and is removed prior to the stacks or falls to the bottom of the furnace and is extracted by the ash handling system.

The heat produced in the furnace acts on the feedwater flowing through pipes arranged around the furnace, turning it into steam, which continues to be heated as it flows through further pipework. The steam is eventually let out into the steam headers at the specified temperature and pressure, from where valves allow it to be directed to either of the two turbines.

The following individual items have been identified and Inventory forms have been prepared (see Appendix A):

2.1 Pulverising Mill a) Drive Motor b) Fan Motor

2.2 Chutes from Hopper to Mill

2.3 The Pulverised Fuel Feed Pipes

2.4 The Boiler a) The Furnace b) Superheaters c) Attemperator d) Economisers e) Air Heaters f) Air Ducts

3.3.2 Individual Items

Pulverising Mills — 2.1 (a & b)

The pulverising mills were located on the basement floor of the Boiler House. Each mill stands about three metres high and consists of a cast-iron plinth with cast-iron superstructure on which are two massive steel doors and hold-down bolts. Each mill unit possesses a massive 100 HP driving motor, a 100 HP electric motor driving a massive fan and two auxiliary motors located on the mill frame itself. Coal enters through the square chute and distributed into the central crushing chamber of the mill, which has a constantly spinning floor plate.

The crushing chamber includes a number of heavy cast-steel balls (average diameter of 300mm) which are also spun and pulverise the coal into a fine powder. Pulverised coal, when small enough, passes to the saucer-like annulus immediately beyond the crushing ring where it is mixed with high volumes of preheated air pushed by the massive fan and the air-fuel mixture flows upwards through an overhead duct, through a final separator into the single Fuel Feeder pipe.

Drive Motors — 2.1a

The main driving motor for each of the pulverising mills is Lancashire Dynamo and Crypto Co Ltd, rated at 100 BHP and operating at 1470 rpm. Their size is given as ET 3H 28M4. The date of manufacture is given as 1951 and the Serial Number of the eastern mill is 237496. The nameplates are missing from the middle and the northern driving motors.

Fan Motors — 2.1b

The fuel injection fans are manufactured by Babcock and Wilcox Pty Ltd, of Renfrew and London and their motors manufactured by Lancashire Dynamo and Crypto Co Ltd, Manchester and Willesden, Trafford Park Works, Manchester. The motor is a 100 BHP SCR induction motor utilising 26 amps at 2200 volts and operating at 1450 rpm. It is rated as a continuous, three-phase, 50 Hz motor.

Its size specification is ET 26 M4, its serial number is 223534 and the date of manufacture is given as 1948.

Chutes from Hoppers to Mill — 2.2

Chutes, made from cylinders of welded steel, lead from the coal bunkers above down to the Pulverising Mills (Item No. 2.1). When utilised, Coal Weighing machines were inserted between the Chute and Mill.

Pulverised Fuel Feeder Pipes — 2.3

At White Bay, each of the outer two pulverising mills has a single pulverised Fuel Feeder pipe which leads up to the floor above, where it enters a distribution box. The central mill has two Fuel Feeder pipes, one leading into each of the other two distribution boxes of the mills of either side, allowing it to substitute for either.

Each pair of Fuel Feeder pipes entered the Distribution box where a two-way valve split the flow into four main risers. These risers are again divided to form eight pulverised fuel feeder pipes, which entered the burner box of the boiler. The feeder pipes entered the boiler in such a way that the coal feed, when controlled by the two-way pulverising fuel valve, produced even and optimum combustion.

The Boilers — 2.4 (a–f)

Only one of the four original identical boilers from the last phase of operation at the power station, the No.1 Boiler, is retained within the Boiler House. It is a Babcock and Wilcox boiler, designed to produce a continuous 225,000 pounds of steam per hour at 650 psi and 840 degrees Fahrenheit. At the time of installation, these boilers were state-of-the-art high-pressure boilers and required little ongoing maintenance.

As with most boilers, the primary design characteristics were for efficient and stable steam production at predetermined output specifications and the boilers could be adjusted to burn various fuels – at White Bay, pulverised (i.e. powdered) coal was the standard fuel, with heavy fuel oil as the start-up fuel. The advantage of coal in pulverised form rather than as lumps was its faster and more complete combustion at higher temperatures. The major disadvantage of pulverised coal was the high levels of airborne soot produced and the difficulty of removing this from the exhaust gas.

The essential element of a boiler is the furnace, a rectangular chamber with refractory lining (firebricks) at the base of the boiler. Hot air is produced in the furnace by the combustion of fuel and this hot air is used to heat water to steam. It rises through the boiler and flows through the various flues to eventually exhaust through the chimney stack.

At White Bay, the flue gas flowed upwards from the furnace chamber through the A and B Superheater tube banks, then passed through the Economiser, the Air Heaters and led out through the Precipitators to the Stacks.

The floor of the furnace chamber is formed into an inverted pyramid and the majority of ash from the furnace chamber fell into the collection chutes. From here, it was carried out by the Ash Handling System, for disposal. Some ash remained suspended in the flue gas and was removed by a multi-clone grit collector located between the superheaters and the economiser and most of the rest was removed by the electrostatic precipitators (now removed) which were located at the base of the chimney stacks.

The Superheaters are a set of boiler tubes carrying steam which was produced from feedwater in the lower part of the boiler. After conversion from water, the steam is continually heated in the superheater tubes until the desired output temperature is achieved.

The Economiser is a chamber containing a set of pipes carrying incoming feedwater on its way from the condensers to the boiler furnace. The passing flue gases heat the feedwater prior to its entry to the boiler, thus minimising the heating energy required in the furnace.

Forced Draft Fans — 2.5

Boilers require very large quantities of combustion air supply and, as combustion takes place more quickly at elevated temperatures, the combustion air supply was heated by Air Preheaters. These were located in two massive Primary Air ducts, one on either side of the boiler, running down from near the roof to the Firing Floor of the boiler house. Within these ducts, furnace exhaust gases are passing through a large number of steel pipes, 50 mm in diameter, on their way to the chimney stacks and these hot pipes transmit their heat to the passing air, raising its temperature to 300°C.

A pair of Forced-draft Fans located on Level 3 of the Boiler sucked the air through the primary air ducts and supplied it, at the correct temperature, to the boilers in four ways:

- mixed with pulverised coal;
- as Primary Air entering below and adjacent to the fuel burners in the furnace of the boiler;
- as Secondary Air entering a point beyond the burners; and
- as side wall or rear wall Tertiary Air (see Figure 3.1).

The air utilised in the Pulverising Mill was cooled (tempered) by mixing it with cold air via Lockheed dampers on the hot and cold air ducts. A further damper controlled the volume of air which entered the Pulverising Mill Fan intake. Correct temperature and volume were necessary to ensure that there was no pre-combustion of the coal dust prior to its arrival at the boiler injectors.

At the Injectors, additional hot air, called Primary Air, was added to the air-fuel mixture to produce the correct combustion ratio and this was supplemented by Secondary Air added into the furnace at other locations to provide further air for the complete combustion of the coal. Tertiary air was mixed into the upper end of the furnace from the side or rear walls to allow the final combustion of any remaining carbon in the flue gases circulating around the furnace chamber.

The Headers — 2.6

The steam headers received the initial steam feed from the boilers and from here, steam ran to the turbo-alternator sets. The steam output was controlled by the valving which could direct the steam flow to turbo-alternator sets 1 or 2. The headers in the boiler house consist of a simple (primary) header pipe with five steam outlet pipes, all controlled by valves, emanating from it. The lagging and cowling has been removed.

Oil Heater Pumps and Valves — 2.7

The Oil Heater Pumps and Valves was used to start the Boilers (Item No. 2.4) after they had been shut down for any reason. Oil was pumped into the Boiler at 110 pounds per square inch with quantities of air. The oil entered and combusted in the Furnace section of the Boiler and when firing temperature was reached, pulverised coal fuel mixed with air was introduced.

The Stacks — 2.8

The stacks were installed with these boilers in the early 1950s and are approximately 80 metres high fabricated from riveted steel plate, tapering from base to approximately 9 metres above ground, then is cylindrical to the top. The flue from the precipitators connected approximately 10 metres above ground in a narrow slot approximately 1 metre wide and 8 metres high on the south side. The base section below the flue entry collected any heavy ash that fell within the stack and this was removed through a small door on the western side located approximately 1.5 metres above the ground. The bracing is internal but does not extend to the top of each stack.

The concrete footings for the induced draft fans are located on the ground on the north and south sides of each stack but no machinery remains. These fans sucked the gases and micro particles from out of the boiler, through the electrostatic precipitators (also removed from their former location between the boiler house and the stacks) and forced it up the stack.

Soot Blower Cabinet — 2.9

Some of the ash particles suspended in the air, called soot, within the boiler settles upon the top surfaces of the water tubes within the boiler chamber. Soot is a thermal insulator and, for continued boiler efficiency, this soot must be regularly removed. For this purpose, a set of soot blowers, compressed-air lances which were inserted into the boiler along special tracks, was installed in the boiler. The only remaining element of the Soot Blowers is the operating panel for the soot blower.

Boiler House Control Room — 2.10

The Boiler House Control Room contains panels of meters and switches for monitoring and controlling the operation of the Boiler. Gauges indicate water and temperature measurements and vacuum readings for inches of air. The switches control coal feed to the mills, air dampers and fuel flow.

3.4 The Power Generation System

3.4.1 Operations in the Power Generation System

The steam produced by the Steam Generation System is fed into the steam headers located on the west wall of the Boiler House, from where it is distributed to the turbines in the Turbine Hall. The steam flows through the turbines, producing rotational motion which is transferred to the alternators attached to the turbines. The alternators produce electrical current which is tapped off and delivered through the Power Reticulation System.

The steam exhausts from the turbines into the Condensers located below each turbo-alternator in the Turbine Hall Basement, where it becomes water again. This water is recycled through the Feedwater System back to the Boilers. The Condensers are cooled by the Circulating Water System.

Within the Turbine Hall are three Overhead Travelling Cranes, two installed at the time of construction of the building and a third which is contemporary with the post-WW2 turbo-alternators. The cranes were essential for the installation and maintenance of the turbo-alternators and other associated equipment in the Turbine Hall.

The following individual items have been identified and Inventory forms have been prepared (see Appendix A):

3.1 Steam Control Valves

3.2 Turbo Alternator Set

3.3 Cooling Fans

3.4 Overhead Cranes

3.4.2 Individual Items

Steam Control Valves — 3.1

The Steam Control Valves control the inlet and passage of steam through the turbine. They are primarily utilised during start-up and shut-down to allow the steam into the turbine slowly and progressively. This is essential to allow temperatures and pressures throughout the turbine to stabilise at each increment of speed to maintain balance and minimise wear.

Turbo-alternator Set — 3.2

The Parsons turbo-alternator set is a three cylinder horizontal steam turbine which has an operating speed of 3000 rpm. Steam at 600 pounds per square inch pressure and 835 degrees Fahrenheit from the Headers enters the high-pressure cylinder, then exhausts into the medium pressure cylinder and then into the low-pressure cylinder, from where it exhausts to the Condenser.

The alternator is direct-coupled to the turbine producing 50 Megawatts at maximum continuous rating, generating three-phase power at 11 kV and 50 cycles per second. The alternators are cooled by an air cooling system, with large air fans situated below the machines within the foundation blocks at Basement level.

Cooling Fans — 3.3

The Sirroco ventilating fans were designed to reduce the build up of heat on components of the turbo alternator set and are located adjacent to the Condensers in the basement of the Turbine Hall. They are flexibly coupled to 75-horse-power electric motors. Specification plates appear to be missing.

Overhead Travelling Cranes — 3.4

There are three overhead cranes or EOHTs (electric overhead travelling cranes) in the turbine hall. The most modern (1948-49) is made by WA Hodgkin and Company Pty Ltd, Cranemakers, Sydney, NSW. The serial number is E5053 and it is marked as rated to 75 tons on the main hoist and 5 tons on the auxiliary hoist. The crane gantry is formed using a set of Warren-truss girders made from large C-section and angle-section steel with riveted gusset plates. Each of the girders of the gantry comprises a large section truss beam and a lighter section truss beam, with a riveted plate connection between the top chords and a truss connection between the bottom chords. The drive cabin is slung beneath the inner-most of the two trusses but it is not currently accessible. The driver was probably equipped with three motor controllers — one for longitudinal movement, one for lateral movement and one or two for the hoists. This crane was installed in the early 1950s.

The second crane (1916-17) is by Babcock and Wilcox Ltd, Makers, London and Renfrew. It is rated to 50 tons and operates utilising Lancashire Dynamo & Motor Co. 600 volt DC motors. The crane gantry is comprised of a pair of parallel girders, each comprised of a rivetted plate inner beam and a trussed outer beam, with trussed connections between the top chords and the bottom chords.

There is a third crane beyond but the makers name and capacity are not visible. It is probably the second original crane identified in Myers (op. cit.) as built by Herbert Morris, with the riveted truss bridge girders supplied by the Sydney Steel Company. It is also rated to 50 tons and operates utilising Lancashire Dynamo & Motor Co. 600 volt DC motors.

3.5 The Feedwater System

3.5.1 Operations in the Feedwater System

The Feedwater System is concerned with the supply of water to the Boilers, where it is converted to steam, and it commences with the extraction of Condensate from the condensers. Condensate is delivered from the Condensers to the Deaerator, which removes any dissolved oxygen, after which it is termed "feedwater". The feedwater is then pumped by the Feedwater Pumps, both steam and electric, to the Feed Heaters then to the Economiser, which raise the temperature to a level close to boiling. The feedwater leaves the Feedwater Pumps at high pressure, allowing considerable temperature rise before the water boils to steam. From the Economiser, the feedwater is led into the main tubes of the boiler. The feedwater system included, in operation, a raw water storage tank, a demineralisation plant and a reserve condensate tank, located within the upper level of the pump gallery between the Boiler house and Turbine Hall.

The following individual items have been identified and Inventory forms have been prepared (see Appendix A):

4.1 Electric High Pressure Feedwater Pumps

4.2 Steam High Pressure Feedwater Pumps

4.3 The Condensate Pumps

4.4 The De-aerators

4.5 Monitor and Metering Cabinets

4.6 Feedwater and Condensate Tanks

3.5.2 Individual Items

Electric High-Pressure Feedwater Pumps — 4.1

The three electric high pressure feedwater pumps are located on the first floor of the Pump House. Each pump comprises a multi-stage centrifugal pump powered by a electric motor supplied with 2,200 volts from the house electricity supply. Specification plates appear to be missing.

Steam High-Pressure Feedwater Pumps — 4.2

The two steam high pressure feedwater pumps are located on the first floor of the Pump House. Each pump comprises a multi-stage centrifugal pump powered by a steam engine motor supplied with primary steam from the boiler. Specification plates appear to be missing.

Condensate Pumps — 4.3

The two identical condensate pumps are centrifugal pumps direct-coupled to electric motors. Specification plates appear to be missing.

De-aerators — 4.4

There are two deaerators with associated equipment standing in the northern end of the Pump Gallery basement. Specification plates appear to be missing. These are large steel cylinders approximately 10 metres high with domed tops, located in the Turbine Hall Basement and projecting into the floor space of the level above. Condensate is admitted into the cylinder, in which the ambient pressure is below atmospheric pressure, as a spray, with steam utilised to heat the Condensate, encouraging the release of dissolved oxygen and other gasses. The Deaerator includes a number of associated subsidiary elements such as a vent condenser (to first cool and condense the gasses extracted, prior to their entry into the pumping unit), an air ejector (an pump to extract the gases) and an air ejector cooler (to condense any steam still present in the gasses). Much of the interior of the Deaerator cylinder operates as a storage tank for the deaerated feedwater, which is drawn from the Deaerator by the Feedwater Pumps.

Monitor and Metering Cabinets — 4.5

There are two steel electrical cabinets standing against the west wall of the Pump Gallery. The southern cabinet has a black enamel coating and has three fascia panels, each with a large central circular mounting for a dial recorder, only the northern of which is intact. The two northern panels also have gauges (one of which is missing). The northern cabinet has three large and seven small circular dial gauges and two pairs of control valves and switches. These cabinets are associated with the feedwater supply system.

Feedwater and Condensate Tanks — 4.6

The Feedwater and Condensate Tanks are a set of welded steel water tanks of varying sizes supported on a frame of RSJs in the airspace above the Pump Gallery floor. The storage of feedwater at the high level allowed for gravitational feed to the Boilers in the event of a catastrophic system failure affecting the pumping systems and was a generally economical operating arrangement.

3.6 The Circulating Water System

3.6.1 Operations in the Circulating Water System

Power stations have two distinct water systems: circulating (cooling) water and feedwater. Steam exhausted from the turbines is cooled in the pipes within the condenser by water which flows around the pipes. The steam is converted to liquid water (Condensate) and, after treatment, is sent back into the boilers by the Feedwater System. The Circulating Water System circulates cooling water through the Condensers.

At White Bay Power Station, saltwater from Rozelle Bay was the circulating water and twin circulating water conduits run in a loop from Rozelle Bay to White Bay, passing under the basement of the Turbine Hall. The inlet was in Rozelle Bay and the exit for warm water was beneath the coal wharf in White Bay, although provision was made for the system to operate in the reverse direction by the installation of fixed grill screens and revolving screens on the White Bay side as well. The paired conduits to the Power House are each 1.9 metres (6ft) by 1.9 metres (6ft) reinforced concrete box sections running 221.5 metres (720 ft) from Rozelle Bay screens and 190.8 metres (620 ft) towards White Bay, with the final 111.7 metres (363 ft) to White Bay in open channel. Beneath the Turbine Hall, the conduits are 5.4 metres by 2.2 metres (17 ft 7 inches by 7 ft) dimension.

Water entered the inlet conduit through a fixed grill screen, to exclude large trash, then through a set of revolving screens to eliminate any other material. The conduits included silt wells and control valves. In the Turbine Hall, a Circulating Water Pump for each condenser drew water from individual pump suction wells fed from the Inlet Conduit and pumped it through the body of the condenser, the outflow dropping into the Outlet Conduit. Sluice gates of mild steel and timber could exclude water from passing into the suction wells for maintenance of the well or the pump.

The following individual items have been identified and Inventory forms have been prepared (see Appendix A):

5.1 Sluice Gates and Motors

5.2 Circulating Water Pumps

5.3 Condensers

5.4 Circulating Water Penstocks (northern set only)

3.6.2 Individual Items

Sluice Gates and Motors — 5.1

Water entered the inlet conduit via a pump and a set of circulating screens which removed foreign matter. The circulating water was directed to the large pumps, which forced water through the Condensers, by mild steel and timber Sluice Gates. The Sluice Gates could exclude water from passing into the suction wells beneath the pumps and to the conduits in the power station, and could isolate each of the Condensers serving Turbo-Alternator Set 1 or Turbo-Alternator Set 2 for maintenance of the well or the pump.

Circulating Water Pumps — 5.2

The Circulating Water Pumps are large, vertically-mounted, positive-displacement pumps direct-coupled to massive AC electric motors mounted in the Turbine Hall basement. The Circulating Water Pumps currently at White Bay cannot be described or assessed because water has flooded the pump wells and the pumps cannot be adequately accessed. Specification plates appear to be missing.

Condensers — 5.3

The condensers are massive cast iron chambers containing steam pipes submerged in a jacket of cold water. The pipes convey steam from the turbine exhaust, which is condensed in the pipes owing to the cold water which flows around the pipes. The condensed water, Condensate, was pumped away by the Condensate Pumps and the Feedwater System.

Cold salt water from Inlet Conduit was pumped into the base of each condenser by the Circulating Water Pumps, passing up through the condensers and into the high level outlet pipe, thence flowing into the Outlet Conduit.

Circulating Water Penstocks (northern set only) — 5.4

The penstocks comprise a pair of motor-driven lock gates, with one set installed into each of the circulating water canals on the northern side of the power station. The gates are of steel, travelling vertically in steel channels on the sides of the canals and are actuated by the screw effect of threaded shafts turned by small unitary electric motors mounted above the gates on a frame of RSJs.

3.7 The Power Reticulation System

3.7.1 Operations in the Power Reticulation System

The Power Reticulation System controls the electrical current produced by the alternators in the Turbine Hall and delivers it to the consumers of the current, which in the latter half of the operation of White Bay Power Station, was into the Interconnected State Grid. Prior to this, the electrical power was primarily delivered directly to the electric railway and tramways systems. At White Bay, the Power Reticulation System comprises the transformers, reactors, cables, busbars and switches in the Switchhouse, as well as the Main Control Room. The Main Control Room houses all the control and monitoring gear associated with the distribution of the electrical power generated at White Bay.

The majority of the individual elements of the Power Reticulation System, especially the transformers, reactors and switches, have been removed from the White Bay Switchhouse as part of the decontamination and make-safe process, owing to the potential health hazards associated with the fluids utilised in this equipment.

The following individual items have been identified and Inventory forms have been prepared (see Appendix A):

6.1 Main Control Room

6.2 Rheostats

6.3 Cables and Chasers

6.4 Motor-Driven Oil-bath Switches

6.5 Oil Circuit Breakers

3.7.2 Individual Items

The Main Control Room — 6.1

The Main Control Room at White Bay is adjacent to Robert Street on the west side of the Turbine Hall building. Constructed after the power station became the property of the Electricity Commission in 1953, the Control Room, and its associated substation continued to operate at White Bay after the generating equipment had closed down. Dials in the Control Room indicate that electricity had been imported into the system, as well as exported from it.

The equipment in the Control Room consists of the main semi-circular Control Panel, with the control switches set out in front of it on a slightly-cambered, semi-circular switchboard attached to the Control Panel. In front of this, within the semi-circular area, are set two timber desks for the Control Room Operators, the one of the left having a timber-encased manual telephone exchange board. The Control Room was linked via telephone and alarm systems to all other sections of the power house, including the boiler house, boiler house foreman, the generating room and the generating foreman.

The Control Panel has a series of lights and gauges to indicate the distribution areas of the current. There is also, on a central pediment above the main board, an electric clock, a megawatt dial and a steam pressure dial, vital indicators of the output characteristics of generated electricity.

Behind and beside the Control Panel are a series of electrical cabinets, most of which have meters, dials and switches on their fascia. The selection of watt-hour meters, voltage and amp meters, alarm relays, trip meters, current relay meters, trip links and fuses, are all significant items indicating the development of electric power reticulation in the second half of the twentieth century.

The Rheostats — 6.2

There are series of six rheostats numbered five to ten. These were formerly used to provide the field for the exciters on the turbo-alternators five to ten. They are basically a current regulator that advanced the current as the speed of the turbo-alternator was advanced. The rheostats are by

Brayson Bros Pty Ltd, Sydney, Australia. Two rheostats bear the legends 'Rheostat No. E55267A', 200 ohms, 5 to 1 amps and, Rheostat No. E55267A, 200 ohms, 5 to 1 amps. The only other legends are instructions as to declutching the handle.

These rheostats are contained in cabinets standing about one metre high and are about 600mm wide and 800mm deep, with a handle on the face which carries two electrodes, an inner and outer. One of these electrodes bears on an inner continuous circular electrode attached to the marble face of the rheostat cabinet. The outer electrode bears in a circular ring of individual point electrodes attached to the marble face.

The Cables and Chasers — 6.3

The cables are run in groups along the sides of the bricked walls of the internal cable tunnels, supported by light metal brackets tacked against vertical timber posts lining the wall at approximately one metre intervals. Main power cables are set into concrete channels known as chasers formed against the walls. The cabling formed the linkages between the Control Room and the switches throughout the Switch House and, ultimately, provide the reticulation of electricity to the wider community.

Motor-Driven Oil-bath Switches — 6.4

The switches located in the Switch House include the Transformer and Oil Circuit Breaker Switches, Tie Bank Group and Bus Bar Circuit Breaker.

The No. 2 Auxiliary Transformers were manufactured by Cook & Ferguson Manchester England. The Manufacturer's Plate states:

> TYPE SE t, No. 111 87, PHASE 3, KW 33, AMPS 800.
> The Oil Circuit Breakers below was also manufactured by Cook & Ferguson Manchester England. The Manufacturer's Plate states: TYPE: ES, No. 9859, KV 33. AMPS 800, PHASE 3, ~ 50, BREAKING CAPACITY 1000, MVA ATKV 33, SYM.K.V 13.1, ASYM. K.A. 16.4, MAKING CAPACITY KA: 33.4, SHORT TIME CURRENT 1 SEC KA 13.1, 3 SECS KA 13.1, BS-116-1952.

The Bus Bar Circuit Breaker was manufactured by the English Electric Company Ltd. The Manufacturer's Plate states;

> B.S.S. 116, Serial No. 75072W/108671C PIPE O.L.F. 413, 33,000 VOLTS, 1,200 AMPS, 50. CYCLES, RUPTING CAPACITY 1.500.000 KVA, SOLEROID OIL 120 DC VOLTS, 3.5 AMPS, STAFFORD WORKS ENGLAND.

The General Electric Manufacturer's Plate on the Oil Circuit Breaker Switches states:

> The General Electric Co. Ltd of England. Oil Circuit Breaker to B.S.S 116-1937. TYPE K8, FORM SB, SERIAL No. 45737, VOLTS 33,000, 1200 AMPS, 50 CYCLE, BREAKING CAPACITY 1000 MVA, SYMETRICAL 17,500, ASYMETRICAL 21 875 AMPS, MAKING CAPACITY 44,450 AMPS, SHORT

TIME AMPS 1 SEC 17, 500. 5 SEC 17, 500, CLOSING COIL 120, SHORT TIME COIL 120 VOLTS DC.

Oil Circuit Breakers — 6.5

A set of motor-driven oil-bath electrical switches set in steel cabinets. The fascias are plain, with a row of status lights. Each is labelled with its function, i.e. 1A Feed Pump, No. 2 Auxiliary Group Tie, Tie Group No. 2 Station Transformer, No. 1 Auxiliary Group Tie. The 1A Feed Pump switch has a recorder mounted on its fascia.

3.8 Ash Handling System

3.8.1 Operations in the Ash Handling System

The Ash Handling System takes ash from the base of the boiler furnaces and from the fly ash collectors, including the Precipitators, and collects and stores it for removal off site. Ash was collected at the base of the Boiler Furnaces in a water trough through which ran a drag-link conveyor and the resulting slurry was deposited in an Ash Hopper, where it was thickened and then trucked off site. Fly ash in the exhaust gases was largely removed by electrostatic precipitators (completely removed) installed at the base of the chimney stacks. Ash collected by the precipitators was united with the furnace ash for disposal.

The Ash Kibbles and associated trucks were a contingency system, available if there was any trouble with the water trough system. Ash could be dumped straight from the ash collector at the bottom of the furnace into the Kibbles and carried outside.

There is little of the ash handling equipment directly associated with the only boiler still in existence at White Bay, with the most notable item being the external Ash Tower containing the Ash Storage Hoppers and Ash Kibble Crane. There is little information about the Ash Handling System which was attached to the Phase Three boilers, however, it appears that certain components of the Ash Handling System surviving at White Bay may relate to the Phase Two boilers which continued to operate until the 1970s but which have been subsequently removed. The Ash Kibbles and Battery-powered Ash Trucks were associated with the earlier boilers but their use as part of the more modern Phase Three boilers is not presently known.

The following individual items have been identified and Inventory forms have been prepared (see Appendix A):

7.1 Ash Kibble Sets

7.2 Ash Trucks

7.3 Ash Tower

3.8.2 Individual Items

Ash Kibble Sets — 7.1

The waste product at the end of the electricity generation process, ash, passed through the ash chutes from the boilers to large buckets or kibbles. The kibbles were carried by special battery-powered truck to the ash tower. The final process entailed deposition into the ash hoppers from whence it was taken off site by trucks. The kibbles, measuring approximately 2m by 3m by 2.5m, were removed by battery-powered trucks to a crane where they placed on motor carriers. The kibbles were fitted with trunnion pins to facilitate lifting.

Ash Trucks — 7.2

The purpose built, low loading, rigid frame, battery powered ash trucks removed the ash kibbles from beneath the boiler ash discharge chute and conveyed it to the kibble crane located on the ash tower. The kibbles were lowered onto motor lorries and the ash dumped. The ash trucks were placed in the ash truck cage for recharging of batteries overnight.

Ash Tower — 7.3

The Ash Tower is a four-storey high steel-framed tower attached to the north-east corner of the Boiler House which primarily contains two Ash Storage Tanks, which are large cylindrical steel hoppers into which the ash collected in the various collectors and hoppers around the boilers was conveyed. The hoppers are mounted in the upper section of the tower running over , standing over a large truck-loading bay, occupying the southern half of the Tower. At White Bay Power Station, ash was transported off-site and disposed of in various ways, including as landfill.

The northern side of the Ash Tower contains, on the eastern side, a concrete walled two-storey building (commencing above ground on the first floor level). Above this, the next level of building covers the full extent of the northern half of the Ash Tower is clad in corrugated iron with a skillion roof and appears to contain two internal floors. Access into this building was not possible and its contents is unknown.

The western side of the northern half of the tower is largely open, with a steel framed stair and a large RSJ projecting out on the northern side as a cathead bream. This beam has a substantial electric hoist installed on it, which has a rigid lifting beam fitted with twin-hooks suspended from the cable of the winch. These twin hooks fit the trunnions of the Ash Kibbles and the winch provided vertical lifting for the emptying of the kibbles into trucks.

3.9 The House Electrical and Auxiliary Power Supply System

3.9.1 Operations in the House Electrical and Auxiliary Power Supply System

White Bay Power Station, as well as supplying high-voltage electricity to the Interconnected State Grid, utilised electricity within the building to power lights, motors and miscellaneous equipment. As well, an emergency system was installed to provide light and power to the building in the event of a major disruption to the usual supply methods.

The primary systems were the 240 volt AC normal domestic supply, reticulated around the building to various distribution boards, the 120 volt DC house lighting and control supply, the 600 volt DC supply for the original heavy-duty electric motors installed in the building, such as the overhead cranes, and the 415 volt AC supply for the more modern heavy-duty electric motors and supply to the rectifiers. Many of these systems are no longer intact or able to be traced owing to the level of removal of equipment in the last decade. Evidence of the various systems is retained in various components, especially Switchboards, located in various places throughout the power station buildings.

The house electricity supply was 120 volt DC, delivered from at least two banks of wet cell batteries housed on the top floor of the switch house. These batteries were constantly trickle-charged by a charging unit fitted with a mercury-arc rectifier receiving a permanent supply of 415 volts AC. This supply was utilised for most lighting and most of the control systems throughout the building. In the event of a major power failure, the batteries could maintain this supply for a number of hours.

The following individual items have been identified and Inventory forms have been prepared (see Appendix A):

8.1 Disused No. 1 Battery Booster

8.2 a) Motor-Generator Set 2 b) No. 2 Motor-Generator Switchboard

8.3 Motor-Generator No. 3

8.4 Motor-Generator No. 4

8.5 Battery Charger Unit (Mercury Arc Recifier)

8.6 No. 1 Booster

8.7 Rectifier Sets 1 and 2

8.8 Switchboard (marble) in Motor-Generator Room

8.9 Batteries

8.10 Pedestal Drill

8.11 Selenium Rectifier for charging Ash Carts

3.9.2 Individual Items

Disused Battery Booster Set 1 — 8.1

The disused No. 1 Battery Booster has been moved into the workshop, immediately south of the Motor-generator room, from an unknown location and it is not permanently mounted on the floor. The battery booster produced direct current for charging to the batteries. The motor is a 415 volt 3-phase 50 cycle AC motor operating at 960 rpm manufactured in 1925 by the Electric Construction Co Ltd of Wolverhampton. The 125 kW dynamo was also manufactured by the Electric Construction Ltd of Wolverhampton in 1925, producing 1000 amps at 125 volts. The most outstanding feature of this is the completely open commutator and brushwork.

Motor Generators Set 2 and Switchboards — 8.2

The largest of the motor generators at White Bay, designated as MG No. 2, is now located in the former Control Room and was manufactured by the General Electric Corp. of Birmingham, England. It is a 415-volt, 3-phase motor, operating at 50 cycles and 750 rpm, flexibly-coupled to the General Electric 125kW DC generator, operating at 750 rpm producing 125 volts and 1000 amps.

There are two switchboards associated with this machine. The 120 volt DC feeder board of white marble is standing against the east wall and the 415 50-cycle board of slate is against the south wall. Both boards stand about 2.5 metres high. The AC board is equipped with a circuit breaker, a main knife switch and a voltage regulating handle. Mounted on the upper panel is a direct-current ammeter and a Thompson AC ammeter, both by General Electric Co, of Schenectady, New York, USA.

Motor Generator No. 3 — 8.3

A further two motor generators, designated as No. 3 Motor Generator and No. 4 Motor Generator, were also associated with the house power supply and are located in the Motor-generator room on the south side of the former Control Room. MG No. 3 is located between the No. 1 Booster and No. 4 Motor Generator. It has a 415 volt, 3-phase motor by Crompton Parkinson of Australia, operating at 705 rpm, which is flexibly coupled to a shunt-wound DC generator, manufactured by Westinghouse Electric and Manufacturing Co Ltd, Manchester, England,. It has a capacity of 12.5

kilowatts, producing 100 amps at 110 volts. A painted sign on this indicates it was last overhauled on 3 May 1954. This machine appears to be one of the original 25 cycle motor generator sets (see Myers) which has subsequently had its Westinghouse 25 cycle AC motor replaced with a Crompton Parkinson 50 cycle AC motor after 25 cycle power ceased to be produced at White Bay.

Motor Generator No. 4 — 8.4

Motor Generator No. 4 is located in the Motor-generator room on the south side of the former Control Room, west of the Motor Generator No. 3. Motor Generator No. 4 has a 415 volt, 3-phase motor, producing 25 HP and operating at 1050 rpm, by Electric Construction Co Ltd, of Wolverhampton, UK, dated 1925. It is flexibly coupled to an Electric Construction Co Ltd DC dynamo, again dated 1925, which is rated at 125–165 volts, operating at 960 rpm, producing at 100 amp maximum.

Battery Charging Unit (Mercury-Arc Rectifier) — 8.5

The rectifier cabinet (2m high and about 700mm square) is identified as manufactured by Electric Control and Engineering Ltd, Australia. The primary input voltage was 415 volts, 3-phase at 50 cycles and the output was 160 DC volts maximum and 100 amperes max. In the event that the drain on the batteries became excessive, there were a number of motor generators that could be used to supplement the current supplied by the batteries. Overall, however, batteries were preferred, as motor generators deliver power at an uneven rate.

No. 1 Battery Booster — 8.6

The No. 1 Battery Booster motor is by Crompton Australia (Australia) Pty Ltd. It is a 3-phase, 450 volt, 50 cycle motor operating at 720 rpm, which is flexibly coupled to a shunt-wound DC generator producing 100 amps at 50 volts, manufactured in 1912 by Lancashire Dynamo and Motor Co Ltd, Trafford Park, Manchester. This machine appears to be one of the original 25 cycle motor generator sets (see Myers) which has subsequently had its L. D. & M Co. 25 cycle AC motor replaced with a Crompton Parkinson 50 cycle AC motor after 25 cycle power ceased to be produced at White Bay.

The No. 1 Booster was used to boost the current from the batteries for the house system, while the two motor generator sets were used as back-up for battery charging in case of failure by the ECE rectifier. The No. 1 Booster board is located immediately opposite on the south wall. It has a booster field switch to the rheostat to raise and lower the field. It also has a large knife switch to engage and it is equipped with a magnetic blow-out circuit breaker by General Electric.

All three of these motors are in very good condition with all of their nameplates in place. They also have open brushwork and commutators, thus placing them to the early twentieth century period.

Rectifier Sets 1 & 2 — 8.7

A further two Hewittic arc rectifiers of the bottle type, designated as Rectifier No. 1 and Rectifier No. 2 are located in the 120 switchboard room. These are both in steel cabinets fitted with ammeters and voltmeters. These rectifiers were used to supply power directly to the overhead travelling cranes, the office lift, the Switchhouse lift and the boiler house lift at 600V DC. These rectifiers did not act, however, through a bank of batteries but directly supplied the cranes and lifts.

120 Volt Distribution Control Board — 8.8

The centrepiece of the former Control Room is the 10x3 (30) piece white marble switchboard against the north wall. This board is for the distribution of the 120 volt DC current used throughout the station for lighting and control. It is fitted with several open-air circuit breakers, three ammeters, a voltmeter, a ground detector and a number of emergency control switches for control room operating supply, lift operating supply and overall operating supply.

Located against the east wall in the former Control Room is the Switchhouse lighting board, which includes the 120 volt DC emergency supply contactor and the 240 volt AC normal supply contactor.

Batteries — 8.9

The Battery Room, on the south side of the Battery Workshop, has been denuded of batteries, except for a remnant group of six lead-lined, wooden-framed battery cells, numbered 51 to 56. The lead is still in place, although in poor condition, and there has been significant deterioration of the timber boxes. These open celled batteries are now rare in Sydney and have a high degree of significance. All components of the wet cells have shown considerable deterioration and great care will be required to ensure their survival. The floor of the Battery Room is lined in lead, including the guttering along each wall. The floor is cambered from the centre to the gutters and the lead lining rises about 300mm up the four walls.

Pedestal Drill — 8.10

The Battery Workshop has been stripped of virtually all equipment. There is a series of small lockers and a single, pedestal drill by PRP (Paul Roberts and Parsons Pty Ltd of Sydney). This precision instrument appears to date from the period of the First World War. Owing to its Australian-manufacture, it is a rare and very significant item.

Of note also is a cast-iron framed and lead-lined sink in the north-east corner of the Battery Workshop. It has a timber draining board and it was obviously used for refurbishing or working on batteries.

Selenium Rectifiers For Charging Ash Carts — 8.11

The selenium rectifier for charging ash trucks is integral to the Auxiliary Electrical System and provides a link with the Ash Handling System. The battery charging system indicates the method of charging the batteries of the ash carts.

Two selenium rectifiers are located in the north-east corner of the Boiler House. These took power at 415 volts AC and converted it to DC, probably at 600 volts. However, there is no indication as to where the DC current was used. The selenium rectifiers are approximately 1.8m high and the cabinets are approximately 800mm by 800mm. Immediately above the name plate on the front panel of the cabinets are a green and a red light, flanked by two dials, one showing the charging current in amperes DC and the other is a voltmeter in volts DC, measuring the outgoing current. The incoming current was 415 volts. There is a start/stop button on the right-hand side and, on the left, is a simple gauge running from one through to five. Below is the main on/off switch, above a handle attached to a semi-circular half drum. The handle moves through a slot in the drum and its precise function is unknown. Also unexplained is the function of two bakelite knobs approximately 70mm in diameter, located on either side of the on/off switch. One has the inscription 'Fine' above it, the other has inscription 'Coarse'. The arrow pointing to the right in both cases says 'Raise'.

Switch House Lighting Board — 8.12

The DC Switch House Lighting Board switchboard has a circuit breaker mounted above the ammeter on the top board, a main knife switch, a charge switch, a field handle to lower and raise and a 120 volt bus tie bar. Although some of the cabling appears to be missing, the equipment is in excellent condition. There is a quantity of pigeon droppings over the equipment.

Switchboard in Motor-Generator Room — 8.13

This small Switchboard was part of the inhouse House Electrical and Auxiliary Power Supply System and was used to control current from the Booster sets which boosted the supply of DC power when the demand exceeded the capacity of the Batteries. The marble Board is equipped with the ammeter, a rheostat, and main knife switch, an auxiliary knife, and an open air circuit breaker.

Battery Charging Board — 8.14

The battery feed was through a switchboard located in the south-west corner of the former Control Room. Its lower panels are predominantly grey slate, surmounted by a black slate section. The only signage is confined to ‘A-battery’ and ‘B-battery’, which are placed above the ampere meters. The board is relatively straightforward but was infrequently used by staff during the second half of the twentieth century.

Air Compressor — 8.15

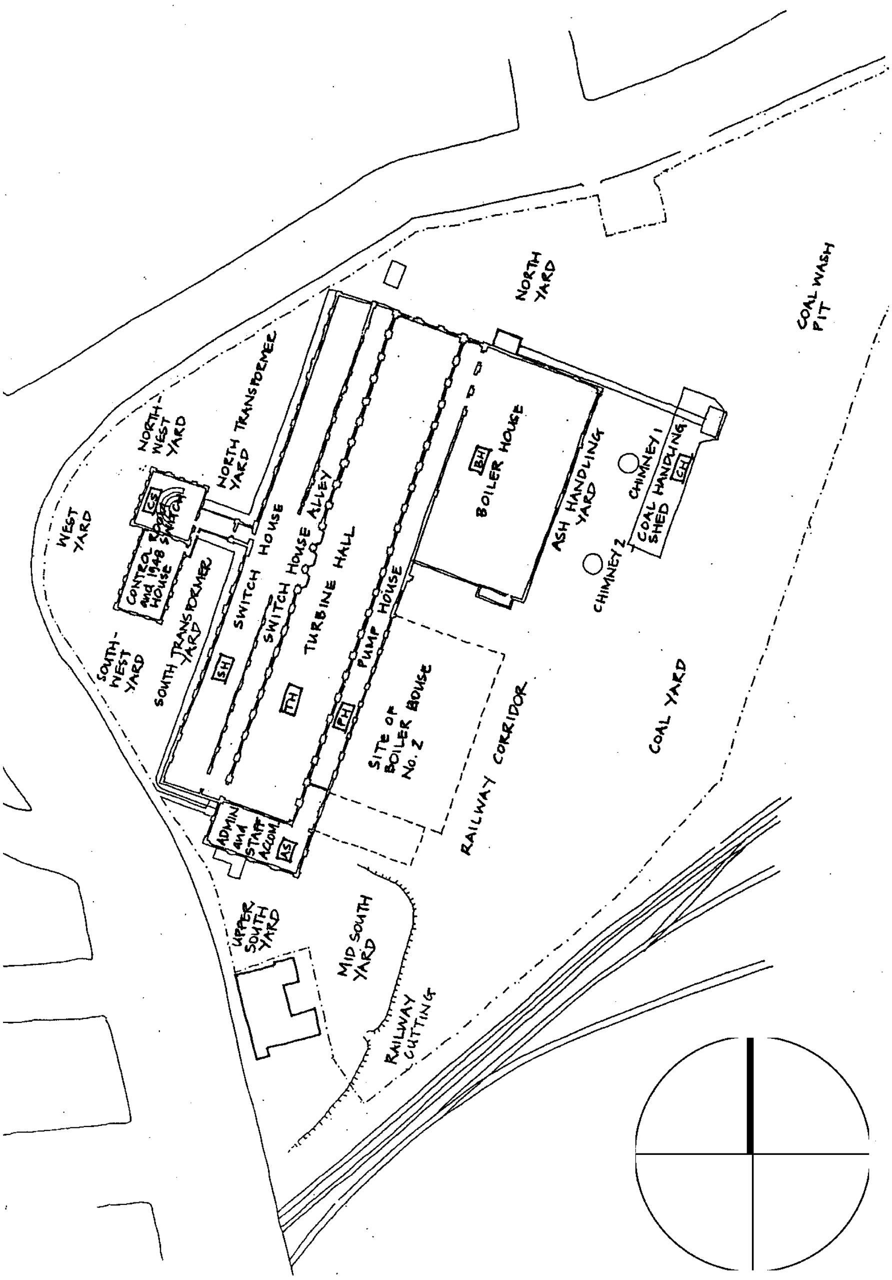
The air compressor is associated with the functioning of the Main Control Room and dates to its construction after World War II. It is BroomWade manufactured by Broom & Wade Ltd, High Wycombe England with an English Electric motor from their Bradford Works. Although undated, it is characteristic of the period of the 1950s and is associated with the increasingly automated system at this time. Compressed air was used to power switching devices in high temperature environments such as the Babcock and Wilcox boilers.

25 Cycle Switches — 8.16

The 25 cycle supply (feeder) switches are more closely associated with the earlier period of electricity production at White Bay when it functioned in conjunction with the power house at Ultimo in supplying DC power to the tramways. They are motor-driven oil-bath switches that run vertically between all three floors.

The large part of the 25 cycle switches have been removed from the power station, so that now only a sample is retained on the first floor. These are likely to be the switches described in Myers as being manufactured by General Electric (USA) or BTH (high tension switches) or by Ferguson Pailin (low tensions switches).

Figure 3.1
White Bay Power Station site plan as at July 2002.



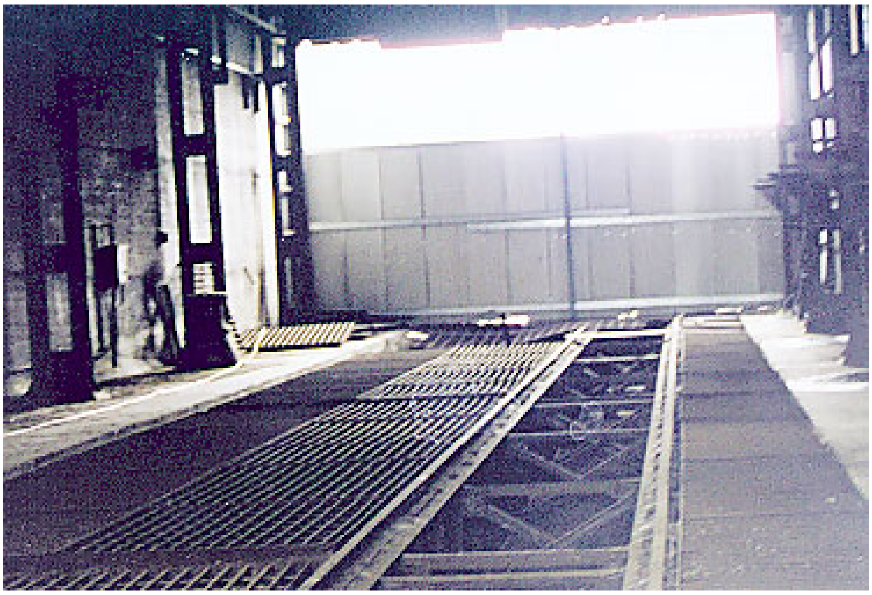


Figure 3.2
View southwards in Coal Handling Shed. The screens, capstan and rail tracks are visible.

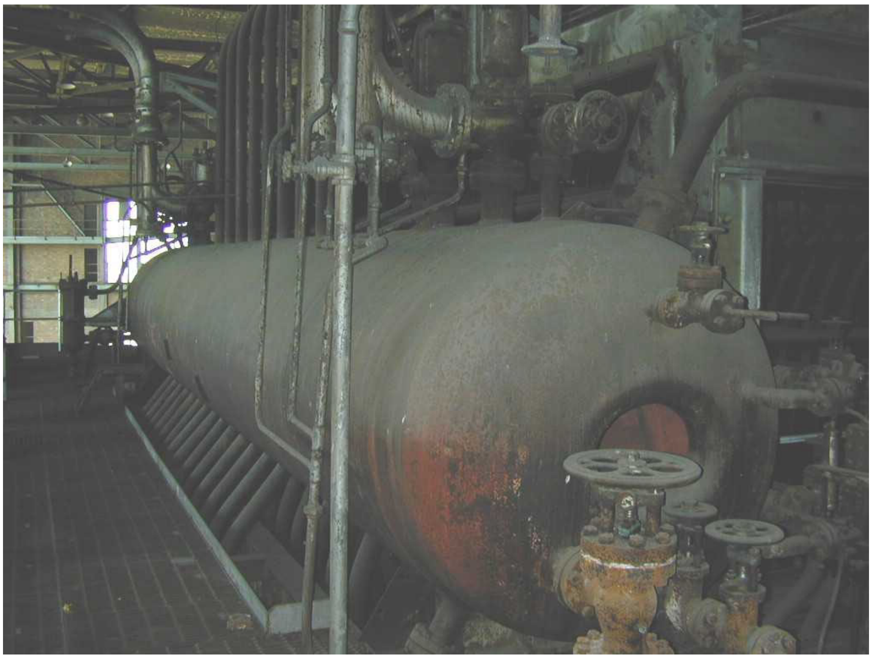


Figure 3.3
Boiler Drum, located on the top floor of the Boiler House. The boiler is an integral part of the Steam Raising System.

Figure 3.4
View northwards of the Turbine Hall. The Parsons turbo-alternator is located in the centre of this view.

Figure 3.5
Parsons turbo-alternator, located in the southern end of the Turbine Hall. The turbo- alternators are integral to the Power Generating System.

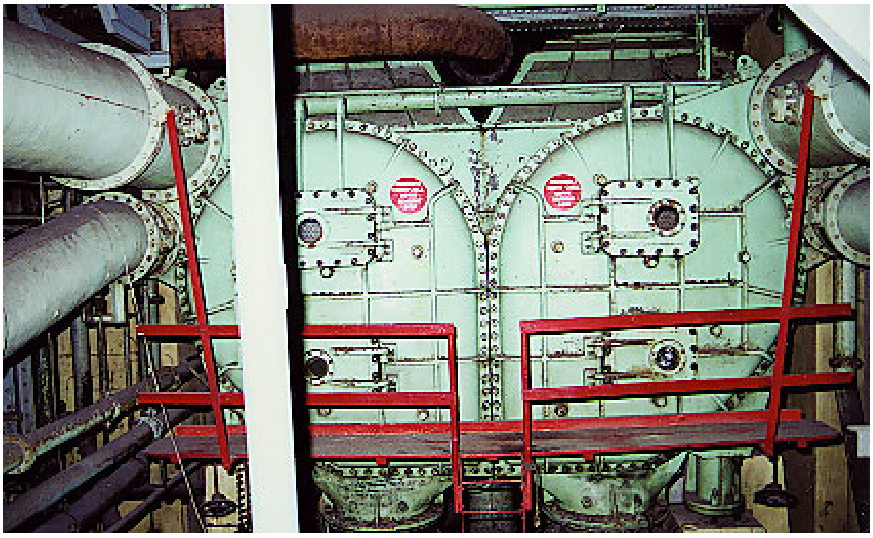


Figure 3.6
The condensers, an integral part of the Cooling Water System. The steel pipes on either side convey steam from the Boiler into the condensers where it is cooled before it is pumped out by the high pressure water pumps.

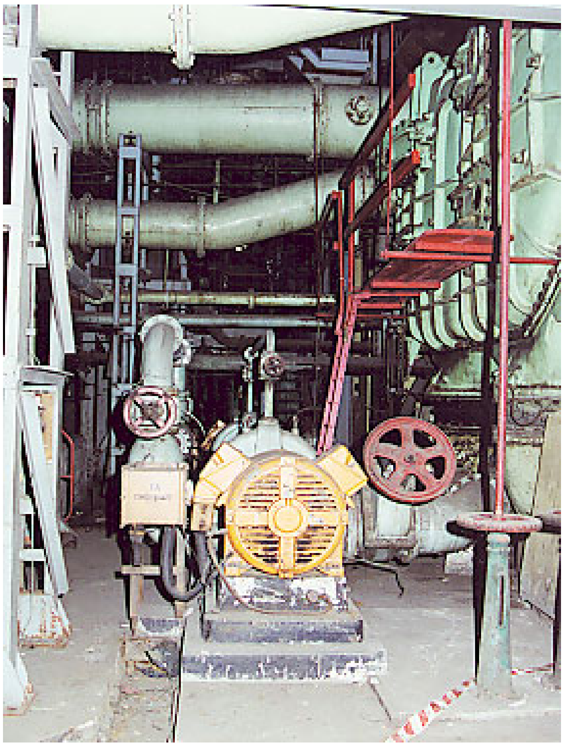


Figure 3.7
The Feedwater System in White Bay Power Station. The Condensers are located on the right hand side. The Condensate extraction pump is directly in the centre of this view.

Figure 3.8
Motor-Generator Sets 3 & 4 in the Motor-generator Room form part of the Electricity and Auxiliary Supply System. These were used to boost power when the drain on the batteries was excessive.

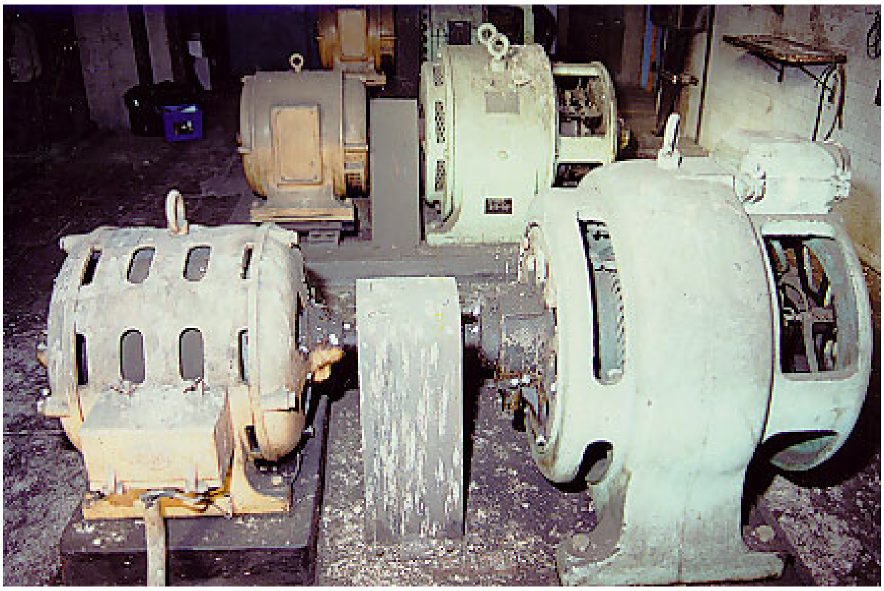


Figure 3.9
The former control room. Motor Generator Set 2 is located in the left side of this view. The motor generator Set 2 switchboard, one of the oldest in the power station, is located in the background on the right hand side. Other switchboards also part of the Power Reticulation System are located on the left hand side.

Figure 3.10
The Main Control Room is on the top floor of the post-war extension to the Switchhouse.

Figure 3.11
The Ash Tower, viewed from the east side, is the only substantial remnant of the Ash handling system.

4.0 Significance Assessment

4.1 Principles

Assessments of cultural significance endeavour to establish why a place or item is considered important and its value to the community. Cultural significance is embodied in the fabric of the place (including its setting and relationship to other items), the records associated with the place, and the response that the place evokes in the community.

The *Burra Charter* of Australia ICOMOS and its *Guidelines for Assessment of Cultural Significance*, recommends that significance be assessed in categories such as aesthetic, historic, scientific and social significance.

The assessment of heritage significance relies on an understanding and analysis of the values of the site, derived from examination of the documentary evidence, the context of a place or item, the way in which its extant fabric demonstrates its function, its associations and its formal or aesthetic qualities. An understanding of the historical context of a place and consideration of the physical evidence are therefore key components in significance assessment.

4.2 Assessment of Heritage Significance

4.2.1 Assessment Criteria

The *NSW Heritage Manual*, published by the NSW Heritage Office and Department of Urban Affairs and Planning (now PlanningNSW), sets out a detailed process for conducting assessments of heritage significance.[1] The seven criteria are outlined below:

- *Criterion (a) (Historic): an item is important in the course, or pattern, of NSW's cultural or natural history;*
- *Criterion (b) (Historic Association): an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history;*
- *Criterion (c) (Aesthetic): an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW;*
- *Criterion (d) (Social): an item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons;*
- *Criterion (e) (Scientific): an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history.*
- *Criterion (f) (Rarity): an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history; and*

- *Criterion (g) (Representativeness): an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments.*

4.2.2 Gradings of Significance

The basis of a management strategy should be in accordance with the assessed level of significance. The following table identifies gradings and justification of significance and appears in the NSW Heritage Office publication *Assessing Heritage Significance*:

Grading	Score	Significance
Exceptional	1	Rare or outstanding element directly contributing to an item's local and state significance.
High	2	High degree of original fabric. Demonstrates a key element of the place's significance. Alterations do not detract from significance.
Moderate	3	Altered or modified elements. Elements with little heritage value, but which contribute to the overall significance of the item.
Little	4	Alterations detract from significance. Difficult to interpret.
Intrusive	5	Damaging to the item's heritage significance.

4.2.3 Previous Significance Assessments

NSW Heritage Act – Section 170 Register

White Bay Power Station is listed on the NSW State Heritage Register. This listing is a result of its listing on a State Government Departmental Heritage and Conservation Register (as required under Section 170 of the NSW Heritage Act). The database report of White Bay Power Station on the State Heritage Register is included as Appendix C to this report.

White Bay Power Station was originally identified as a heritage item on the Pacific Power Section 170 Heritage and Conservation Register and following the transfer of its ownership to the Sydney Harbour Foreshore Authority, has been transferred to the Sydney Harbour Foreshore Authority's Section 170 Heritage and Conservation Register. The Sydney Harbour Foreshore Authority Section 170 Heritage and Conservation Register identifies White Bay Power Station as having a State level of significance.

The Statement of Significance from the Sydney Harbour Foreshore Authority Section 170 Heritage and Conservation Register states:

White Bay is a significant item of industrial heritage associated with the evolving pattern of power generation in NSW and Australia. It is characteristic of coal fired power stations from the early twentieth century which serviced the expansion of Australia's major cities. None of these stations remain intact today. It predates the formation of the Electricity Commission (and Pacific Power), dating back to a time when localised and vested interest in the power industry hampered expansion of industry and commerce and, public access to a commodity (electricity) which we now take for granted. As the last remaining metropolitan power station from this era, the site must be considered rare. Given the substantial changes in industrial relations which have occurred in Australia and particularly NSW over the last 70 years, White Bay Power Station is also evidence of social and industrial practices no longer in use today. As a result, White Bay Power Station and its associated records provide a basis for a study into employer/employee relationship changes over this period.

However, all of these listings address White Bay Power Station in its entirety, without explicitly acknowledgement of the specific contribution of the surviving machinery to the significance of the station. The assessment of significance undertaken in the following sections specifically and exclusively addresses the significance of the machinery and equipment remaining within the Power Station.

National Trust of Australia (NSW)

White Bay Power Station is included on the Register of the National Trust of Australia (NSW).

The National Trust of Australia (NSW) is a community-based heritage conservation organisation. The Trust has assembled a Register of heritage items and conservation areas through the assessment work of its expert committees. While the National Trust Register has no legal status, it is considered to be an authoritative guide to heritage significance and the Trust acts as a lobby group for heritage conservation.

The National Trust listing for White Bay Power Station describes it as significant for the following reasons:

White Bay Power Station and its equipment evidence the development of power generation technology and processes throughout the twentieth century, and the political history of the supply of electricity in New South Wales.

As the longest serving power station in New South Wales, White Bay Power Station made a major contribution to the State's rail networks and to the daily lives of millions of people.

The extant buildings and machinery demonstrate the complete process of power generation and supply.

White Bay Power Station is a prominent landmark which displays industrial application of Arts and Crafts design.

The Turbine Hall has aesthetic significance as a rare example of an industrial application of Arts and Crafts design.

It provides important tangible evidence of the first phase of large scale power generation in metropolitan NSW. White Bay Power Station provided power to the Sydney rail transport network for most of its working life. it was the major supplier of DC power in Sydney for most of this century. In addition to its railway usage, this power was essential for other major public facilities, such as swing bridges and pumping stations. quilt as a Railways power station, but acquired by the newly formed Electricity Commission of NSW in 1953, this power station epitomizes the institutional and political history of the development of public electricity supply in NSW

The Power Station has undergone continuous growth, development and alteration throughout its history. It's fabric and artifacts therefore demonstrate the major phases and innovations in electricity supply from its inception until the 1980s.

White Bay Power Station, including its remaining plant and machinery, evidence the phenomenal growth and importance of electricity over the last century. The advent of electricity had a major impact on the daily lives of millions of Sydney's residents. It was a crucial part of the Sydney rail network which was itself a fundamental aspect of life in Sydney in the 20th century. The complex has additional social significance as a steady employer of a large workforce for much of this century.

White Bay Power Station contains an unparalleled collection of frequency changers, rotary converters and transformers which were associated with its original Railway function. This equipment enabled a flexibility of AC/DC power supply and conversion unavailable at other major power stations. The surviving fabric and equipment at White Bay demonstrates the complete process of power generation and supply including; coal handling, ash handling, boilers and feed water, circulating cooling water, turbines and generators, and electrical switchgear. The Turbine Hall features an operating power generation system, including headers, gauges, condensers, feed water pumps and turbo alternators. It is the oldest operable system in NSW. Many relics and assemblages within the white Bay Power Station have considerable individual value as artifacts. Together they constitute the best collection of power generation equipment in the State. The entire system documents modern development of a single technology throughout this century. The Power Station buildings display design and structural elements which demonstrate their purpose-built functionality and the interface of developing construction techniques and technology.

4.3 Discussion of Significance

4.3.1 Practice and Approach to Industrial Heritage at White Bay Power Station

The term ‘industrial heritage’ refers to items and places related to the historical past and associated with a variety of industries. The maintenance and conservation of items and places of significance as industrial heritage is an aspect of the maintenance and conservation of Australia's cultural heritage.

Power stations, more than any other type of industrial complex, are operational complexes composed of a series of interdependent operational systems. Each of these systems is then composed of a number of related individual items, assemblages and collections of machinery, plant and equipment. In all large power stations there is often more than one example of each operational system, such that there may be, for example, four Steam Raising Systems and four Power Generating Systems.

At White Bay Power Station during the late 1980s and early 1990s, it was determined that the majority of equipment was to be disposed of but that a single representative example of each primary operational system would be retained. Each of the retained systems was substantially intact and represented the main operating equipment utilised for electrical generation. Hence, although many items, assemblages and systems have been removed from White Bay, one set of substantially-complete systems remains, which allows the generating process to be interpreted.

White Bay Power Station is the only surviving obsolete power station in New South Wales which retains a complete operational complex of equipment and machinery, including some which dates from the earlier phase of power generation. The extant equipment and machinery used in the generation of electrical power at White Bay Power Station represents an invaluable resource to enhance the understanding of the history and development of power generation in Sydney and New South Wales which is not available from other sources.

4.3.2 Operational Systems at White Bay Power Station

White Bay Power Station is comprised of a number of operational systems, each of which consists of component parts which are integral to the successful functioning of each system. Each system is, in turn, integral to the function of White Bay Power Station overall. Similarly, the significance of White Bay Power Station can be considered in overall terms but can also be considered in terms of all the contributing elements of individual machinery and equipment.

Eight operational systems have been identified as representing the operation of White Bay Power Station. The following list identifies each of the eight operational systems:

1. The Coal Handling System
2. The Steam Raising System
3. The Power Generating System
4. The Feedwater System
5. The Circulating water System

6. The Power Reticulation System
7. The Ash Handling System
8. The House Electrical and Auxiliary Power Supply System

Each operational system must be considered as a group and any analysis must respect the relationships, qualities and significance of the group as a whole whilst also taking into account the spatial relationship and association of each element within the system and its contribution to the operation of the group and to the power station overall.

4.4 Application of Significance Assessment Criteria

4.4.1 Preamble

In the following sections, assessment of heritage significance through application of the Assessment Criteria is presented in relation to each operational systems identified above. This is followed by a simple summary statement of significance for those individual elements within each system which have been identified as surviving on the site. In relation to two of the assessment Criteria, no significance attribution is made. These are Criterion B and Criterion D

Criterion (b) an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history;

Criterion (d) an item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons;

No specific attributions of associational significance are made in the following analysis owing to the nature of the subject matter. Machinery and electrical equipment may be arguably associated with their manufacturer and this may, to some degree, confer some significance to the individual item of machinery. However, in general, it is assumed that this is an ambient characteristic of machinery which does not require exposition in relation to the significance of White Bay Power Station.

No specific assessment of social significance has been undertaken in relation to the significance of the machinery heritage associated with White Bay Power Station and it therefore cannot, at this stage, be considered to satisfy this criterion. However, given the site's industrial prominence, Context Pty Ltd have undertaken community consultation to establish the social values of the Power Station. This has been carried out concurrently with this report.

The significance of White Bay Power Station is based on all the contributing elements of individual machinery and equipment. The following sections identify the contribution made by these disparate elements to the significance of White Bay Power Station.

4.4.2 Significance of Individual Elements

1.0 The Coal Handling System

Criterion A (Historic):	The Coal Handling System is an integral and vital part of the White Bay Power Station supplying fuel to be converted to electrical energy.
Criterion C (Aesthetic):	The Coal Handling System is an evocative series of structures whose external features have a high significance and machines reminiscent of the industrial milieu of the early 20th century.
Criterion E (Scientific):	The Coal Handling System is indicative of engineering design principles, work practices and changing patterns of materials handling and can yield information on the development of less labour intensive methods from during the inter-war period through to the later 20th century. The Coal Handling System contributes to an understanding of the necessity for the placement of the early power station system close to consumers rather than on the coal fields as was later practice.
Criterion F (Rarity):	The Coal Handling System is a rare example of a labour intensive materials handling site with items which are no longer extant at any suburban or rural power station.
Criterion G (Representativeness):	The Coal Handling System is a representative example of coal handling systems, particularly those installed in power stations located in metropolitan areas and serviced by rail systems.

1.0 Coal Handling System - Summary Statement of Significance

The Coal Handling System is an integral part of the White Bay Power Station and has historical associations with the electrification of the Sydney rail and tramways systems. The system is demonstrative of engineering design principles. It is a rare demonstration of the changing patterns of materials handling that can yield information on the development of the less labour-intensive practices of the post-war period. The Coal Handling System demonstrates the fuel requirements of power stations in metropolitan areas and illustrates the transition to coalfields power stations.

The significance grading for the Coal Handling System is 2/5.

1.1 Hoppers and Pneumatic Feed Gates

The Hoppers and Pneumatic Feed Gates are an integral part of the coal-handling system and are now rare examples of pre-war coal-handling technology. They are representative of screens and hoppers found in many metropolitan power stations and illustrate the processes and approaches typical of large coal handling facilities.

The significance grading for these elements is 2/5.

1.2 The Capstan

The Capstan, with its associated motor and gearbox, is now a rare item formerly used in many rail goods sidings. It is indicative of the traditional techniques of moving rail trucks short distances within confined areas without the use of locomotives. The Capstan is a relic of early, more-time consuming work practices.

The significance grading for the Capstan is 1/5.

1.3 The Cranes and Associated Grabs

The Cranes and Grabs are an integral part of the Coal Handling System. They are representative examples of mid-twentieth century materials-handling technology. The Cranes were designed and made in Sydney specifically for this location and are representative of mid-twentieth century crane technology. The Cranes and Grabs, through their size and configuration, are evidence of the industrial technology of the early 20th century.

The significance grading for these elements is 1/5.

1.4 Screens

The screens for the rail and lorry delivery of coal evidence the change from rail delivery to delivery by motor lorry. The grates are an integral part of the coal-handling system and, although simple in construction and detail, are dominant features of the coal terminal and indicate its mode of operation.

The significance grading for these elements is 2/5.

1.5 Conveyors

The Conveyors throughout the coal terminal are integral elements of the Coal Handling System and form part of the original components of the Coal Handling Shed. They evidence the means by which coal flow was regulated and directed to processing and storage points. They are representative examples of mid-twentieth century Conveyor technology.

The significance grading for these elements is 2/5.

1.6 Short Elevators and Motors

The Short Elevators and their Motors are integral parts of the Coal Handling System. They evidence the use of predominantly English technology in all aspects of the power station. The items are sturdy and functional and are representative examples of post World War II coal-elevating equipment.

The significance grading for these elements is 2/5.

1.7 Coal Crushers

The Coal Crushers are an integral part of the Coal Handling System. They evidence the use of predominantly English technology in all parts of the power station. They are large and impressive items, with massive cast-iron components which are representative of pre-World War II design for industrial machines. The Crushers evidence an intermediate stage in the handling of coal at the power station.

The significance grading for these elements is 2/5.

1.8 The 90 Foot Elevators

The 90 Foot Elevators are an integral part of the Coal Handling System. They evidence the use of predominantly English technology throughout the power station. They are sturdy and functional industrial items and are representative of coal-elevating equipment of the period immediately after World War II.

The significance grading for these elements is 2/5.

1.9 Transfer Houses and Equipment

The Transfer Houses are an integral part of the Coal Handling System. They have aesthetic qualities as framing elements to the overhead conveyor. The Transfer Houses evidence the methods used to control the transfer of coal from the coal store via Crushers and Elevators to the Hoppers within the Boiler House. The Transfer Houses evidence the predominantly English technology used throughout the power station.

The significance grading for these elements is 2/5.

1.10 External Conveyor

The External Conveyor is an integral part of the Coal Handling System. It evidences the method by which coal is transferred from the coal shed to the upper Transfer House and, ultimately, the Coal Hoppers. The Conveyor is a prominent feature on the northern side of the Boiler House and illustrates the industrial architectural approaches of the period following World War II. It is a representative example of mid-twentieth century conveyor technology.

The significance grading for the external conveyor is 1/5.

1.11 Coal Weigher

The Coal Weigher is an integral element of the Coal Handling System. It evidences the processes and precision of coal delivery to the Mills and Furnaces. The Coal Weigher demonstrates the need for precision in the regulation of coal supply and temperature control for the functioning of the Boilers. The retention of one example only of these Coal Weighers contributes to the historic and research value of this rare item.

The significance grading for the Coal Weigher is 1/5.

1.12 Coal Hoppers

The Coal Hoppers and Coal Hopper Conveyors and regulators are integral parts of the Coal Handling System. They evidence the way in which coal is transferred from the Coal Handling Shed to the Boiler House. The Hoppers are indicative of the need to have a quantity of coal immediately available to regulate fluctuations in demand. The Hoppers are, through their size and configuration, evidence of the industrial technology of the early 20th century.

The significance grading for these elements is 1/5.

1.13 Coal Handling Control Room

The Coal Handling Control Room is an integral part of the Coal Handling System. The Control Room illustrates the way in which the coal was delivered as regulated quantities via the Conveyors and Elevators to the coal store and the Crushers and, via the External Conveyor system, to the Boiler Hoppers. The Control Room switchboard demonstrates the power distribution arrangements within the power station and the decentralised nature of certain operations within the power station.

The significance grading for the Coal Handling Control Room is 1/5.

2.0 The Steam Raising System

Criterion A (Historic):	The Steam Raising System is a vital element in the successful functioning of the power station in the harnessing of steam in the generation of electricity.
Criterion C (Aesthetic):	The Steam Raising System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.
Criterion E (Scientific):	The Steam Raising System is indicative of the latest advances in engineering design principles and technological advances in the raising of steam for electrical generation at the time of the construction of the power station. An understanding of the Steam Raising System contributes to an understanding of the generation of electrical power and reasons for locating power stations adjacent to abundant water supplies along coastal areas.
Criterion F (Rarity):	The Steam Raising System consists of an integrated system comprising integral elements which are no longer extant at any suburban or rural power station. The Steam Raising System incorporates elements which demonstrate the technological advances

	of their time and which are now no-longer in use in the generation of electricity in Australia.
Criterion G (Representativeness)	The Steam Raising System is representative of such systems used in the generation of electrical power since the early 20th century. The Steam Raising System at White Bay Power Station represents an operational system comprising a number of integrated elements, some of which are now rare within the industrial milieu.

2.0 Steam Raising System - Summary Statement of Significance

The Steam Raising System is an integrated system composed of a number of elements which demonstrate early-to-mid twentieth century advances in engineering design and technological development in steam generation. The system incorporates elements that are now rare and are now no longer in use in power generation and, as such, has the ability to enhance our understanding of the technology of steam raising for power generation.

The significance grading for the Steam Raising System is 1/5.

2.1 Pulverising Mills - Drive Motor and Fan Motor

The Coal Pulverising Mills are an integral part of the Steam Raising System. The Mills are large complex assemblages which are impressive in size and configuration and dominate the Boiler House basement. They are representative examples of immediate post-war industrial plant. The Mills and their stand-alone primary Drive Motor and massive Fan Motor illustrate the influence of English technology on Australian power station design. The Mills evidence the efficiency of pulverised fuel boiler technology which superseded the solid coal boilers of earlier years. The Mills contain information on the design and operation of Pulverising Mills.

The significance grading for the pulverising mills is 1/5.

2.2 Chutes from the Hopper to the Mill

The Chutes through which the coal is deposited into the Mills are integral components in the process of transfer of the coal from the Coal Handling System to the Steam Raising System. The chutes evidence the travel of the coal from the Hopper to the Mills and are highly visible items within both the firing floor and the basement. The retention of one set only of these chutes contributes to the historic and research value of this rare item.

The significance grading for these Chutes is 1/5.

2.3 The Pulverised Fuel Feed Pipes

The Pulverised Fuel Feed Pipes are an integral part of the Steam Raising System. Pipes form a complex arrangement in the firing floor space and are a visually evocative industrial element in the system. They evidence the way in which pulverised coal was transferred pneumatically from Mill to the Boiler.

The significance grading for the Pulverised Fuel Feed Pipes is 1/5.

2.4 The Boiler (a, b, c, d, e and f)

The No. 1 Boiler is the principal element in the Steam Raising System. The Boiler illustrates, through its massive size and configuration, the development of steam-raising technology in the period between the war and the 1970s and the tubes, Economisers, heated and cool Air Ducts, Furnace and other surviving elements provide evidence of the operation of the Boiler in the raising of steam. The Boiler, with its visible steam pipes, tank and suspension springs, is a massive industrial item evocative of older technologies and industrial environments now rarely seen. The No. 1 Boiler at White Bay is the only example of its type to be retained in situ within a power station environment and has the potential to provide information on the raising of steam not available from other sources..

The significance grading for the Boiler and its associated elements is 1/5.

2.5 The Forced-Draft Fans

The Forced Draft Fans are an integral part of the Steam Raising System. They evidence the operation of the Boiler and demonstrate the need for massive amounts of air for the combustion of coal in the Furnace. The Fans also evidence the predominantly English technology used throughout the power station.

The significance grading for the Forced Draft Fans is 1/5.

2.6 The Headers

The Headers are an integral part of the Steam Raising System. Through their associated valves and wheels, they indicate the steam feed to the Turbine Hall and illustrate past industrial processes. The Headers are impressive in their size and configuration and are evocative of the industrial milieu of the early 20th century. The Headers have the potential to yield information on the operation of the Boiler House and the transfer of steam to the Turbine Hall.

The significance grading for the Headers is 1/5.

2.7 The Oil Heater Pumps and Valves

The Oil Heater Pumps and Valves are an integral part of the Steam Raising System. They evidence the need for a volatile start-up fuel for pulverised-coal fuelled Boilers and illustrate past industrial processes.

The significance grading for the Oil Heater Pumps and Valves is 2/5.

2.8 The Stacks

The chimney Stacks are an integral part of the Steam Raising System. They are amongst the most visible landmarks in the area. The Stacks are the most evocative of the power station's elements and are associated with power generation by many people. The Stacks are now rare industrial structures in a region in which they were once common.

The significance grading for the stacks is 1/5.

2.9 The Soot Blower Cabinet

The Soot Blower Cabinet is integral to the operation of the Steam Raising System. As the operating panel for the remote control for the Soot Blower (now removed), it is the visible evidence of the need to control the deposition of soot on the Boiler tubes. Only one example of the original thirteen Soot Blower Cabinets has been retained which, in the light of the removal of the Soot Blowers, contributes to the historic and research value of this rare item.

The significance grading for the Soot Blower Cabinet is 2/5.

2.10 The Boiler House Control Room

The Boiler Control Room is an integral part of the Steam Raising System. The Boiler Control Room retains remnant evidence of operation of the original four boiler systems and has the ability to provide information on the processes of steam generation associated with electrical power. The Boiler Control Room is a rare example of a mid twentieth century semi-automatic materials flow control system and is evidence of the industrial technology of the mid-20th century.

The significance grading for the Boiler House Control Room is 1/5.

3.0 The Power Generating System

Criterion A (Historic):	The Power Generating System, as an integral and vital element of the White Bay Power Station, has a strong association in the early history of the development of electrical energy and the electrification of the mass transit system in Sydney.
Criterion C (Aesthetic):	The Power Generating System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.
Criterion E (Scientific):	The Power Generating System contributes to our understanding of the use of steam in the generation of electrical energy. The use of the latest technology in steam powered Turbo-Alternators and associated elements during the inter-war and post-war periods demonstrates the vital role of electricity in the development and expansion of Sydney.

Criterion F (Rarity):	The Power Generating System includes elements, such as the last Parsons Turbo-Alternator, which are no longer extant within the Power Generating System in NSW.
Criterion G (Representativeness):	The Power Generating System is representative of the similar systems used during the 20th century in the generation of electrical energy. The system retains elements that are representative of the developmental history of the process of electrical generation.

3.0 Power Generating System - Summary Statement of Significance

The Power Generating System is an integral part to White Bay Power Station. It has a strong association with the history of the development of electrical energy and the electrification of Sydney tram and rail systems. When introduced, it was the latest technology in steam power generation.

The significance grading for the Power Generating System is 1/5.

3.1 The Steam Control Valves

The Steam Control Valves are an integral element of the Power Generating System. The Steam Control Valves, through their size and configuration, are immediately identifiable as power station elements and are evocative of superseded steam power generation technologies.

The significance grading for the Steam Control Valves is 1/5

3.2 The Turbo Alternator Set

The Parsons Turbo-Alternator set is an integral part of the Power Generating System and is regarded as the heart of the power station. Through its massive size and unusual configuration, it has landmark qualities within the Turbine Hall. When installed, the Parsons Turbine was regarded as state-of-the-art and, at that time, it was one of the largest Turbo-Alternators providing power to the state electricity grid. The Parsons Turbo-Alternator set evidences the continuing influence of English technology on the design and fit-out of the White Bay Power Station.

The significance grading for the Turbo-Alternator set is 1/5.

3.3 The Cooling Fans

The Sirocco Cooling Fans are an integral part of the Power Generating System. They illustrate the provision of air to the Turbo-Alternator to cool and their operation components which heats up under load. The cooling fans have the ability to provide information on the design and operation of Turbo-Alternator sets.

The significance grading for the Cooling Fans is 1/5.

3.4 Overhead Cranes

The three Overhead Cranes are integral to the continuing maintenance of the elements associated with the Power Generating System. The set of Cranes illustrates the on-going process of systems upgrading associated with power stations. The Cranes are demonstrative of the move away from a dependence on equipment manufactured in England to locally-made machinery.

The significance grading for the Overhead Cranes is 1/5.

4.0 The Feedwater System

Criterion A (Historic):	The Feedwater System illustrates the development of steam as a means to generate electrical power.
Criterion C (Aesthetic):	The Feedwater System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.
Criterion E (Scientific):	The Feedwater System is a vital element in the overall functioning of the power station and integral to the functioning of the boiler and Steam Raising System.
Criterion F (Rarity):	The Feedwater System is integral in the provision of electrical energy through the harnessing of steam. The White Bay Power Station retains the most complete set of early feedwater facilities surviving in the NSW power station system.
Criterion G (Representativeness):	The Feedwater System is representative of the technologies typically used in the generation for steam for electrical purposes.

4.0 The Feedwater System - Summary Statement of Significance

The Feedwater System is an integral part of the power station complex. It demonstrates the technology by which feedwater is constantly re-cycled via a change in its state. The system has the ability to enhance our understanding of the technology of power generation that is not available from other sources.

The significance grading for the Feedwater System is 1/5.

4.1 The Electric High Pressure Feedwater Pumps

The Electric High Pressure Feedwater Pumps are an integral part of the Feedwater System. They demonstrate the technique by which feedwater is constantly re-used in power generation. The Electric High Pressure Feedwater Pumps are large, of extremely sturdy construction and have a robust quality not evident in similar items. They are representative of Electric High Pressure Feedwater Pumps which were used in power stations in the mid-twentieth century.

The significance grading for the Electric High Pressure Feedwater Pumps is 1/5.

4.2 The Steam High Pressure Feedwater Pump

The Steam High Pressure Feedwater Pump is an integral of the Feedwater System. It demonstrates the technology by which feedwater is constantly re-used in power generation. Steam Feedwater Pumps are now rare, having been replaced in almost all power stations by electrically-driven models. The Steam High Pressure Feedwater Pump is large, of extremely sturdy construction and has a robust quality not evident in many other items. It is representative of steam pumps which were used in power stations up to the mid-twentieth century. The Steam High Pressure Feedwater Pump has the ability to provide information on the design of steam-driven, high-pressure pumps and their operation.

The significance grading for the Steam High Pressure Feedwater Pump is 1/5.

4.3 The Condensate Pumps

The Condensate Pumps are integral elements of the Feedwater System. The Condensate Pumps are relatively compact, well-designed centrifugal Pumps representative of the medium-capacity, electrically-driven type. The Condensate Pumps demonstrate the technology by which feedwater is constantly re-used in power generation.

The significance grading for the Condensate Pumps is 1/5.

4.4 The De-aerators.

The De-aerators are integral elements to the efficient functioning of the Feedwater System. They are characteristic examples of mid-twentieth century technology typically used in power stations of the era. The De-aerators are impressive in their size and configuration and are evidence of the industrial technology of the early 20th century.

The significance grading for the De-aerators is 1/5.

4.5 The Monitor and Metering Cabinets.

The Monitor and Metering Cabinets are representative of mid-twentieth century electrical control and metering equipment within discrete industrial complexes and illustrate a range of ancillary electrical processes and equipment. They represent technological developments in the supply of electricity from the beginning of the 20th century through to the middle part of the century.

The significance grading for the Monitor and Metering Cabinets is 3/5.

4.6 Feedwater and Condensate Tanks

The Feedwater and Condensate Tanks are integral elements of the Feedwater System. The tanks are representative of the size, design and layout of water storage arrangements in a large Boiler House. The Feedwater and Condensate Tanks demonstrate the technology by which feedwater is constantly re-used in power generation.

The significance grading for the Feedwater and Condensate Tanks is 3/5.

5.0 The Circulating Water System

Criterion A (Historic):	The Circulating Water System illustrates the development of steam as a means to generate electrical power and demonstrates the necessity, during the early period of power generation, of locating power stations near to a reliable and constant water source.
Criterion C (Aesthetic):	The Circulating Water System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.
Criterion E (Scientific):	The Circulating Water System is integral to the generation of electricity by the use of steam power and evidences the way in which steam was converted to water through the massive cast iron Condensers.
Criterion F (Rarity):	The Circulating Water System is an integrated system comprising integral elements which are no longer extant at any suburban or rural power station. It incorporates elements which demonstrate the technological advances of their time and which are now no-longer in use in the generation of electricity.
Criterion G (Representativeness):	The Circulating Water System consists of an integrated system comprising elements which demonstrate the technologies of their time and it represents the requirement, during the early phase of electricity generation, to locate power stations in coastal areas.

5.0 The Circulating Water System - Summary Statement of Significance

The Circulating Water System is an integral part of the power station operational complex. The system evidences the way in which steam was converted to water in order to recycle it through the massive cast iron Condensers. The Circulating Water System demonstrate the technologies of the time and has the potential to yield information on the technology of power generation that is no longer available from other sources.

The significance grading for the Circulating Water System is 1/5.

5.1 The Sluice Gates and Motors

The Sluice Gates and Motors are integral parts of the Circulating Water System. The Sluice Gates and Motors evidence the way circulating water is controlled throughout the power station and admitted to the Condenser Pump Wells. They are unusual in appearance and construction and are evocative elements in the basement of the Turbine Hall. Their operation is simple and effective and easily interpreted.

The significance grading for the Sluice Gates and Motors is 1/5.

5.2 The Circulating Water Pumps

The Circulating Water Pumps are an integral part of the Circulating Water System. The Circulating Water Pumps have the ability to provide information on the operations of the Condensers.

The significance grading for the Circulating Water Pumps is 1/5.

5.3 The Condensers

The Condensers are an integral part of the Circulating Water System. The Condensers are massive, cast-iron structures which have landmark qualities in the Turbine Hall basement. The Condensers have the ability to provide information on the design and operation of Condensers and the conversion of steam into water for re-circulation to the Boilers.

The significance grading for the Condensers is 1/5.

5.4 Circulating Water Penstocks (northern set only)

The Penstocks were components of the Circulating Water system and were important to the overall operation of the power station. They are representative examples of small motor-driven lock-gates of the mid-twentieth century.

The significance grading for the Circulating Water Penstocks (northern set only) is 3/5

6.0 The Power Reticulation System

Criterion A (Historic):	The Power Reticulation System, as an integral element of the White Bay Power Station, has a strong association in the early history of the development of electrical energy and the electrification of the mass transit system in Sydney.
Criterion C (Aesthetic):	The Power Reticulation System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.
Criterion E (Scientific):	The Power Reticulation System is a vital element in the understanding of the technological developments in the reticulation and management

	of electrical energy throughout the twentieth century. The Power Reticulation System demonstrates the most sophisticated technology relating to electrical distribution management prior to the introduction of transistors and integrated circuits.
Criterion F (Rarity):	The Power Reticulation System retains elements which are contemporary with the earliest phase in the provision of electrical power in Sydney. As such these elements are rare in a system which has become increasingly dependant on automatic systems.
Criterion G (Representativeness):	The Power Reticulation System is representative of the similar systems used during the 20th century in the generation of electrical energy. The system retains elements that are representative of the developmental history of the process of electrical distribution.

6.0 The Power Reticulation System - Summary Statement of Significance

The Power Reticulation System retains elements which are relics of and which are evocative of the technological developments in the management of the reticulation of electrical power in the first half of the twentieth century. Elements associated with the Power Reticulation System demonstrate the development of electrical power reticulation from the early-to-mid twentieth century and represent the most sophisticated technology relating to electrical distribution management prior to the introduction of transistors and integrated circuits.

The significance grading for the Power Reticulation System is 1/5.

6.1 The Main Control Room (a, b and c)

The Main Control Room is an integral element in the reticulation of electrical power. It retains elements which demonstrate the transition from the early phase of power reticulation to the increasingly sophisticated developments in electrical distribution in the mid twentieth century. The Main Control Room illustrates the increasingly complex processes in the reticulation of electrical power and its visual character is strongly reminiscent of the industrial technology of the early 20th century.

The significance grading for the Main Control Room is 1/5.

6.2 Rheostats

The Rheostats were integral elements in the Power Reticulation System and are among the few surviving relics directly associated with the early Turbo-Alternator sets formerly located in the south end of the Turbine Hall. The Rheostats are rare examples of their type and are evocative of the Power Reticulation System and have the ability to provide information on the operation of the earlier, low pressure, Turbo-Alternators.

The significance grading for the Rheostats is 2/5.

6.3 Cables and Chasers

The cables and their chasers were an integral element in the Power Reticulation System and are among the few relics directly associated with the original Switch House. They are representative of mid-twentieth century electrical distribution equipment within discrete industrial complexes and these cables are believed to be the first use of their type in Australia. They are associated with technological developments in the supply of electricity from the beginning of the 20th century through to the middle part of the century.

The significance grading for the Cables and Chasers is 2/5.

6.4 The Motor Driven Oil-bath Switches

The Motor Driven Oil-bath Switches are representative of mid twentieth century electrical control, metering and distribution equipment within discrete industrial complexes and illustrate a range of ancillary electrical processes and equipment. They represent technological developments in the supply of electricity from the beginning of the 20th century through to the middle part of the century.

The significance grading for the Motor Driven Oil-bath Switches is 3/5.

6.5 Oil Circuit Breakers

The Motor Driven Oil-bath Circuit Breakers are representative of mid twentieth century electrical control, metering and distribution equipment within discrete industrial complexes and illustrate a range of ancillary electrical processes and equipment. They represent technological developments in the supply of electricity from the beginning of the 20th century through to the middle part of the century.

The significance grading for the Oil Circuit Breakers is 2/5.

7.0 The Ash Handling System.

Criterion A (Historic):	The Ash Handling System, as an integral element of the White Bay Power Station, has a strong association in the early history of the development of electrical energy and the electrification of the mass transit system in Sydney.
Criterion C (Aesthetic):	The Ash Handling System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.
Criterion E (Scientific):	Component parts of the Ash Handling System have some potential to contribute to our understanding of the technology associated with the

	removal of the waste products of using fossil fuels.
Criterion F (Rarity):	The Ash Handling System retains elements specifically designed for the disposal of industrial waste which have become increasingly rare within the modern industrial milieu.
Criterion G (Representativeness):	The Ash Handling System is an integrated system comprising elements which demonstrate the technologies of their time and it represents the nature and general form of Ash Handling Systems installed in many coal-fired power stations in NSW.

7.0 Ash Handling System - Summary Statement of Significance

The Ash Handling System is a relic of early attempts to efficiently dispose of industrial waste and to reduce pollution and demonstrates changing attitudes to, and methods in, the management of industrial pollution. The system has been depleted by the removal of the precipitators which were integral and vital component parts and those individual elements which are retained are the only extant elements of the Ash Handling System and, as such, they have a high degree of significance within the context of the Station. They demonstrate an Ash Handling System developed specifically for White Bay but which is broadly representative of similar power stations.

The significance assessment of the remaining elements of the Ash Handling System is 2/5.

7.1 Ash Kibble sets

The Kibble Sets are integral elements of the Ash Handling System. They demonstrate one of the ash handling processes utilised at White Bay and are evocative of the labour-intensive, by today's standards, nature of the system when in operation. While not a complex element they were crucial to the function of the Ash Handling System.

The significance grading for the Ash Kibble sets is 3/5.

7.2 Ash Trucks

The Ash Trucks are integral elements of the Ash Handling System. They provide evidence of the labour intensive methods of removal of ash from the Boiler. The Ash Trucks are early examples of electrically powered industrial vehicles.

The significance grading of the Ash Trucks is 2/5.

7.3 Ash Tower

The Ash Tower is an integral part of the Ash Handling System and the efficient disposal of the ash waste. The Ash Tower is an evocative visual and aesthetic element of the power station which is now a rare element of the industrial environment where it was once common.

The significance of the Ash Tower is 1/5.

8.0 The House Electrical and Auxiliary Power Supply System

Criterion A (Historic):	The House Electrical and Auxiliary Power Supply System, as an integral element of the White Bay Power Station, has a strong association with the early history of the development of electrical energy and the electrification of the mass transit system in Sydney.
Criterion C (Aesthetic):	The House Electrical and Auxiliary Power Supply System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.
Criterion E (Scientific):	The House Electrical and Auxiliary Power Supply System is a vital component part in the production of electrical energy and consists of component parts which relate closely to the in-house supply of electricity and to the reticulation of electricity into the wider Sydney community. The diverse elements within this system represent the technological developments in the supply of electricity from the beginning of the 20th century through to the middle part of the century.
Criterion F (Rarity):	The House Electrical and Auxiliary Power Supply System retains elements which are no longer extant within the modern system of electrical power generation. These elements contribute to the overall rarity of the machinery and equipment extant at White Bay.
Criterion G (Representativeness):	The House Electrical and Auxiliary Power Supply System is representative of mid twentieth century electrical control, metering and distribution equipment within discrete industrial complexes and illustrates a range of ancillary electrical processes and equipment.

8.0 House Electrical and Auxiliary Power Supply System - Summary Statement of Significance

The House Electrical and Auxiliary Power Supply System demonstrates the historical development of increasingly complex methods of electrical energy production and reticulation. The power station retains elements contemporary with the earliest phase in electrical power generation through to the most sophisticated technology relating to electrical distribution management prior to the introduction of transistors and integrated circuits. The system retains diverse elements that are now extremely rare and have a high technical value, particularly as they are in situ at the power station.

The significance assessment for the Electricity Supply System and Auxiliary Systems is 1/5.

8.1 Disused No. 1 Battery Booster

The Disused No. 1 Booster is an integral element in the in-house Electricity Supply and Auxiliary System. It is representative of the influences of English technology and engineering design.

The significance grading for the Disused No. 1 Booster is 1/5.

8.2 a) Motor-Generator set 2

The Motor-Generator set is amongst the oldest items in the power station and represents an era when direct current was generated though a generator powered by an AC motor. The item evidences early electrical power technology and was the forerunner of the Rectifier. The item represents early manufacturing technology through the massive cast iron bed, bearing blocks and cowling.

The significance grading for the Motor-Generator set is 1/5.

8.2 b) No. 2 Motor-Generator Switch Board

The No. 2 Motor-Generator Switchboard is among the oldest items associated with the House Electrical and Auxiliary Power Supply System at the station. The Switchboard is representative of the influences of English technology and engineering design.

The significance grading for the Motor-Generator Switchboard is 1/5.

8.3 Motor-Generator 3

The Crompton Parkinson Motor-Generator No. 3 is an integral element in the in- Electricity Supply and Auxiliary System. It is representative of the influences of English technology and engineering design. It evidences early electrical machine technology though its open brushwork and commutator (now partially enclosed).

The significance grading for the Motor-Generator No. 3 is 1/5.

8.4 Motor-Generator 4

The Motor-Generator No. 4 is an integral part of the in-house Electricity Supply and Auxiliary System. It is representative of the inter-war period of electrical generation at White Bay Power Station and of the influence of English technology and engineering.

The significance grading for the Motor-Generator No. 4 is 1/5.

8.5 Battery Charger Unit – Mercury Arc Rectifier

The Battery Charger Mercury-Arc Rectifier is an integral element in the in-house Electricity Supply and Auxiliary System. It is representative of the influences of English technology and engineering design. It has particular and impressive aesthetic qualities.

The significance grading for the Battery Charger Unit – Mercury Arc Rectifier is 2/5.

8.6 No. 1 Battery Booster

The Battery Booster Set No. 1 is one of the oldest items in the Boiler House. It represents an era where direct current was generated through a Generator powered by an AC Motor. The item evidences early electrical power technology though its open brushwork and commutator.

The significance grading for the No. 1 Battery Booster Set is 2/5.

8.7 Rectifier Sets 1 and 2

The Mercury-Arc Rectifiers No. 1 and No. 2 were integral to the in-house Electricity Supply and Auxiliary System. They are representative of the influences of English technology and engineering design in Australia. They have particular and impressive aesthetic qualities, however, the removal of bottles has compromised their integrity to a notable degree.

The significance grading for the Rectifier Sets 1 and 2 is 3/5.

8.8 Switchboard

The marble Switchboard is an example of an early twentieth century switchboard evidencing voltmeters and ammeters of now rare configurations, copper knife switches and open air circuit breakers. The item is evocative of early electrical Switch House technology and has impressive aesthetic qualities.

The significance grading for the Switchboard is 1/5.

8.9 Batteries

The extant battery of lead-acid Wet Cells is a remnant of an originally much-larger battery system. The system of Batteries at the power station evidences the need for an auxiliary or emergency supply of power for the power station in case of failure of the main supply. The remaining wet cells illustrate the method by which electrical power was stored in the early twentieth century.

The significance grading for the Batteries is 2/5.

8.10 The Pedestal Power Drill

The Pedestal Power Drill evidences the need of an in-house Workshop. The item is representative of a class of power tools which could be powered by a stand alone motor or a lineshaft belt. It is a beautifully designed and constructed precision power tool manufactured in Australia prior to 1920.

The significance grading for the Pedestal Power Drill is 2/5.

8.11 Selenium Rectifier for charging Ash trucks

The Selenium Rectifier for charging Ash Trucks is integral to the Electricity Supply and Auxiliary System. It provides a link with the Ash Handling System and the efficient disposal of the ash waste from the Electrical Generating System. The Battery Charging System indicates the method of charging the Batteries of the Ash trucks.

The significance grading for the Selenium Rectifier for charging Ash Trucks is 2/5.

8.12 Switch House Lighting Board

The Switch House Lighting Board was an integral part of the House Electrical and Auxiliary Power Supply System and is a representative example of a mid-twentieth century powerboard which is complete and intact.

The significance grading for the Switch House Lighting Board is 2/5.

8.13 Switchboard in Battery Room

The Switchboard in the Battery room is an integral part of the House Electrical and Auxiliary Power Supply System and is a representative example of an early twentieth century electrical switchboard which is complete and intact.

The significance grading for the Switchboard in the Battery room is 2/5.

8.14 Battery Charging Switchboard

The Battery Charging Switchboard is an integral part of the House Electrical and Auxiliary Power Supply System and is a representative example of an early twentieth century electrical switchboard which is complete and intact.

The significance grading for the Battery Charging Switchboard is 1/5.

8.15 Air Compressor

The Air Compressor is an integral element in the Electricity Supply and Auxiliary System. It is representative of air compressors used in power stations during the twentieth century and is a contributing element to the understanding of Electricity Supply and Auxiliary Systems.

The significance grading for the Air Compressor is 2/5.

8.16 25 Cycle Switches

The 25 Cycle Supply (feeder) Switches are a relic of the era when White Bay Power Station and Ultimo Power Station were operated jointly by the Railway Commissioners to supply the electrified tramways and railways of Sydney. The 25 Cycle Switches have the ability to provide information on the operation of early tramway electrical systems and are representative examples of motor-driven and manual oil-immersion switches.

The significance grading for the 25 Cycle Switches is 3/5.

4.5 Summary Statement of Significance

The complex of historic machinery extant at White Bay Power Station is a rare collection of exceptional significance because of its ability to demonstrate the history of twentieth century power generation in New South Wales. The historic machinery is significant for its ability to demonstrate technological and engineering advances in power generation and the working conditions and practices which evolved in tandem both for the workers at White Bay Power Station and the expanding industrial workforce of New South Wales. The production of electric power at White Bay Power Station and its increasing reticulation and availability stimulated associated industrial and suburban growth in the Sydney region throughout the twentieth century.

The exceptional aesthetic value of the machinery and equipment is enhanced by landmark value of the buildings within which they are housed. The extant items within the operational systems are of an impressive scale and exhibit a high degree of creative and technical achievement in their design and configuration. These operational systems, comprising interdependent items, assemblages, documentation and collections of machinery and plant equipment, are of exceptional technical significance with research potential to yield information not available from any other source.

The extant interdependent operational systems which comprise the machinery and equipment which generated power at White Bay Power Station represent a unique and comprehensive resource of equipment and machinery which is no longer to be found at either rural or suburban power stations in NSW. The extant equipment and machinery encompass all aspects of the generation of electrical power as well as representing all phases from the inter-war period through to the increasingly sophisticated and less labour intensive methods and technologies of the later twentieth century. The collection of machinery and equipment at White Bay Power Station has exceptional historic, technical and aesthetic value representative of the technological advances and influences of English technology and engineering design.

White Bay Power Station is the last of the early NSW power stations to retain a substantially-intact, representative sample of steam-driven electrical generation system dating from the mid-twentieth century and immediate post-war era.

4.6 Endnotes

[1] *NSW Heritage Manual* 1996, NSW Heritage Office and NSW Department of Urban Affairs and Planning, Sydney.

5.0 Constraints and Opportunities

5.1 Preamble

The conservation planning process established by the guidelines of the *Burra Charter* of Australia ICOMOS requires that relevant constraints and opportunities be identified as part of the process for developing conservation policies and strategies for places of significance. These are generally addressed within the following categories:

- constraints arising from the heritage significance of the place and its component elements;
- physical constraints arising from the condition of the buildings and structures;
- external factors, including relevant statutory and non-statutory controls; and
- feasible uses and client requirements.

This section of the report sets out the key constraints and opportunities that affect the extant historic machinery at White Bay Power Station. As this report addresses machinery only and forms a component of a larger study relating to the whole of the White Bay Power Station complex and its fabric and values, the following sections address only those factors relevant to the machinery. For this reason, statutory controls (as pertain to the place overall) are not detailed in the following section.

5.2 Constraints Arising from Significance

5.2.1 Eight Operational Systems

White Bay Power Station retains a representative sample only of the original machinery responsible for the power generating process, represented in eight operational systems housed largely in four buildings at White Bay Power Station. In most instances, there is now a single item where once there were multiple examples. These now rare items are integral to the overall significance of White Bay Power Station and have been identified as having Exceptional and High significance.

Recommendation:

- *The eight operational systems at White Bay are central to its significance and should be conserved. The systems have a significance of context through the relationship of their parts.*

The nature of the eight operational systems is such that they are composed of interdependent elements, with all the systems also being operationally interdependent upon each other.

Recommendation:

- *All of the individual elements that form the eight operational systems at White Bay should be conserved and retained in situ.*

The eight operational systems at White Bay are central to the industrial qualities of the place and contribute to its interpretability as a power station. They provide a focus for understanding the historical development and functions of White Bay Power Station as an industrial site which played a significant role in the generation of electrical power in Sydney and in the expansion of Sydney's electric railway and tramway networks.

Recommendation:

- *The significance of the eight operational systems at White Bay should be interpreted to the public as part of the conservation of the place.*

5.2.2 Miscellaneous Items and elements

There are various miscellaneous items and elements within the power station which are not part of the eight operational systems and are not itemised on inventory sheets as part of this report. Such items as are to be found in the Boiler House, the Turbine Hall and the Switch House and especially in the old Control Room and the Battery Room. Such items include:

- signage, including labels and tags;
- minor switchboards and power distribution boards etc;
- power outlets and associated electrical equipment;
- meters and dials;
- electrical cabling and wiring looms;
- piping and valves; and
- furniture, fixtures, and fittings such as tables and sinks (i.e. in the Battery Room).

These small and, in some cases, apparently nondescript items contribute to an understanding of the operational roles and significance of the eight operational systems at White Bay Power Station. They provide a context for the evidence of the human aspect of the station's use.

Recommendation:

- *The miscellaneous items within the power station which are not part of the eight operational systems, including signage, power outlets and distribution boards, meters, electrical wiring, piping, fixtures and furniture and the like, should also be conserved and interpreted.*

5.3 Constraints Arising From Physical Condition

5.3.1 Location

The extant machinery relating to the eight operational systems at White Bay Power Station generally occupies the northern section of the buildings in which it is housed. Hence, the machinery associated with coal handling is located at the northern end of the coal handling shed, whilst the boiler, pulverising mills and associated machinery and equipment is housed in the northern section of the Boiler House. The turbo-alternator set, the condensers and associated machinery and equipment are in the northern section of the Turbine Hall. This arises from the retention of a single representative Operational System from a larger Operational Group.

Recommendation:

- *The physical co-location of the majority of the remaining historic machinery at White Bay relates to it being a single representative Operational System retained from a larger Operational Group of machinery and the present co-location of the retained equipment should be interpreted as being a result of the decision to retain only a representative sample of White Bay's operating equipment.*

The equipment and individual machines associated with the in-house electrical supply and the power reticulation system are not, generally, so closely located. They occur in various locations but are generally concentrated in the Switchhouse. In some cases, much of the intermediate equipment with which any individual machine or item of equipment was directly associated has been removed but its location, nonetheless, is an important aspect of their heritage significance.

Recommendation:

- *Retention of individual machines should occur in their operational location, irrespective of the loss of intermediate or other elements.*

In the majority of instances, an individual machine or item of equipment will not be able to be moved or relocated without impairing its heritage significance, although certain items may be relocated with little negative impact. If an individual machine or item of equipment must be moved for non-heritage reasons, this should not be undertaken without consideration of its total operational environment and its interconnection with other elements.

Recommendation:

- *Relocation of an individual machine or item of equipment may not be done without taking into consideration the associated machinery and equipment that comprise its total environment.*

5.3.2 Repair and Maintenance

The machinery which remains within White Bay Power Station is largely in a stable but deteriorated condition. As much of the fabric of the machinery is steel, corrosion is an on-going problem and little maintenance has been carried out for many years. A program of catch-up repair and on-going maintenance is necessary to conserve these items for the long-term.

Recommendations:

- *As part of the conservation works for White Bay Power Station, a repair and maintenance program for historic machinery should be instituted.*
- *The repair and maintenance programs need to be co-ordinated with each other to ensure that items awaiting repair are preserved from further deterioration until the requisite repairs can be effected.*

5.4 Individual Elements

5.4.1 The Coal Handling Shed and External Conveyor

Discussion

The coal handling shed houses the machinery and equipment associated with the coal handling system. The preferred conservation option for the shed and the machinery contained within is for retention of the whole.

There are, however, opportunities which include the retention of the machinery while exploring alternative avenues for adaptive re-use of the larger part of the shed.

As the major part of the machinery and equipment associated with the coal handling is generally confined to the northern end of the shed, the opportunity exists for this to be retained and interpreted in situ. The capstan is, however, sited on the east side toward the delivery area in the south (CHG.1) and should be retained in situ. An overhead crane, control cabin and grabs could be moved adjacent to the machinery (CHG.3) to enhance the understanding and processes of coal delivery and handling for interpretation. The northern limit of the overhead crane's position should be such that it defines the functioning parts of the coal handling shed to the north.

Other elements associated with the coal handling shed include the overhead conveyor (CH4.1) which provides a functional and visual connection between the Coal Handling Shed and the Boiler House; the next phase in the power generating process. The overhead conveyor elements have an iconic quality in the visual identification of the function of White Bay Power Station.

Although the coal handling shed itself appears to be in a relatively poor physical condition, the machinery which it houses, with the exception of the hoppers and underground conveyors, is in good condition.

The assessed significance of the machinery and equipment associated with the Coal Handling Shed and external conveyor is such that they should all be retained in situ to enhance an understanding of the operation of the power station in its entirety.

Recommendations:

- *The coal handling shed should be retained as evidence of one of the site's principal operational systems and conserved.*
- *The machinery and equipment in the coal handling shed should be retained and conserved in situ to enhance an understanding of the operation of the power station in its entirety.*
- *The machinery and equipment should be retained in the northern part of the shed and an overhead crane should be moved to define the space and to enhance the understanding and processes of coal handling for interpretation.*
- *The overhead conveyor should be retained in situ to provide a visual and physical connection to the Boiler House.*

5.4.2 The Ash Tower

Discussion

The Ash Tower is a prominent visual element which is the physical evidence of the system for management of the waste product of the Steam Raising System, the ash. It is the primary relic of the Ash Handling System and it provides the evidence for the operation of the Ash Handling System.

All of the surviving Ash Kibbles are presently located in proximity to the base of the boiler in the boiler house basement. The relationship between the Ash Tower and the Kibbles, through the Kibble Crane, should be interpreted as part of the interpretation of the Ash Tower and individual Ash Kibbles may be moved, if deemed appropriate as part of an Interpretation strategy, to the vicinity of the Kibble Crane.

Recommendations:

- *The ash tower should be retained in situ retained as evidence of one of the site's principal operational systems.*
- *The operation of the Kibble Crane as part of the operation of the Ash Tower should be expressed as part of the interpretation of the Ash Tower.*

5.4.3 The Boiler House

Discussion

The Boiler House is a large masonry structure, the first floor of which is essentially a void broken up by walkways. The voids identify the location of the other three original boilers, whilst the upper floor levels, which had originally consisted of metal open-grid flooring attached to the boilers, have been removed except where associated with the extant boiler. The magnitude of the internal space is such that there is enormous potential for adaptive re-use of this internal space.

The voids in the floors could be closed to create a continuous floor space which would provide an opportunity for a variety of uses. However, the infill of the voids should be differentiated to indicate the former locations of the boilers. New upper floors could also be installed, however, this should be done in a way that allows for an adequate physical and visual curtilage for the extant boiler.

The extant Babcock and Wilcox boiler, the pulverising mills and the various items of machinery and equipment associated with the Steam Raising and the Coal Handling systems housed in the Boiler House, occupy the northern section of the building (BH1.1). The integrity of the Babcock and Wilcox boiler has been compromised by the removal of elements such as the furnace and the asbestos-insulated steel sheet cladding. Although the removal of these elements detracts from the understanding of the original function and process, it allows for a more vivid interpretation of the boiler operation.

A visual and physical connection with the Turbine Hall is provided by the headers and piping against the west wall of the Boiler House, carrying the steam to the steam high-pressure feedwater pumps and the next operational system.

The boiler house control room is centrally located against the west wall on the first floor (BH1.5), where it should be retained as a discrete total environment.

The machinery and items of equipment within the Boiler House contribute to the assessed significance of the power station and no element can be removed without detracting from the overall significance of this structure and the power station.

The machinery and equipment appears mostly to be in a moderate or good physical condition. A conservation and maintenance program would return many elements to good physical condition.

Recommendations:

- *The opportunity exists to infill the present floor voids through the use of visually distinctive fabric in the void areas of the floor.*
- *All machinery and associated equipment within the Boiler House is to be retained in situ and conserved, maintained and interpreted.*

- *Opportunities exist for adaptive re-use of the Boiler House and for additional floors to be added whilst respecting and enhancing the spaces around the extant boiler and associated equipment.*
- *The boiler house control room should be retained as a discrete total environment.*

5.4.4 The Turbine Hall

Discussion

The Parsons turbo-alternator set (TH1) is a vital component part of the power generating system at White Bay. The significance of the turbo-alternator set and its associated elements within the Turbine Hall are such that no element may be removed without depleting the significance of the power house or detracting from an understanding of the process of electrical generation through harnessing steam.

The Turbine Hall also retains representative examples of elements associated with the cooling and feedwater systems and includes the condensers (TH1B.1), the high pressure feedwater pumps (TH1C.1), the condensate pumps (THG), the circulating water pumps and the circulating water sluice gates(TH1). The Turbine Hall overhead cranes are also important features.

The exceptional significance of the machinery is such that these items should be retained in situ and conserved. Interpretation of the Power Generation, Feedwater and Circulating Water Systems would contribute to an understanding of the operation of the power station.

The voids to the north and east of the turbo-alternator set allow the relationship between the turbo-alternator set on the first floor and the condensers on the floor below to be readily understood. These voids are not only relics of the operational arrangements of the Turbine Hall but also, for the future, enhance the interpretability of the Power Generation System and Circulating Water System.

All of these items of machinery and their associated elements are located in the northern section of the Turbine Hall, with the exception of two of the three overhead cranes. The southern end of the Turbine Hall is relatively clear of machinery and equipment (excepting two overhead cranes) and consequently, offers opportunities for adaptive reuse, including the reconfiguration of floors and the insertion of new floor levels. The existing voids in the floor are either vacant spaces where turbo-alternators were formerly located or are pre-existing voids associated with the turbo-alternators. These voids may be infilled as part of any future adaptive reuse but, where possible, interpretation within the Turbine Hall should identify and express the nature and outline of the former configuration of floors and voids.

The newest of the overhead cranes, the W.A. Hodgkin and Company crane, should be moved northwards to be directly above the turbo-alternator so that the role in the maintenance of the machinery and equipment of the Turbine Hall may be readily understood and interpreted. The other two cranes, which related to turbo-alternators formerly located in the centre and south end of the Turbine Hall, may be relocated to anywhere within the southern end of the Hall, as necessary.

Recommendations:

- *All machinery and associated equipment within the Turbine Hall should be retained in situ and conserved, maintained and interpreted.*
- *The Parsons turbo-alternator and its relationship with the condensers should be maintained by the retention of the adjacent floor voids.*
- *The central and southern end of the Turbine Hall offers opportunities for adaptive reuse. In the event that the floors in these areas are made continuous, interpretation within this area should express the positions where machinery and voids were formerly located.*
- *The W.A. Hodgkin and Company overhead crane should be moved northwards to be directly above the Parsons turbo-alternator and the other two cranes may be relocated to anywhere within the southern end of the Hall, as necessary.*

5.4.5 The Turbine Hall Basement

Discussion

The pumps and sluice gates for the Circulating Water System are located in the basement of the Turbine Hall, adjacent to the condenser, and in the pump gallery between the Turbine Hall and Boiler House basements. The water for the Circulating Water System was derived from Rozelle Bay and returned to White Bay after use (or vice-versa).

An interpretation of the Circulating Water System will not only contribute to an understanding of the processes of power generation at White Bay but would also provide for an understanding of the relationship between the operations of the power station and its broader environment. The physical connection provided by the subsurface channel leading from the power station to and from White and Rozelle Bays should be exploited for its potential to express the linkages between the station, the local community (which made use of the warm water for swimming), the broader community (who suffered from air pollution but benefited from the power and the employment) and the environment.

The Circulating Water System channels extend beyond the land which is currently allocated to be permanently associated with the power station and are largely invisible, being covered brick and stone conduits for much of their length. Consideration should be given to the issues associated with the full length of the Circulating Water channels and how they might be conserved, maintained and interpreted as part of the overall conservation of the power station.

Recommendations:

- *All machinery and equipment within the Turbine Hall basement should be retained in situ and conserved, maintained and interpreted.*
- *The Circulating Water channels between Rozelle and White Bays provide opportunities for interpreting the relationship with White Bay Power Station, the environment and the community.*
- *The Circulating Water channels extend beyond the present boundaries of the land directly attached to the power station. Consideration should be given to the ownership and control of these channels and their conservation and interpretation.*

5.4.6 The Switch House and Control Room

Discussion

Both the House Electrical and Auxiliary Power Supply System and the Main Control Room for the Power Reticulation System are located within the Switch House. The Power Reticulation System is central to an understanding of the extent of the operational capacity of White Bay Power Station, while the House Electrical and Auxiliary Power Supply System retains elements from the earliest phase in the development of the power station.

The machinery and associated elements of these systems are not conveniently located such that a representative slice may be readily identified for interpretation by elements retained in close juxtaposition. The Control Room is located in a square building (CS2) attached to the centre of the west side of the Switch House by a connecting hallway (CS1.3), which also houses the rheostats and two large cable tunnels. The components of the House Electrical and Auxiliary Power Supply System are, however, dispersed at a number of locations throughout the Switch House.

The former control room (SH4.9) overlooks the Turbine Hall through three floor-to-ceiling bay windows and contains the Switchhouse lighting board and an early motor generator set. To either side of the old control room are associated rooms. The main room to the north (SH4.2) had been a battery room, as evidenced by the imprints of the battery legs in the brick floor, but which had subsequently become a store and workroom with shelving containing sundry dials, meters and associated equipment. To the south are the motor generator room, the workshop and the battery room (SH4.10, SH4.11, SH4.12). The battery room retains the lead-sheet floor covering but has been depleted of all machinery and equipment other than a single battery unit (containing batteries 51-56), a lead-lined sink and a cupboard. The workshop has also been depleted of all equipment other than a pedestal drill set and the Disused No. 1 Battery Booster set. The motor generator room retains its full complement of machinery, including the marble switchboard, the motor generators Nos. 3 and 4 and their associated switchboards.

The various components of the House Electrical and Auxiliary Power Supply System encompass a wide range of functions and materials which are in variable condition. Items such as the remnant battery in the Battery Room are in a poor to moderate physical condition, while the fabric of items such as the air compressor on the ground floor of the Switchhouse (SHG.12) is in a comparatively good condition. All items associated with these systems do, however, require cleaning and conservation to restore them to a stable and presentable state.

Some items within these systems, such as the Disused No.1 Battery Booster in the workshop (SH4.12), have been moved from their original positions and may need to be relocated, as appropriate, for interpretation purposes. Items such as the air compressor on the ground floor of the Switch House may be relocated to a more convenient location where the function may be more readily accessible for interpretation purposes.

Although the integrity of the Main Control Room has been depleted by the removal of a number of elements, both as part of the decommissioning process and through vandalism, the Main Control Room is functionally evocative. This room should be retained in its entirety, including status tags and personal paraphernalia. Innovative interpretative devices such as soundscapes could highlight its significance.

The fragmentary nature of the surviving machinery and equipment scattered throughout the Switchhouse is such that individual items may be relocated in a manner that enables interpretation. The intact nature of the Motor Generator Room (SW4.10), on the other hand, is such that this total environment should be retained in situ and intact.

The machinery and elements associated with the Power Reticulation and House Electrical and Auxiliary Power Supply systems contribute to the assessed significance of the power station and, although it may be acceptable to move or relocate some items, no item can be removed without diminishing its own significance as well as the overall significance of the station.

Recommendations:

- *The Main Control Room should be retained in situ as a total environment and conserved and interpreted as a significant part of the Power Reticulation System.*
- *The Motor Generator Room should be retained in situ in its entirety as a total environment and conserved and interpreted as a significant part of the House Electrical and Auxiliary Power Supply System.*
- *Other machines and associated equipment as well as assorted dials, meters etc in the Switch House should be conserved in situ as much as is possible and practical, to maintain the authenticity and heritage significance of the Power Reticulation and House Electrical and Auxiliary Power Supply Systems.*

- *Some elements of the surviving machinery and equipment scattered throughout the Switch House may be relocated if necessary to allow for adaptive reuse of the building and to enhance the interpretation of these items as part of an overall interpretation scheme. These items include the Disused No.1 Battery Booster and the air compressor; others may be considered on a case-by-case basis.*

5.4.7 The Chimney Stacks

Discussion

The chimney stacks have a strong visual association within the community of the identity of the White Bay Power House. The two extant chimney stacks are the evidence of the end process of the generation of electrical power through coal firing and steam raising, although the integrity of the surviving evidence of this process has been significantly degraded by the removal of the Precipitators and Induced Draft Fans as part of the site's decontamination. Although this degrade detracts from the overall integrity of the power station, the remaining evidence of these elements, the motor and fan footings and remnant flue openings, have the potential to contribute to an understanding of the final process of waste elimination in the generation of electrical power at White Bay Power Station.

The condition of the chimney stacks should not be a hindrance to their retention in situ and these should be retained and conserved as part of the visual identification of the place of White Bay Power Station.

Recommendations:

- *The two extant chimney stacks are a contributing element to the visual identity of the White Bay Power Station and should be retained in situ and conserved, maintained and interpreted as an integral part of the significance of the power station.*
- *The evidence of the Precipitators and Induced Draft Fans located around the bases of the two chimneys and in the Boiler House walls and chimneys should be retained in situ and conserved, maintained and interpreted.*

5.5 Overall Conclusion

The surviving historic machinery and associated equipment at White Bay Power Station provide a representative slice of the overall operations and, as such, should be retained in situ and conserved, maintained and interpreted as recommended in this report. Although some items may be relocated to enhance their interpretability, or to provide greater scope for the adaptive re-use of the buildings, no item may be removed without reducing the integrity and heritage significance of the power station.

Whilst each of the Inventory Sheets prepared for the surviving machinery as part of this report provides general directions and strategies for the maintenance of the historic machinery, detailed assessment by an appropriately skilled materials conservator will be necessary to initiate detailed conservation and maintenance action.

It is not currently proposed to attempt re-activation of any of the machinery and this course of action is not proposed by this report in relation to any machine. Nevertheless, it is essential that a detailed investigation be undertaken of each machine to determine the maintenance required to preserve the item and to clarify the nature of its detailed technological fabric. This process is partly necessary owing to the lack of documentary records of the machinery but, more importantly, it would further enhance the depth of understanding, and hence interpretability, for each item and its relationship with its operational system.

The preparation of an Interpretation Plan for White Bay which explains and illustrates the eight Operational Systems is an essential contribution to the understanding of the process and historical and cultural significance of electrical power generation through the use of coal and steam. The significance of White Bay Power Station would be enhanced by an interpretation of the technology and processes represented by the surviving historic machinery.

6.0 Appendices

Appendix A

White Bay Power Station Historic Machinery Inventory 2002

Appendix B

White Bay Power Station Missing Machinery

Appendix C

NSW State Heritage Inventory Database Report – White Bay Power Station

Appendix A

White Bay Power Station Historic Machinery Inventory

Coal Handling System

1.1 Screens, Hoppers and Pneumatic Gates

1.2 The Capstan

1.3 The Cranes and Associated Grabs

1.4 Rail and Lorry Delivery

1.5 Conveyors

1.6 Short Elevators and Motors

1.7 Coal Crushers

1.8 The 90 Foot Elevators

1.9 Transfer Houses and Equipment

1.10 External Conveyor

1.11 Coal Weigher

1.12 Coal Hoppers

1.13 Coal Handling Control Room

Steam Raising System

2.1 Pulverising Mill
a) Drive Motor

b) Fan Motor

2.2 Chutes from Hopper to Mill

2.3 The Pulverised Fuel Feed Pipes

2.4 The Boiler
a) The Furnace
b) Superheaters
c) Attemperators
d) Economisers

Power Generating System

The Feedwater System

The Circulating Water System

The Power Reticulation System

6.2 Rheostats

6.3 Cables and Chasers

6.4 Motor-Driven Oil-bath Switches

6.5 Oil Circuit Breaker

Ash Handling System

7.1 Ash Kibble Sets

7.2 Ash Trucks

7.3 Ash Tower

The Electricity Supply + Auxillary Systems

8.1 Disused No. 1 Battery Booster

8.2 a) Motor-Generator Set 2

b) No. 2 Motor-Generator Switchboard

8.3 Motor-Generator No. 3

8.4 Motor-Generator No. 4

8.5 Battery Charger Unit (Mercury Arc Rectifier)

8.6 No 1 Booster

8.7 Rectifier Sets 1 and 2

8.8 Switchboard

8.9 Batteries

8.10 Pedestal Drill

8.11 Selenium Rectifier for charging Ash Carts

8.12 Switch House Lighting Board

8.13 Switch Board in Battery Room

8.14 Battery Charging Switchboard

8.15 Air Compressor

8.16 25 Cycle Switches

Item: Coal Handling System	Reference No: 1.0

Location in Building:

Coal Handling Shed

Statement of Significance:

a. The Coal Handling System is an integral and vital part of the White Bay Power Station supplying fuel to be converted to electrical energy.

c. The Coal Handling System is an evocative series of items reminiscent of the industrial milieu of the early 20th century.

e. The Coal Handling System is indicative of engineering design principles, work practices and changing patterns of materials handling and can yield information on the development of a less labour intensive methods from during the inter-war period through to the later 20th century. The Coal Handling System contributes to an understanding of the necessity for the placement of the early power station system close to consumers rather than on the coal fields as was later practice.

f. The Coal Handling System is a rare example of a labour intensive materials handling site with items which are no longer extant at any suburban or rural power station.

g. The Coal Handling System is a representative example of coal handling systems, particularly those installed in power stations located in metropolitan areas and serviced by rail systems.

The Coal Handling System is an integral part of the White Bay Power Station and has an historical associations with the electrification of the Sydney rail and tramways systems. The system is demonstrative of engineering design principles. It is a rare demonstration of the changing patterns of materials handling that can yield information on the development of the less labour-intensive practices of the post-war period. The Coal Handling System demonstrates the fuel requirements of power stations in metropolitan areas and illustrates the transition to coalfields power stations.

Significance Grading: 2

Photo:
N/A

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White Bay Heritage Machinery Inventory 2002

Item: Coal Handling System	Reference No: 1.0

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed was constructed between 1950 and 1958.

Description:

The Coal Handling System functions to receive coal deliveries from railway or road transport, grade, clean and store the coal, then transfer the coal into the overhead coal bunkers in the Boiler House. At White Bay, the receiving coal stores comprised a large open area on the east side of the present Coal Handling Shed. An open-sided shelter attached to the eastern side of the Coal Handling Shed provided covered storage for a reserve of dry coal.

The Coal Handling System consists of

1.1 Hoppers and Pneumatic Feed Gates
1.2 The Capstan
1.3 The Cranes and Associated Grabs
1.4 Screens
1.5 Conveyors
1.6 Short Elevators and Motors
1.7 Coal Crushers
1.8 The 90 Foot Elevators
1.9 Transfer Houses and Equipment
1.10 External Conveyor
1.11 Coal Weigher
1.12 Coal Hoppers
1.13 Coal Handling Control Room.

Intactness and Condition: See individual items
Conservation Policy: See individual items
Conservation Action: See individual items
Maintenance Schedule: See individual items

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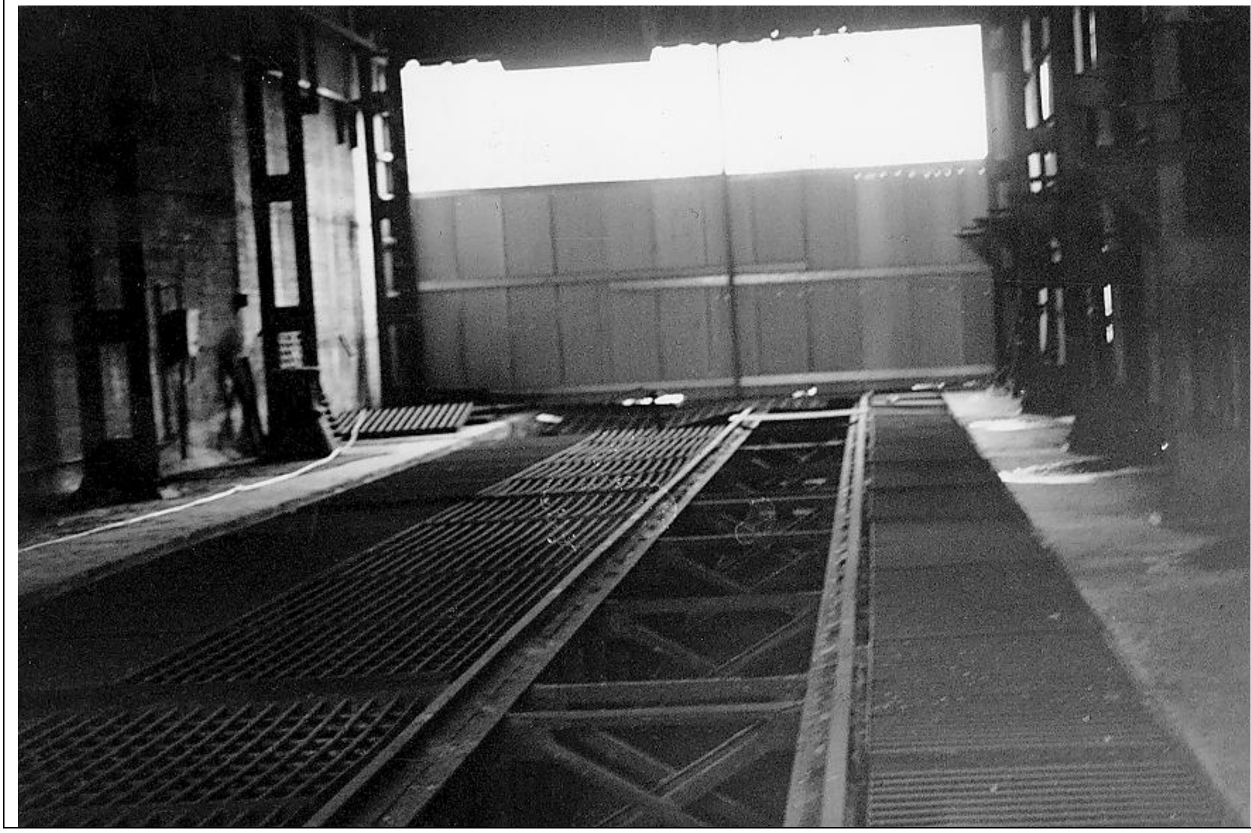
Item: Hoppers and Pneumatic Feed Gates	Reference No: 1.1
Location in Building: Coal Handling Shed, ground floor (CHG. 1)	
Statement of Significance: The Hoppers and Pneumatic Feed Gates are an integral part of the coal-handling system and are now rare examples of pre-war coal-handling technology. They are representative of screens and hoppers found in many metropolitan power stations and illustrate the processes and approaches typical of large coal handling facilities.	
Significance Grading: 2	

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Hoppers and Pneumatic Feed Gates	Reference No: 1.1

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

Coal was lifted from railway coal delivery wagons on a single set of tracks located close to the western wall and dropped onto the Screens through which smaller pieces fell into a series of Hoppers on the main longitudinal Conveyors which deposited coal on short transverse Conveyors which fed into the two Short Elevators. To the west of the tracks, there is another set of Screens, beneath which were much smaller Coal Hoppers. The ingress of water has covered the motors and associated infrastructure below ground level.

- The Hoppers were inverted square concrete pyramids with steel clad lips to prevent wear. Each Hopper was equipped with a pneumatic gate which controlled the flow of coal onto the long conveyors below.
- A Pneumatic Feed Gate controlled the flow of coal onto the long Conveyors from the Hoppers.

Intactness and Condition:

- The item appears to be structurally sound
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion and with some very badly corroded elements

Conservation Policy:

- The item is to be retained in situ and conserved.

Conservation Action:

- All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
- Remaining rust should be converted with Emertan or similar.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

White Bay Heritage Machinery Inventory 2002

Item: The Capstan	Reference No: 1.2

Location in Building:

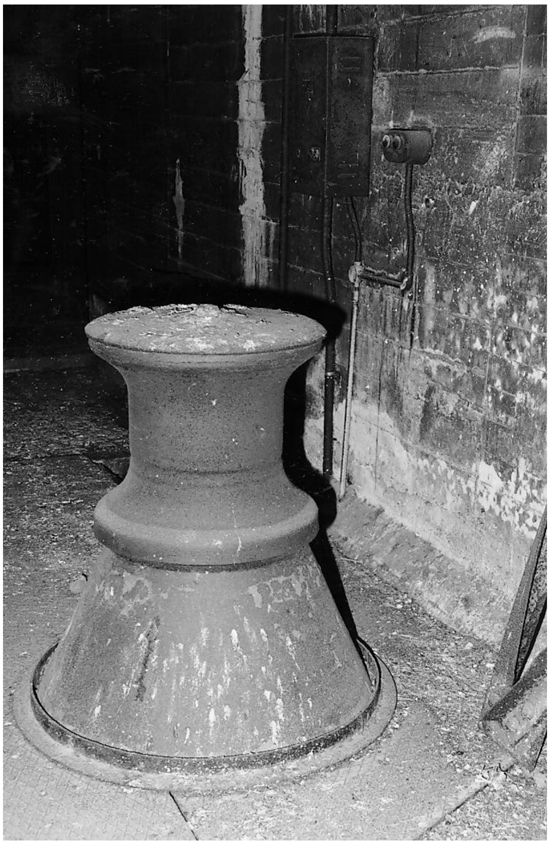
Coal Handling Shed, ground floor (CHG. 1)

Statement of Significance:

The Capstan, with its associated motor and gearbox, is now a rare item formerly used in many rail goods sidings. It is indicative of the traditional techniques of moving rail trucks short distances within confined areas without the use of locomotives. The Capstan is a relic of early, more-time consuming work practices.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: The Capstan	Reference No: 1.2

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The Capstan is a massive cast iron post mounted on a central shaft. The post itself is about 800mm diameter base, then reducing to about 500mm at the collar, above which there is the standard cable reel. The capstan was powered by a shaft through a gear box at its base, which is direct-coupled to a large General Electric motor of unknown voltage and type. The motor and gear box are mounted beneath the check plate. The cable for the Capstan appeared to run directly from the Capstan around the pulley, which is located about a metre to the south of the southernmost rail line. As in most instances, the gable would have had a large hook on the end which would simply have been hooked on to the towing eye of the coal hopper wagon, and it dragged into the correct location for the Grab Crane (Item No. 1.3) to operate.

Intactness and Condition:

- The item appears to be structurally sound.
- The paint system has broken down and the item exhibits a degree of corrosion.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ if possible - however if it is relocated contextual items essential to its interpretation should be relocated with it.

Conservation Action:

- Initial investigation indicates the following action should be undertaken.
  - All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
  - Remaining rust should be converted with Emertan or similar.
  - Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

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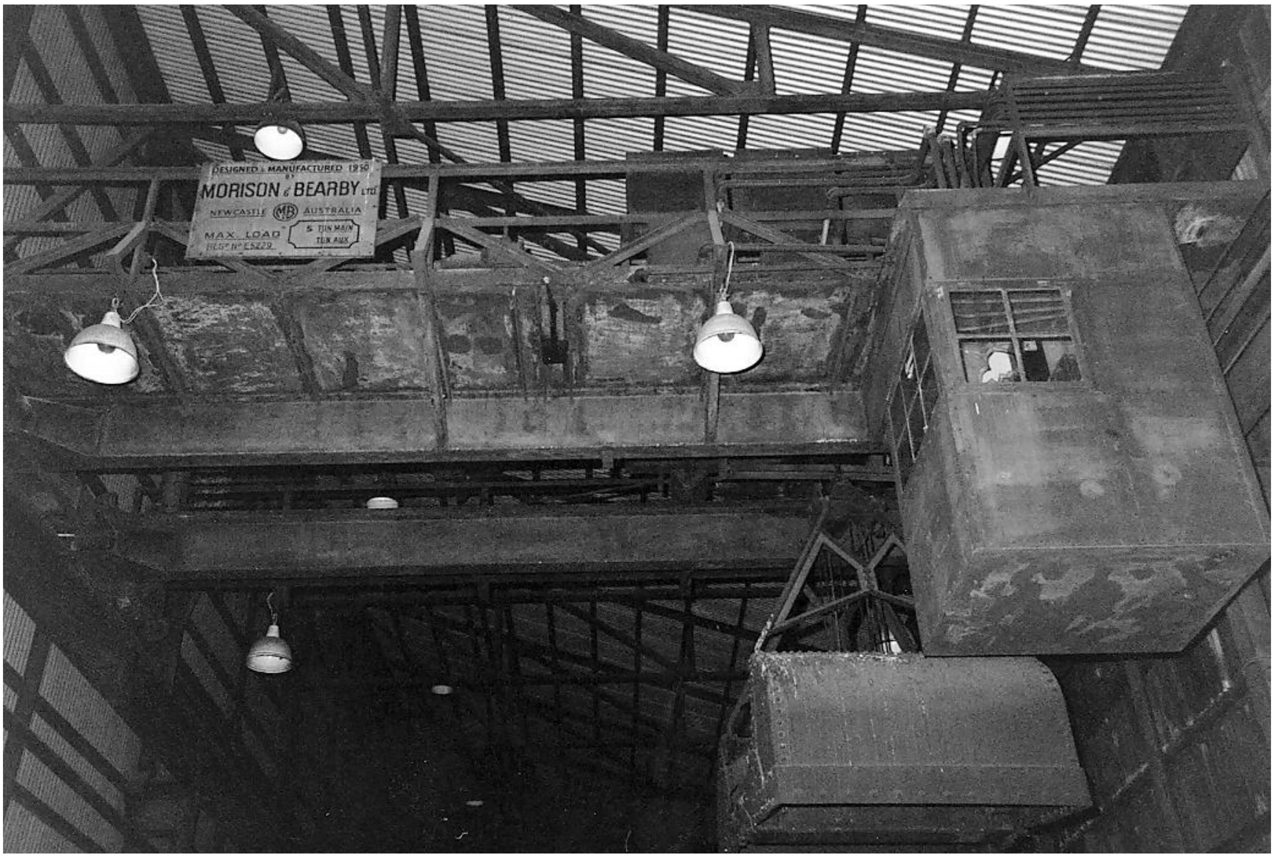
White Bay Heritage Machinery Inventory 2002

Item: The Cranes and Associated Grabs	Reference No: 1.3
Location in Building: Coal Handling Shed, ground floor (CHG. 2)	
Statement of Significance: The Cranes and Grabs are an integral part of the Coal Handling System. They are representative examples of mid-twentieth century materials-handling technology. The Cranes were designed and made in Sydney specifically for this location and are representative of mid-twentieth century crane technology. The Cranes and Grabs, through their size and configuration, are evidence of the industrial technology of the early 20th century.	
Significance Grading: 1	

Photo:



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Item: The Cranes and Associated Grabs	Reference No: 1.3

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The two Grab Cranes were designed and manufactured in 1950 by Morison and Bearby Ltd, Newcastle, Australia. Their maximum load is given as five tons main, and there is no entry on the auxiliary maximum load. The registered number of the northernmost crane is E5229. The second crane is also by Morison and Bearby and bears the registered number E5228.

The Cranes themselves consist of two large ‘I’ Beams which support the total structure. On both sides, the ‘I’ Beams themselves are about 1.5 metres apart, and both have external walkways which are mounted on angle iron brackets. Electric power of unknown voltage but possibly 600 volts DC was supplied to both Cranes by a series of four wires which ran over brown roller insulators attached to brackets on the northern crane rail beam.

It was not possible to get to cabin level but, as with most cranes, it is believed it will hold three motor controllers that operated the three motors of the Crane — one for longitudinal movement, one for transverse movement of the carriage, and the third to operate the hoist. The hoist operated the grab at the same time. The grab was lowered into a truck and, on hoisting, it first closed the jaws of the grab and then lifted the grab which was then full of coal.

Intactness and Condition:

- The item appears to be structurally sound
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion
- The paint system has broken down and the item exhibits a degree of corrosion

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.

Item: Screens	Reference No: 1.4

Location in Building:

Coal Handling Shed, ground floor (CHG. 2, CHG. 3)

Statement of Significance:

The screens for the rail and lorry delivery of coal evidence the change from rail delivery to delivery by motor lorry. The grates are an integral part of the coal-handling system and, although simple in construction and detail, are dominant features of the coal terminal and indicate its mode of operation.

Significance Grading: 2

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Screens	Reference No: 1.4

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The north and south ends of the Coal Handling System were originally open to allow the entry and exit of railway coal wagons on a single set of tracks located close to the western wall. Originally, the rail tracks had run through the building but, at some stage, a series of heavy rails, which now form the motor lorry discharge screen, was laid transversely across the rail tracks, preventing through-travel. The rail tracks are themselves supported on massive steel plate girders which run the length of the building below ground level. All rail trucks were pushed through the shed by engine or by fettlers or they were dragged through by a cable turned on the Capstan located on the south side of the shed.

The Screens are located to either side of and between the north-south rail track and screened the coal which fell through to be collected by the hoppers above the Conveyors in the basement below. The screens, or "grizzlies", are manufactured from roughly squared sections of approximately 2 x 1.5m. steel strap frame (or bar frame), to which a series of transverse and longitudinal 25mm bars have been welded. The screens could be removed for repair and replacement and several sections are stored on the northern side of the tracks.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.

Conservation Action:

- All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
- Remaining rust should be converted with Emertan or similar.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

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White Bay Heritage Machinery Inventory 2002

Item: Conveyors	Reference No: 1.5

Location in Building:

Coal Handling Shed, ground floor (CHG.1)

Statement of Significance:

The Conveyors throughout the coal terminal are integral elements of the coal-handling system and form part of the original components of the Coal Shed. They evidence the means by which coal flow was regulated and directed to processing and storage points. They are representative examples of mid-twentieth century conveyor technology.

Significance Grading: 2

Photo: No photo available

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White Bay Heritage Machinery Inventory 2002

Item: Conveyors	Reference No: 1.5

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The Conveyors were (or are) of the fabric belt type about 800mm wide supported on steel rollers and powered by large electric motors acting through gearboxes. The longitudinal and transverse Conveyors are now both under water and could not be inspected.

Intactness and Condition:

No comment can be made on the condition.

Conservation Policy:

- The item is to be retained in situ and conserved.

Conservation Action:

- A separate Conservation Plan will have to be prepared at a time when the item can be inspected.

Maintenance Schedule:

A maintenance schedule can only be prepared once decisions have been made concerning the preparation of a conservation plan.

Item: Short Elevator and Motors	Reference No: 1.6

Location in Building:

Coal Handling Shed, ground floor (CHG. 3)

Statement of Significance:

The Short Elevators and their Motors are integral parts of the Coal Handling System. They evidence the use of predominantly English technology in all aspects of the power station. The items are sturdy and functional and are representative examples of post World War II coal-elevating equipment.

Significance Grading: 2

Photo:

Item: Short Elevators and Motors	Reference No: 1.6

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The Short Elevator to the north is designated 'A' while the southern Short Elevator is designated 'B'. The Short Elevators consist of a series of buckets shaped like inverted rectangular prisms, measuring about 600mm wide, 300mm deep and 300mm across. These are attached by a shaft on the inner lip, to which two wheels running on a rail or guide then pass over a massive cog at the top. They are powered by large electric Motors, horizontally mounted, which run into a worm gear box, then into a reduction gear box directly attached to the main shaft. The Motors were manufactured by Crompton Parkinson; the main drive gear box has no markings, but the worm gear box was manufactured by CNJ. The main shaft of the Elevator has a bearing on either side of the case which is lubricated by small oil bottles to each side.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.

Conservation Action:

- Initial investigation indicates the following action should be undertaken.
  - All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
  - Remaining rust should be converted with Emertan or similar.
  - Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.

Item: Coal Crushers	Reference No: 1.7

Location in Building:

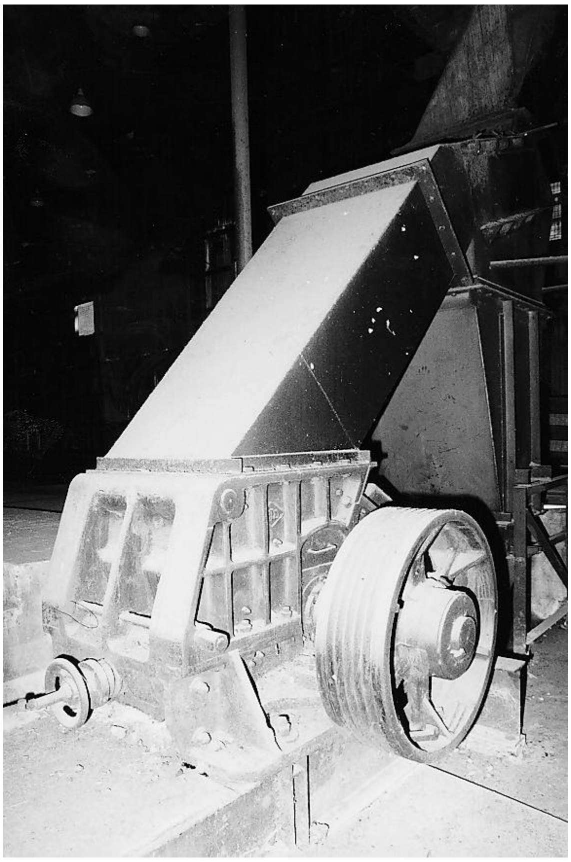
Coal Handling Shed, ground floor (CHG.3)

Statement of Significance:

The Coal Crushers are an integral part of the Coal Handling System. They evidence the use of predominantly English technology in all parts of the power station. They are large and impressive items, with massive cast-iron components which are representative of pre-World War II design for industrial machines. The crushers evidence an intermediate stage in the handling of coal at the power station.

Significance Grading: 2

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Coal Crushers	Reference No: 1.7

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The Coal Crushers are massive, webbed, cast-iron constructions typical of pre-World War II crushing equipment, powered by large electric motors (now missing) through a series of five V-belts. These items, manufactured by British Jeffrey-Diamond Limited, Wakefield England (machine number A1842), represent an earlier stage of machine design, being made completely from cast iron, rather than welded steel sections. The Crushers are of the tooth-type with massive teeth to force the coal through heavy cast-iron fingers reducing to approximately 25mm.

On the third level of the space immediately above the Crushers there are two small electric-driven hoists, powered by a small electric motor. The motor operates through an electromagnetic safety brake into a large gear box. The hoist drum, used for hoisting items from lower levels up to the third level, is approximately 400mm long and 300mm diameter.

Intactness and Condition:

- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion, some very badly corroded elements and some possibly in irreparable condition

Conservation Policy:

- To be conserved and maintained in situ.
- Interpretation to acknowledge integral place in the Power Generating System as well as within the operational history of White Bay Power Station.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action should be undertaken:
  - The pieces should be brushed clean with a soft bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.

White Bay Heritage Machinery Inventory 2002

Item: The 90 Foot Elevators	Reference No: 1.8

Location in Building:

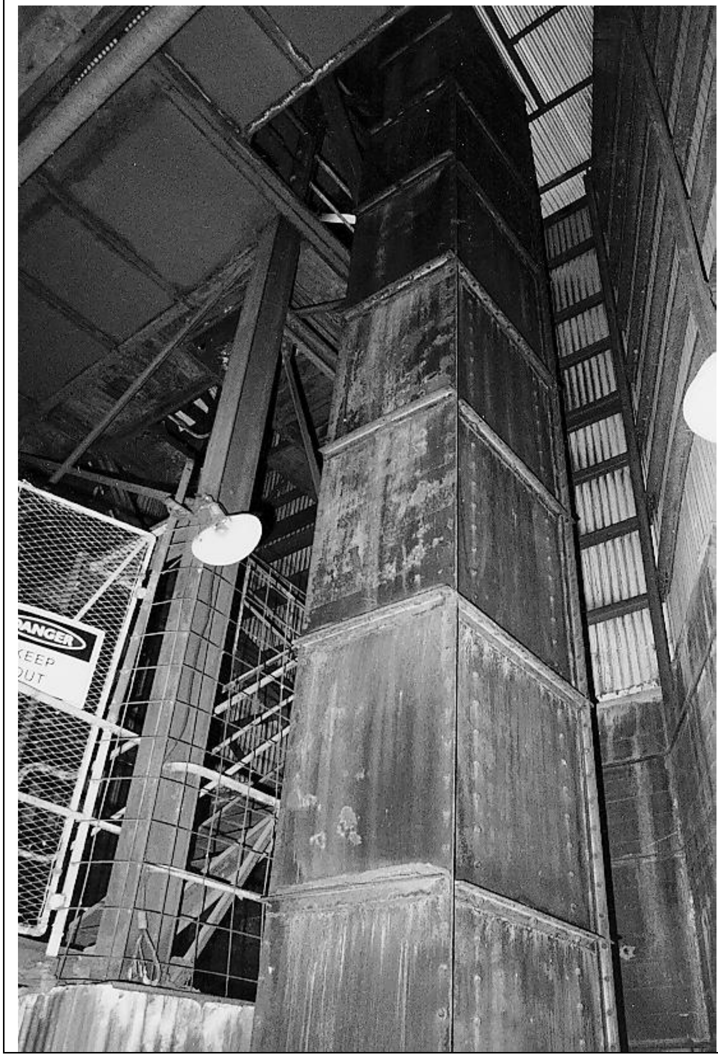
Coal Handling Shed, ground floor (CHG. 3)

Statement of Significance:

The 90 Foot Elevators are an integral part of the Coal Handling System. They evidence the dominance of English technology throughout the power station. They are sturdy and functional industrial items and are representative of coal-elevating equipment of the period immediately after World War II.

Significance Grading: 2

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: The 90 Foot Elevators	Reference No: 1.8

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The two 90 Foot (27m) Elevators are of the bucket type and are designated "A" and "B". The buckets are attached to a pair of continuous flat link chains which passes over a pair of large pulleys driven by an electric motor through a worm gearbox. The Elevator is fully enclosed within a rectangular column of riveted steel plate. These Elevators raises the crushed coal from the crusher level up to the first Transfer House where it is dropped onto the External Conveyor belt and carried to the Boiler House. The Elevator could also tilt uncrushed coal, which bypassed the Crusher, and deposit it in the dry coal store reserve.

Intactness and Condition:

- The items appear to be structurally sound
- The items exhibit a light bloom of rust on the surfaces with areas of deeper corrosion
- The items appear to be functional should a power source be available

Conservation Policy:

- The items are to be retained in situ and conserved.
- A Conservation plan should be prepared for the items.

Conservation Action:

- Initial investigation indicates the following action should be undertaken.
  - All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
  - Remaining rust should be converted with Emertan or similar.
  - Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.

Maintenance Schedule:

- The items should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- The items should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.

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White Bay Heritage Machinery Inventory 2002

Item: Transfer Houses and Equipment	Reference No: 1.9

Location in Building:

Coal Handling Shed, ground floor (CHG. 2.1, CHG 4.2)

Statement of Significance:

The Transfer Houses are an integral part of the Coal Handling System. They have aesthetic qualities as framing elements to the overhead conveyor. The Transfer Houses evidence the methods used to control the transfer of coal from the coal store via Crushers and Elevators to the Hoppers within the Boiler House. The Transfer Houses evidence the predominantly English technology used throughout the power station.

Significance Grading: 2

Photo:

Fax: (02) 9319 4383

White Bay Heritage Machinery Inventory 2002

Item: Transfer Houses and Equipment	Reference No: 1.9

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The Transfer Houses are steel and timber framed corrugated iron structures located a the top of the coal shed and attached to the exterior of the north wall of the Boiler House. The Transfer Houses contain the motors of the Conveyor belts and the Chutes for transferring coal from the Elevators to the Conveyor belts or from one Conveyor to another.

The lower Transfer House surmounts the Coal Handling Shed at the northern end and contains the Motors and gearboxes for powering the 90 Foot Elevators plus the Chutes for transferring coal to the External Conveyor. The upper Transfer House, mounted on the north wall of the Boiler House contains the Motors and gearboxes for the Conveyors as well as the belt tensioning devices.

Intactness and Condition:

- The items appear to be structurally sound.
- The items exhibit a light bloom of rust on its surface with areas of deeper corrosion.
- The machinery contained within the items appear to be functional should a power source be available.

Conservation Policy:

- The items are to be retained in situ and conserved.
- A Conservation Plan is to be prepared for the each transfer house and the equipment contained within

Conservation Action:

- Initial investigation indicates the following action should be undertaken:
  - All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
  - Remaining rust should be converted with Emertan or similar.
  - Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.
  - All machinery and equipment should be weatherproofed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- The machinery should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- The transfer houses, framing and cladding should be inspected annually for structural integrity after initial repairs are executed.

Item: External Conveyor	Reference No: 1.10

Location in Building:

Coal Handling Shed, top level (CH4.1)

Statement of Significance:

The External Conveyor is an integral part of the Coal Handling System. It evidences the method by which coal is transferred from the coal shed to the upper Transfer House (Item No. 1.9) and, ultimately, the Coal Hoppers (Item No. 1.12). The Conveyor is a prominent feature on the northern side of the Boiler House and illustrates the industrial architectural approaches of the period following World War II. It is a representative example of mid-twentieth century conveyor technology.

Significance Grading: 1

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: External Conveyor	Reference No: 1.10

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The External Conveyor is a steel and timber framed corrugated iron clad structure which runs from the lower coal shed Transfer House, to the upper Boiler House Transfer House. It supports the frame and roller system of the Conveyor. The floor of the External Conveyor is timber and steel and timber joists.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item is to be the subject of a Conservation Plan, a vital part of which will be the structural report.

Conservation Action:

- According to Conservation Plan.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

White Bay Heritage Machinery Inventory 2002

Item: Coal Weigher	Reference No: 1.11

Location in Building:

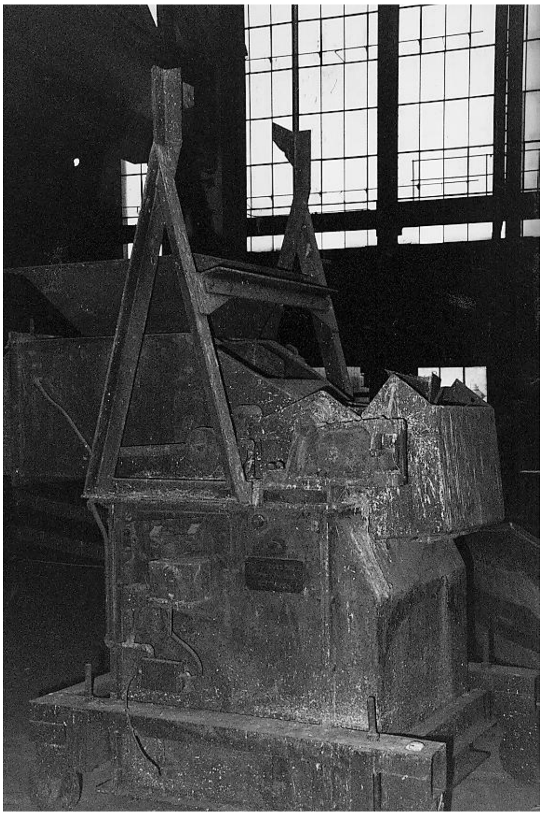
Boiler House, first floor (BH1.4)

Statement of Significance:

The Coal Weigher is an integral element of the Coal Handling System. It evidences the processes and precision of coal delivery to the Mills and Furnaces. The Coal Weigher demonstrates the need for precision in the regulation of coal supply and temperature control for the functioning of the Boilers (Item No. 2.4). The retention of one example only of these Coal Weighers contributes to the historic and research value of this rare item.

Significance Grading: 1

Photo:



Item: Coal Weigher	Reference No: 1.11

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function: From the second Transfer House, attached to the north wall of the Boiler House, the coal was transferred to the high level Hoppers in the Boiler House via the Coal Weighers. The automatic weighing machines measured the amount of coal being fed into the Hoppers and provided a precise measure of coal to each of the Hoppers for combustion.
Intactness and Condition: • The item appears to be structurally sound. • The item exhibits a light bloom of rust on its surface with areas of deeper corrosion. • The item has been subject to some modification.
Conservation Policy: • The item is to be retained in situ and conserved.

Conservation Action:
• Initial investigation indicates the following action should be undertaken.
  • All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
  • Remaining rust should be converted with Emertan or similar.
  • Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.

Maintenance Schedule: • The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: Coal Hoppers	Reference No: 1.12

Location in Building:

Coal Handling Shed, ground floor (CHG. 1)

Statement of Significance:

The Coal Hoppers and Coal Hopper Conveyors and regulators are integral parts of the Coal Handling System. They evidence the way in which coal is transferred from the Coal Handling Shed to the Boiler House. The Hoppers are indicative of the need to have a quantity of coal immediately available to regulate fluctuations in demand. The Hoppers are, through their size and configuration, evidence of the industrial technology of the early 20th century.

Significance Grading: 1

Photo:

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Item: Coal Hoppers	Reference No: 1.12

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The Hoppers are large welded steel tanks, parabolic in section, reinforced with gussets, supported by steel trusses high in the Boiler House. They are each equipped with a rectangular pyramidal chute, made in steel plates at their lower end which fed coal into the mill feed Chutes (Item No. 2.2). The delivery of coal was regulated by pneumatically controlled gates.

Intactness and Condition:

- The items appear to be structurally sound.
- The items exhibit a light bloom of rust on its surface with some very badly corroded elements and some possibly in irreparable condition.

Conservation Policy:

- The item should be the subject of a Conservation Plan prior to any action which intervenes in the fabric. An essential part of a Conservation Plan will be the structural assessment.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: Coal Handling Control Room	Reference No: 1.13

Location in Building:

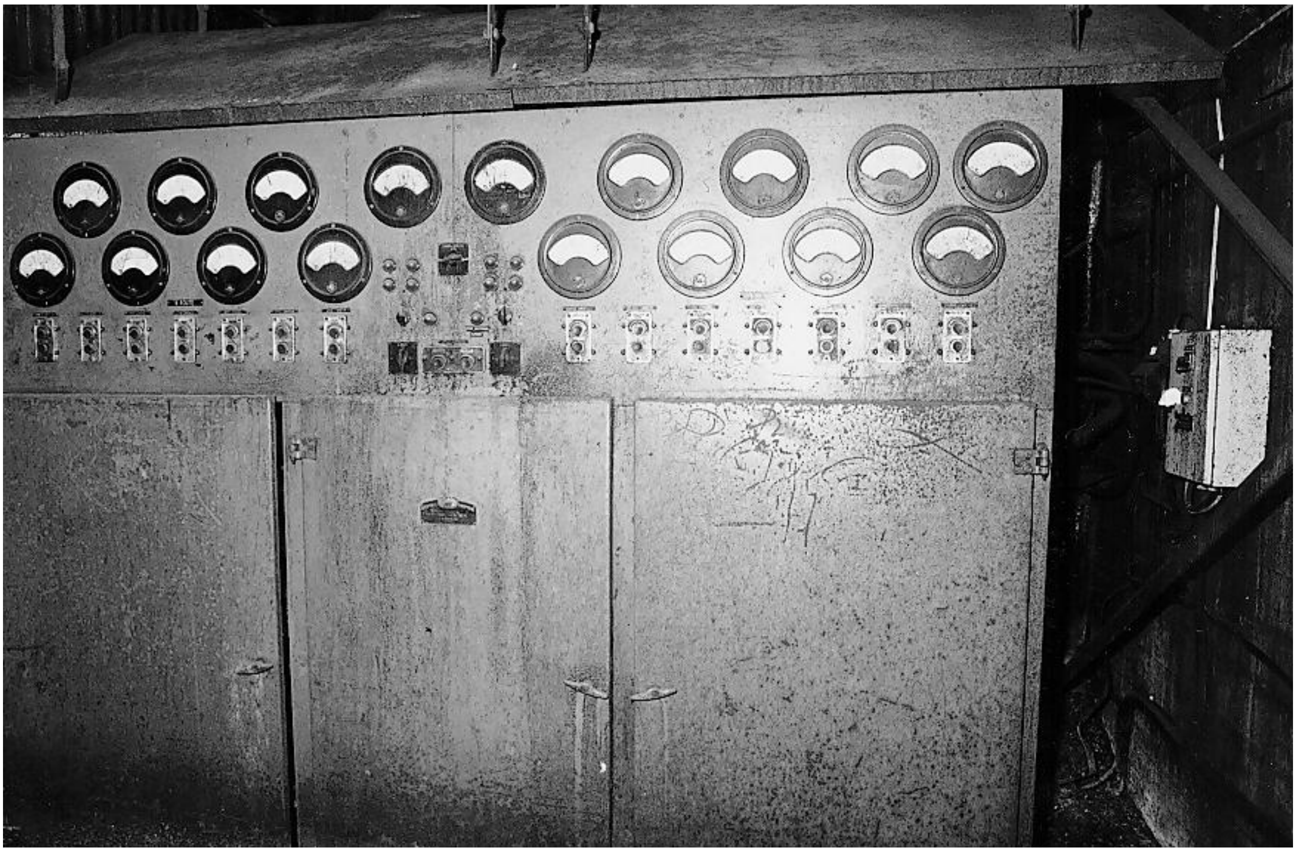
Coal Handling, ground floor (CHG. 4)

Statement of Significance:

The Coal Handling Control Room is an integral part of the Coal Handling System. The Control Room illustrates the way in which the coal was delivered as regulated quantities via the Conveyors and Elevators to the coal store and the Crushers and, via the External Conveyor system, to the Boiler Hoppers. The Control Room switchboard demonstrates the power distribution arrangements within the power station and the decentralised nature of certain operations within the power station.

Significance Grading: 1

Photo:



Item: Coal Handling Control Room	Reference No: 1.13

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The current Coal Handling Shed and associated equipment was constructed and installed between 1950 and 1958.

Description/Function:

The Coal Handling Control Room is located adjacent to the dry coal store to the east and behind the Coal Crushers in the Coal Handling Shed. The small control panel is complete and consists of a single cabinet for controlling the Conveyors and Elevators with a second, smaller, panel which controlled the lighting and some of the auxiliary power systems. The main cabinet has what is known as the A-root system and the B-root system. Each consists of seven sets of stop/go buttons, a series of indicator lights and, a series of seven ammeters to measure the current passing into the various motors. This control panel, which was separate from the rest of the control panels throughout the station, simply ran the Coal Handling System.

Mounted in one corner of the control room is a Motor Generator, which obviously produced power for some of the DC Motors within the system and was manufactured by the Machine and Electrical Company Pty Ltd, Sydney. The manufacturers specifications are — Volts 220 – No.5359, KW5 CONT, rpm 1440 July 1948.

Intactness and Condition:

- The item appears to be substantially intact with most of the switchboard and associated items intact. The whole surface is covered in coal dust and could not be fully assessed.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a Conservation Plan prior to any action which intervenes in the fabric

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.

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Item: Steam Raising System	Reference No: 2.0

Location in Building:

Boiler House

Boiler House Ground (BHG)

Boiler House First Level (BH1)

Mezzanine Floor at Bottom of Hoppers (BH2.1)

Statement of Significance:

a. The Steam Raising System is a vital element in the successful functioning of the power station in the harnessing of steam in the generation of electricity.

c. The Steam Raising System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.

e. The Steam Raising System is indicative of the latest advances in engineering design principles and technological advances in the raising of steam for electrical generation at the time of the construction of the power station. An understanding of the Steam Raising System contributes to an understanding of the generation of electrical power and reasons for locating power stations adjacent to coastal areas.

f. The Steam Raising System consists of an integrated system comprising integral elements which are no longer extant at any suburban or rural power station. The Steam Raising System incorporates elements which demonstrate the technological advances of their time and which are now no-longer in use in the generation of electricity.

g. The Steam Raising System is representative of such systems used in the generation of electrical power since the early 20th century. The Steam Raising System at White Bay Power Station represents an operational system comprising a number of integrated elements, some of which are now rare within the industrial milieu.

The Steam Raising System is an integrated system composed of a number of elements which demonstrate early-to-mid twentieth century advances in engineering design and technological development in steam generation. The system incorporates elements that are now rare and are now no longer in use in power generation and, as such, has the ability to enhance our understanding of the technology of steam raising for power generation.

Significance Grading: 1

Photo:

N/A

White Bay Heritage Machinery Inventory 2002

Item: Steam Raising System	Reference No: 2.0

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to its acquisiton by the Electricity Commission. A section of the old Boiler House was demolished in order to construct a new section with boiler capacity. The new HP (high pressure) Boiler House consisted of the four Babcock and Wilcox boilers installed between 1951 and 1958, and remained in use until the mid 1980s when the station was used only as a Standby plant and eventually decommissioned. The Low Pressure Boiler House consisted of nine units installed in 1926 and 1927, which were progressively removed after 1975.

Description:

The Steam Raising System was centred in the Boiler House and functioned to provide steam at specified temperature and pressure to the turbines in the Turbine Hall, where it was utilised to produce electricity by the Power Generation System. Steam was raised in boilers which burned coal and produced ash. The steam was manufactured from water provided by the Feedwater System. Steam was condensed back into water in condensers, located below the turbines, which were cooled by the Circulating water System. Ash was disposed of by the Ash Handling System.

The Steam Raising System consists of:

2.1 Pulverising Mill
2.1a) Drive Motor
2.1b) Fan Motor
2.2 Chutes from Hopper to Mill
2.3 The Pulverised Fuel Feed Pipes
2.4 The Boiler
2.4a) The Furnace
2.4b) Superheaters
2.4c) Attemperators
2.4d) Economisers
2.4e) Air Heaters
2.4f) Air Ducts
2.5 Forced Draft Fans
2.6 The Headers
2.7 Oil Heater Pumps and Valves
2.8 The Stacks
2.9 Soot Blower Cabinet
2.10 The Boiler Control Room

Intactness and Condition:

See individual items

Conservation Policy:

See individual items

Conservation Action:

See individual items

Maintenance Schedule:
See individual items

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White Bay Heritage Machinery Inventory 2002

Item: Pulverising Mill	Reference No: 2.1
Location in Building: Boiler House, ground floor (BHG.1)	
Statement of Significance: The Coal Pulverising Mills are an integral part of the Steam Raising System. The Mills are large complex assemblages which are impressive in size and configuration and dominate the Boiler House basement. They are representative examples of immediate post-war industrial plant. The Mills and their stand-alone primary Drive Motor and massive Fan Motor illustrate the influence of English technology on Australian power station design. The Mills evidence the efficiency of pulverised fuel boiler technology which superseded the solid coal boilers of earlier years. The Mills contain information on the design and operation of Pulverising Mills.	
Significance Grading: 1	

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Pulverising Mill	Reference No: 2.1

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section to contain the new boilers. The first two boilers were installed between 1951 and 1952. A further two were installed in 1958.

Description/Function:

The Pulverising Mills were located on the basement floor of the Boiler House. Each Mill stands about 3m high and consists of a cast-iron plinth with cast-iron superstructure on which are two massive steel doors and hold-down bolts. Each mill unit possesses a massive 100 HP Driving Motor (Item No. 2.1a), a 100 HP Electric Motor (Item No. 2.1b) driving a massive fan and two auxiliary motors located on the mill frame itself. Coal enters through the square Chute and distributed into the central crushing chamber of the Mill, which has a constantly spinning floor plate.

The crushing chamber includes a number of heavy cast-steel balls (average diameter of 300mm) which are also spun and pulverise the coal into a fine powder. Pulverised coal, when small enough, passes to the saucer-like annulus immediately beyond the crushing ring where it is mixed with high volumes of preheated air pushed by the massive fan and the air-fuel mixture flows upwards through an overhead duct, through a final separator into the single Fuel Feeder pipe (Item No. 2.3).

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- Initial investigation indicates the following action should be undertaken:
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
  - Remaining rust should be converted with Emertan or similar.
  - Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.

Maintenance Schedule:

- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.

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White Bay Heritage Machinery Inventory 2002

Item: Mill: a) Drive Motor	Reference No: 2.1a

Location in Building:

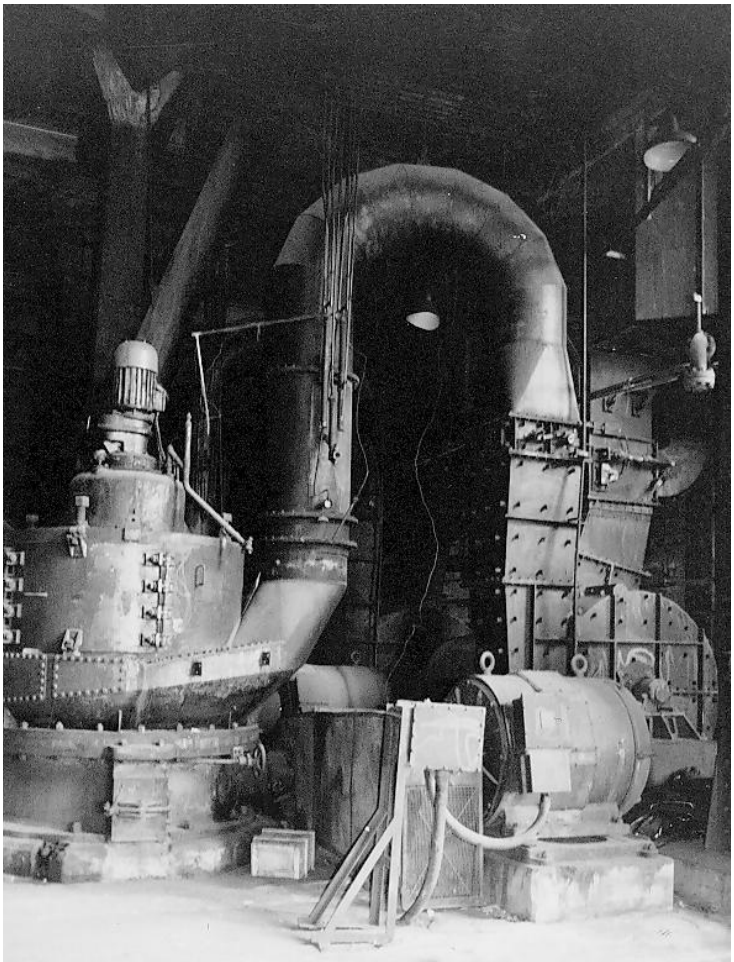
Boiler House, ground floor (BHG1)

Statement of Significance:

The Coal Pulverising Mills are an integral part of the Steam Raising System. The Mills are large complex assemblages which are impressive in size and configuration and dominate the Boiler House basement. They are representative examples of immediate post-war industrial plant. The Mills and their stand-alone primary Drive Motor and massive Fan Motor illustrate the influence of English technology on Australian power station design. The Mills evidence the efficiency of pulverised fuel boiler technology which superseded the solid coal boilers of earlier years. The Mills contain information on the design and operation of Pulverising Mills.

Significance Grading: 1

Photo:



Item: Mill: a) Drive Motor	Reference No: 2.1a

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section to contain the new boilers. The first two boilers were installed between 1951 and 1952. A further two were installed in 1958.

Description/Function:

Coal is gravity fed into the Mill through pipes, and ground to a powder form by large steel balls inside, powered by the Drive Motor.

The main Driving Motor for each of the Pulverising Mills is Lancashire Dynamo and Crypto Co Ltd, rated at 100 BHP and operating at 1470 rpm. Their size is given as ET 3H 28M4. The date of manufacture is given as 1951 and the Serial Number of the eastern mill is 237496. The nameplates are missing from the middle and the northern driving motors.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action should be undertaken:

  The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on a monthly basis.

Item: Mill: b) Fan Motor	Reference No: 2.1b

Location in Building:

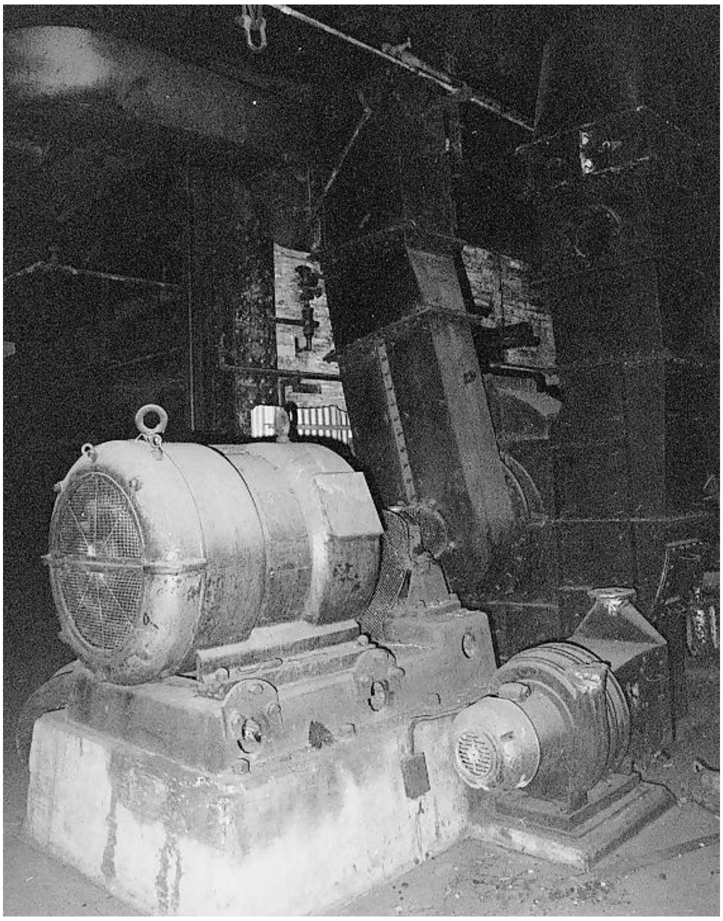
Boiler House, ground floor (BHG1)

Statement of Significance:

The Coal Pulverising Mills are an integral part of the Steam Raising System. The Mills are large complex assemblages which are impressive in size and configuration and dominate the Boiler House basement. They are representative examples of immediate post-war industrial plant. The Mills and their stand-alone primary Drive Motor and massive Fan Motor illustrate the influence of English technology on Australian power station design. The Mills evidence the efficiency of pulverised fuel boiler technology which superseded the solid coal boilers of earlier years. The Mills contain information on the design and operation of Pulverising Mills.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Mill: b) Fan Motor	Reference No: 2.1b

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section to contain the new boilers. The first two boilers were installed between 1951 and 1952. A further two were installed in 1958.

Description/Function:

The Fuel Injection Fans are manufactured by Babcock and Wilcox Pty Ltd, of Renfrew and London and their Motors manufactured by Lancashire Dynamo and Crypto Co Ltd, Manchester and Willesden, Trafford Park Works, Manchester. Each Motor is a 100 BHP SCR Induction Motor utilising 26 amps at 2200 volts and operating at 1450 rpm. It is rated as a continuous, three-phase, 50 Hz Motor.

The eastern Motor is the only Motor with a manufactures plaque. Its size specification is ET 26 M4, its serial number is 223534 and the date of manufacture is given as 1948.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
- All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
- All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
- No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on a monthly basis.

Item: Chutes from Hopper to Mill	Reference No: 2.2

Location in Building:

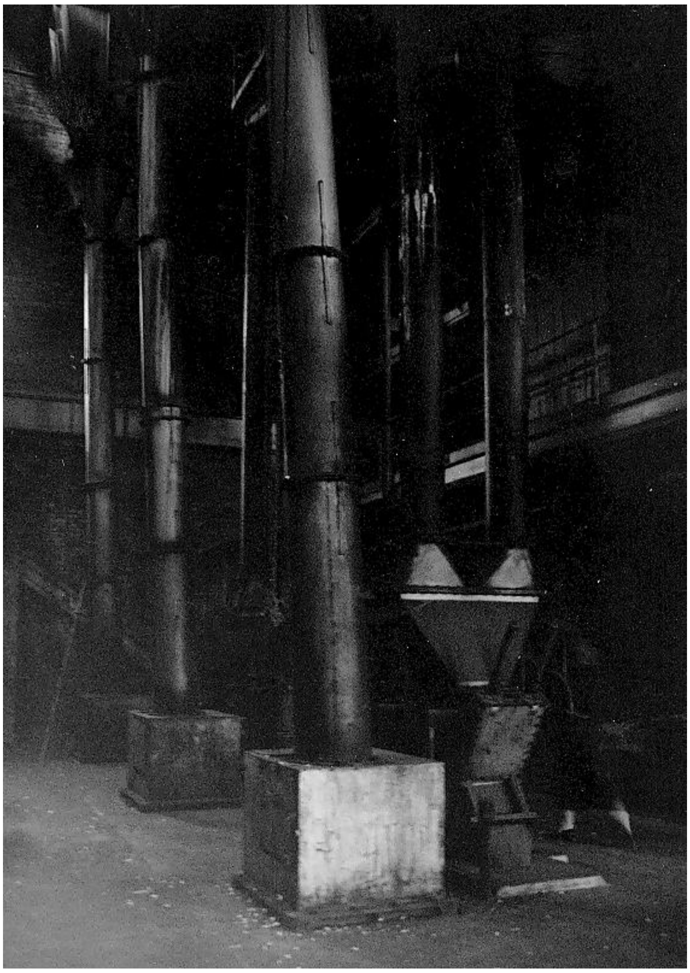
Boiler House, first and second floors (BH1.1, BH2.2)

Statement of Significance:

The Chutes through which the coal is deposited into the Mills are integral components in the process of transfer of the coal from the Coal Handling System to the Steam Raising System. The chutes evidence the travel of the coal from the Hopper to the Mills and are highly visible items within both the firing floor and the basement. The retention of one set only of these chutes contributes to the historic and research value of this rare item.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Chutes from Hopper to Mill	Reference No: 2.2

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section to contain the new boilers. The first two boilers were installed between 1951 and 1952. A further two were installed in 1958.

Description/Function:

Chutes, made from cylinders of welded steel, lead from the coal bunkers above down to the Pulverising Mills (Item No. 2.1). When utilised, Coal Weighing machines were inserted between the Chute and Mill.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface.
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.

Conservation Action:

- Initial investigation indicates the following action should be undertaken:
  - Remaining rust should be converted with Emertan or similar.
  - Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: The Pulverised Fuel Feed Pipes	Reference No: 2.3

Location in Building:

Boiler House, ground and first floors (BHG1.1 and BH1.1)

Statement of Significance:

The Pulverised Fuel Feed Pipes are an integral part of the Steam Raising System. Pipes form a complex arrangement in the firing floor space and are a visually evocative industrial element in the system. They evidence the way in which pulverised coal was transferred pneumatically from Mill (Item No. 2.1) to the Boiler (Item No. 2.4).

Significance Grading: 1

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: The Pulverised Fuel Feed Pipes	Reference No: 2.3

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section to contain the new boilers. The first two boilers were installed between 1951 and 1952. A further two were installed in 1958.

Description/Function:

At White Bay, each of the outer two Pulverising Mills has a single Pulverised Fuel Feeder Pipe which leads up to the floor above, where it enters a distribution box. The central Mill has two Fuel Feeder pipes, one leading into each of the other two distribution boxes of the Mills of either side, allowing it to substitute for either.

Each pair of Fuel Feeder Pipes entered the Distribution box where a two-way valve split the flow into four main risers. These risers are again divided to form eight Pulverised Fuel Feeder Pipes, which entered the burner box of the Boiler. The feeder Pipes entered the Boiler (Item No. 2.4) in such a way that the coal feed, when controlled by the two-way pulverising fuel valve, produced even and optimum combustion.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface.
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.

Conservation Action:

- Initial investigation indicates the following action should be undertaken:
  - Remaining rust should be converted with Emertan or similar.
  - Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

White Bay Heritage Machinery Inventory 2002

Item: The Boiler	Reference No: 2.4

Location in Building:

Boiler House, first floor (BH1.1)

Statement of Significance:

The No. 1 Boiler is the principal element in the Steam Raising System. The Boiler illustrates, through its massive size and configuration, the development of steam-raising technology in the period between the war and the 1970s and the tubes, Economisers, heated and cool Air Ducts, Furnace and other surviving elements provide evidence of the operation of the Boiler in the raising of steam. The Boiler, with its visible steam pipes, tank and suspension springs, is a massive industrial item evocative of older technologies and industrial environments now rarely seen. The No. 1 Boiler at White Bay is the only example of its type to be retained in situ within a power station environment and has the potential to provide information on the raising of steam not available from other sources.

Significance Grading: 1

Photo:

Fax: (02) 9319 4383

White Bay Heritage Machinery Inventory 2002

Item: The Boiler	Reference No: 2.4

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section. The first two boilers were installed between 1951 and 1952. A further two were installed in 1958. The new HP (high pressure) Boiler House remained in use until the mid 1980s when the station was used only as a Standby plant and eventually decommissioned. The nine units in the low pressure Boiler House, installed between 1926 and 1927, were progressively removed after 1975, and the building was subsequently demolished.

Description/Function:

The Boilers at White Bay were Babcock and Wilcox pulverised solid fuel type fitted with Economisers (Item No. 2.4d) and Attemperaters (Item No. 2.4c), two per Boiler, and Superheaters (Item No. 2.4b). The fuel was picked up in the Pulverising Mill (Item No. 2.1) by hot air and pumped into the Furnace (Item No. 2.4a). The air was heated prior to being fed into the Boiler by passing it through an Air Pre-heater which consisted of a number of tubes encased in a steel shell. Hot exhaust air from the Boiler was passed through the tubes while the primary air which was to be fed to the Boilers passed around the tubes and into the main hot Air Duct (Item No. 2.4f). The Forced-Air Fans (Item No. 2.5), besides delivering this hot air to the Boiler, also fed the tempering ducts directly with cool air which had not been passed through the Pre-heater. Air, either pre-heated or heated air mixed with tempered air, was supplied from the primary Air Duct, which was sometimes called the main forced-air duct, into the Boilers in four ways: mixed with pulverised coal, as primary air entering below and adjacent to the fuel burners, as secondary air at a point beyond the burners, and as side-wall and rear-wall tertiary air.

The asbestos lagging, refractories and much of the steel cladding has been removed from the Boilers leaving their internal tubes visible and enhancing the Boiler's interpretation.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion.
- The item has been subject to some modification and the lagging, cowling and refractories have been removed.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates that remaining rust should be converted with Emertan or similar, and a suitable surface coating applied.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

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Item: The Boiler a) The furnace	Reference No: 2.4a

Location in Building:

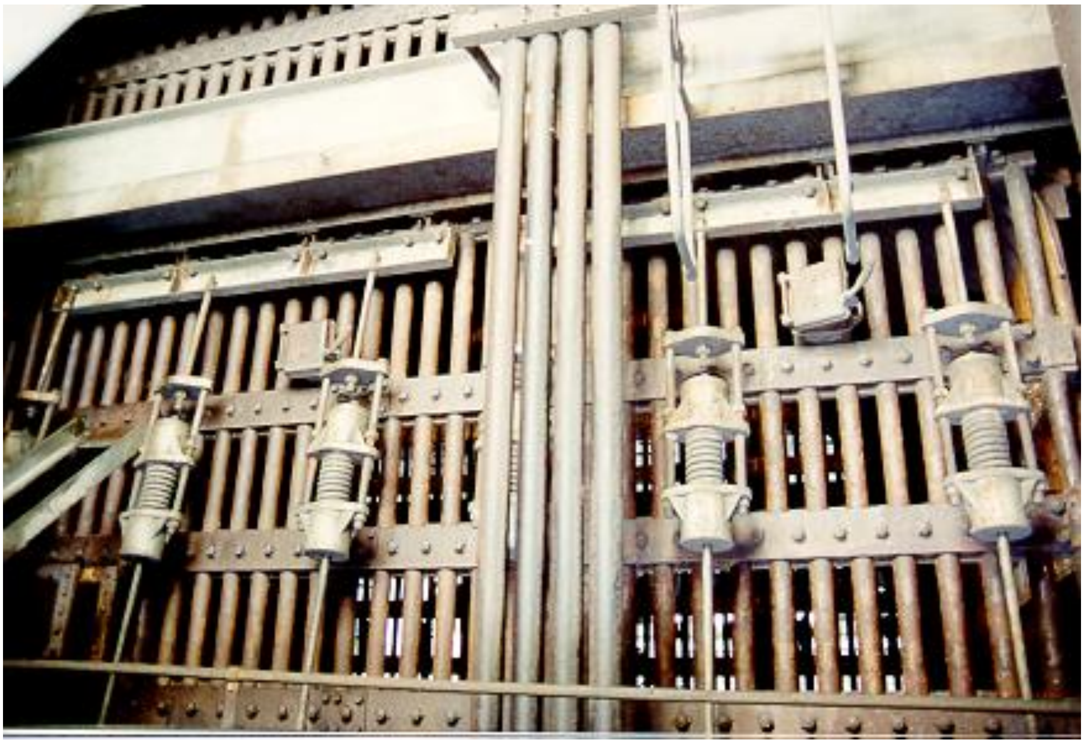
Boiler House, first floor (BH1.1)

Statement of Significance:

As integral elements in the functioning of the Boiler, the Furnace, the Superheaters (Item No. 2.4b), Attemperators (2.4c), Economisers (2.4d), Air Heaters (2.4e) and Air Ducts(2.4f) are closely associated with the heritage values of the Boiler. These individual elements represent the function and the processes by which the feedwater and the pulverised coal are supplied to the Boiler and the processes of steam raising.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: The Boiler a) The furnace	Reference No: 2.4a

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section. The first two boilers were installed between 1951 and 1952. A further two were installed in 1958. The new HP (high pressure) Boiler House remained in use until the mid 1980s when the station was used only as a Standby plant and eventually decommissioned. The nine units in the low pressure Boiler House, installed between 1926 and 1927, were progressively removed after 1975, and the building was subsequently demolished.

Description/Function:

The essential element of a Boiler is the Furnace, a rectangular chamber with refractory lining (firebricks) at the base of the Boiler. Hot air is produced in the Furnace by the combustion of fuel and this hot air is used to heat water to steam. It rises through the Boiler and flows through the various flues to eventually exhaust through the chimney Stack.

At White Bay, the flue gas flowed upwards from the Furnace chamber through the A and B

Superheater tube banks (Item No.2.4b), then passed through the Economiser (Item No. 2.4d), the Air Heaters (Item No. 2.4e) and led out through the Precipitators to the Stacks (Item No. 2.8).

The floor of the Furnace chamber is formed into an inverted pyramid and the majority of ash from the furnace chamber fell into the collection chutes. From here, it was carried out by the Ash Handling System, for disposal. Some ash remained suspended in the flue gas and was removed by a multi-clone grit collector located between the Superheaters and the Economiser and most of the rest was removed by the electrostatic precipitators (now removed) which were located at the base of the chimney Stacks.

Intactness and Condition:

- The item appears to be structurally sound
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion
- The item has been subject to some modification and the lagging, cowling and refractories have been removed

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan before any action which intervenes in the fabric or any reconstruction takes place.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken immediately: any remaining rust should be converted with Emertan or similar and a suitable surface coating applied

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: The Boiler b) Superheaters	Reference No: 2.4b

Location in Building:

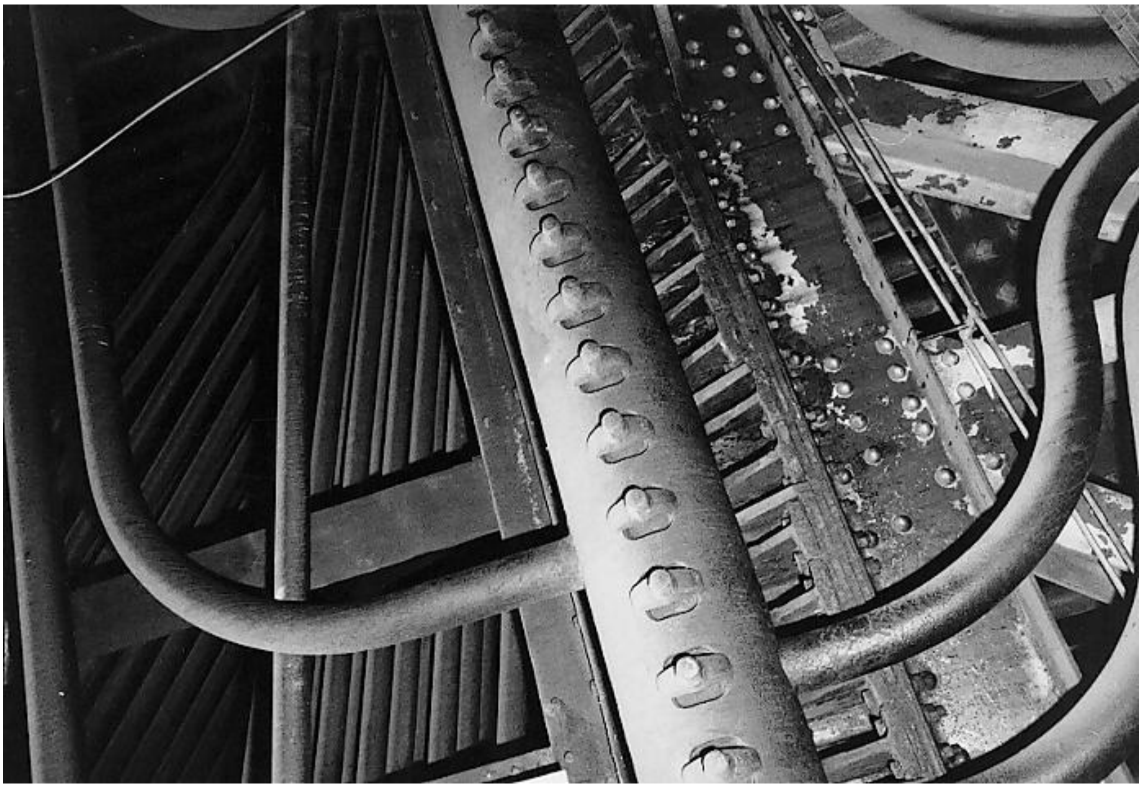
Boiler House, first floor (BH1.1)

Statement of Significance:

As integral elements in the functioning of the Boiler, the Furnace, the Superheaters (Item No. 2.4b), Attemperators (2.4c), Economisers (2.4d), Air Heaters (2.4e) and Air Ducts(2.4f) are closely associated with the heritage values of the Boiler. These individual elements represent the function and the processes by which the feedwater and the pulverised coal are supplied to the Boiler and the processes of steam raising.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: The Boiler b) Superheaters	Reference No: 2.4b

History:

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Description/Function:

The Boiler is equipped with a Superheater designed to maintain a controlled steam outlet temperature. The Superheaters are a set of Boiler tubes carrying steam which was produced from feedwater in the lower part of the Boiler. After conversion from water, the steam is continually heated in the Superheater tubes until the desired output temperature is achieved.

Intactness and Condition:

- The item appears to be structurally sound
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion
- The item has been subject to some modification and the lagging, cowling and refractories have been removed

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- Initial investigation indicates the following action may be undertaken immediately:
  - Any remaining rust should be converted with Emertan or similar rust convertor and a suitable surface coating applied.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: The Boiler c) Attemperators	Reference No: 2.4c

Location in Building:

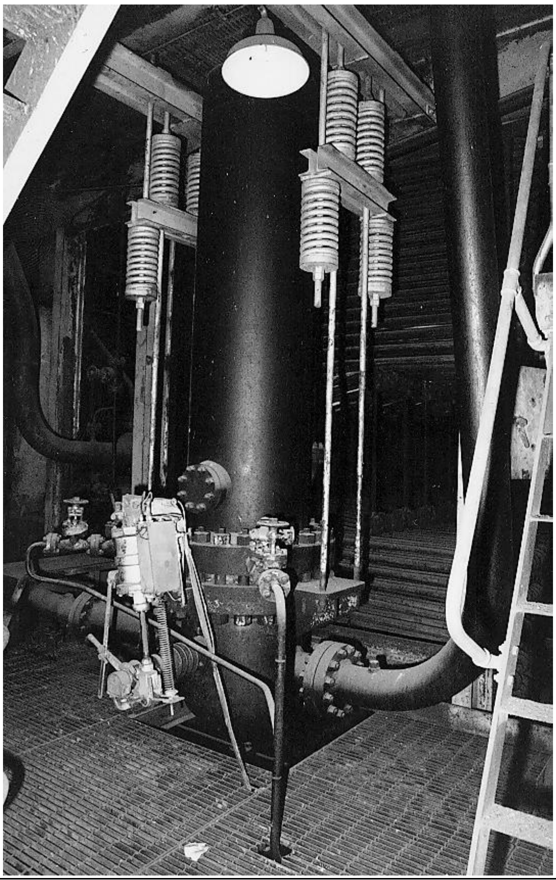
Boiler House, first floor (BH1.1)

Statement of Significance:

As integral elements in the functioning of the Boiler, the Furnace, the Superheaters (Item No. 2.4b), Attemperators (2.4c), Economisers (2.4d), Air Heaters (2.4e) and Air Ducts(2.4f) are closely associated with the heritage values of the Boiler. These individual elements represent the function and the processes by which the feedwater and the pulverised coal are supplied to the Boiler and the processes of steam raising.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: The Boiler c) Attemperators	Reference No: 2.4c

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

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Description/Function:

The Attemperators are a large steel cylinders located on an upper floor of the Boiler. They are probably associated with the earlier Turbo-Alternator Sets installed in 1925-1928. They reduce the temperature of the steam produced by the new Babcock and Wilcox Boilers which were installed during the third, 1950s, phase at White Bay. The new Boilers produced steam at a higher temperature than the early Turbo-Alternators could process so the Attemperators brought the temperature down to a more manageable level. These Turbo-Alternators were rarely used after 1958 and were decommissioned in 1978, rendering the Attemperators obsolete.

Intactness and Condition:

- The item appears to be structurally sound
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion
- The item has been subject to some modification and the lagging has been removed

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric

Conservation Action:

- Initial investigation indicates the following action may be undertaken immediately:
  - Any remaining rust should be converted with Emertan or similar, and an appropriate surface coating applied.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: The Boiler d) Economisers	Reference No: 2.4d

Location in Building:

Boiler House, first floor (BH1.1)

Statement of Significance:

As integral elements in the functioning of the Boiler, the Furnace, the Superheaters (Item No. 2.4b), Attemperators (2.4c), Economisers (2.4d), Air Heaters (2.4e) and Air Ducts(2.4f) are closely associated with the heritage values of the Boiler. These individual elements represent the function and the processes by which the feedwater and the pulverised coal are supplied to the Boiler and the processes of steam raising.

Significance Grading: 1

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: The Boiler d) Economisers	Reference No: 2.4d

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section. The first two boilers were installed between 1951 and 1952. A further two were installed in 1958. The new HP (high pressure) Boiler House remained in use until the mid 1980s when the station was used only as a Standby plant and eventually decommissioned. The nine units in the low pressure Boiler House, installed between 1926 and 1927, were progressively removed after 1975, and the building was subsequently demolished.

Description/Function:

The Economiser is a chamber containing a set of pipes carrying incoming feedwater on its way from the Condensers to the Boiler Furnace. The passing flue gases heat the feedwater prior to its entry to the Boiler, thus minimising the heating energy required in the Furnace.

Intactness and Condition: • The item appears to be structurally sound • The item exhibits a light bloom of rust on its surface with areas of deeper corrosion • The item has been subject to some modification and the lagging, cowling and refractories have been removed
Conservation Policy: • The item is to be retained in situ and conserved. • The item should be the subject of a conservation plan prior to any action which intervenes in the fabric
Conservation Action: • The item is to be investigated in detail prior to any action which intervenes in the fabric of the item. • Initial investigation indicates the following action may be undertaken immediately: • Any remaining rust should be converted with Emertan or similar, and a suitable surface coating applied.
Maintenance Schedule: • The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

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White Bay Heritage Machinery Inventory 2002

Item: The Boiler e) Air heaters	Reference No: 2.4e
Location in Building: Boiler House, first floor (BH1.1)	

Statement of Significance:

As integral elements in the functioning of the Boiler, the Furnace, the Superheaters (Item No. 2.4b), Attemperators (2.4c), Economisers (2.4d), Air Heaters (2.4e) and Air Ducts(2.4f) are closely associated with the heritage values of the Boiler. These individual elements represent the function and the processes by which the feedwater and the pulverised coal are supplied to the Boiler and the processes of steam raising.

Significance Grading: 1

Photo:

Item: The Boiler e) Air Heaters	Reference No: 2.4e

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section. The first two boilers were installed between 1951 and 1952. A further two were installed in 1958. The new HP (high pressure) Boiler House remained in use until the mid 1980s when the station was used only as a Standby plant and eventually decommissioned. The nine units in the low pressure Boiler House, installed between 1926 and 1927, were progressively removed after 1975, and the building was subsequently demolished.

Description/Function:

The Air Heaters are of the cross floor tubular type of two banks arranged in parallel with a total of 1878 tubes, by Babcock and Wilcox. The tubes are approximately 65mm diameter, and 10m long and have a total heating surface of 4500 square meters, with four air passes. The hot gases entered the air preheater tubes directly from the multiclone collectors and is discharged into the electrostatic precipitators and thence the Stack. The heated air is forced through the Forced Draft Fans (Item No. 2.5).

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion.
- The item has been subject to some modification and the lagging, cowling and refractories have been removed.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- Initial investigation indicates the following action may be undertaken immediately:
    - any surface rust should be converted with Emertan or similar converter and an appropriate surface coating applied.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.
- If necessary, the surface should be recoated on a monthly basis.

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White Bay Heritage Machinery Inventory 2002

Item: The Boiler f) Air Ducts	Reference No: 2.4f

Location in Building:

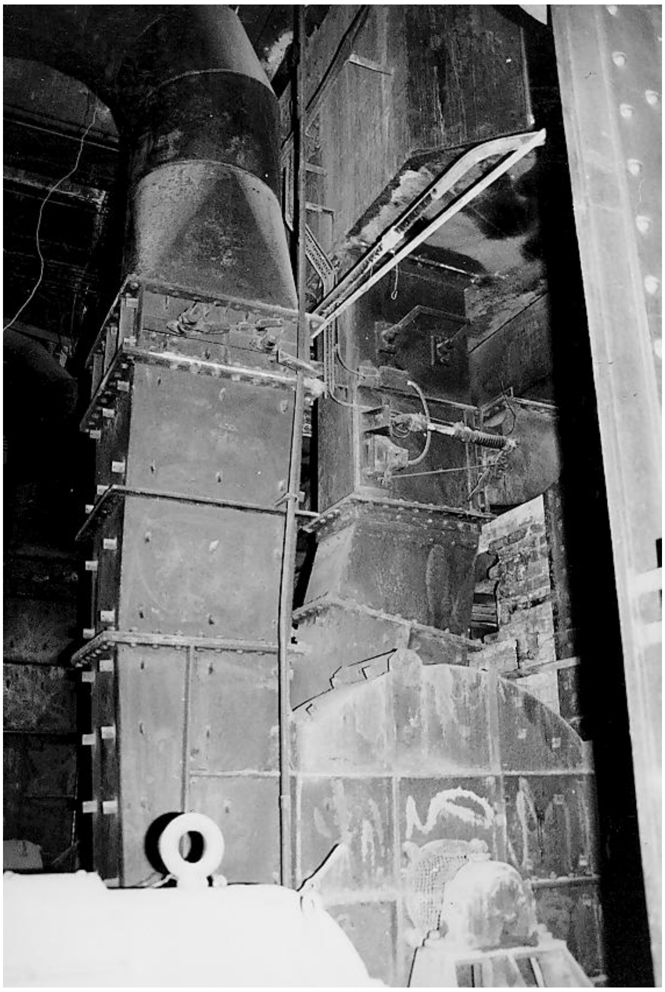
Boiler House, first floor (BH1.1)

Statement of Significance:

As integral elements in the functioning of the Boiler, the Furnace, the Superheaters (Item No. 2.4b), Attemperators (2.4c), Economisers (2.4d), Air Heaters (2.4e) and Air Ducts(2.4f) are closely associated with the heritage values of the Boiler. These individual elements represent the function and the processes by which the feedwater and the pulverised coal are supplied to the Boiler and the processes of steam raising.

Significance Grading: 1

Photo:



Item: The Boiler f) Air Ducts	Reference No: 2.4f

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section. The first two boilers were installed between 1951 and 1952. A further two were installed in 1958. The new HP (high pressure) Boiler House remained in use until the mid 1980s when the station was used only as a Standby plant and eventually decommissioned. The nine units in the low pressure Boiler House, installed between 1926 and 1927, were progressively removed after 1975, and the building was subsequently demolished.

Description/Function:

The large Ducts run down wither side of the Boiler and are surmounted by the Air Heaters from where they take air to the Boilers either directly or via the Coal Pulverising Mills (Item No. 2.1). Air is forced through the Duct by the Forced Draft Fans (Item No. 2.5) which are mounted adjacent to the Boiler. Air is split into primary air which passes to the Pulverising Mills and secondary air which enters the Furnace directly.

Intactness and Condition:

- The items appears to be structurally sound
- The items exhibit a light bloom of rust on their surface with areas of deeper corrosion
- The item has been subject to some modification and some of the lagging and cowling has been removed

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric

Conservation Action:

- Initial investigation indicates the following action may be undertaken:
  - Any surface rust may be converted with Emertan or similar converter, and an appropriate surface coating applied.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied.

- If necessary, the surface should be recoated on a monthly basis.

Item: Forced Draft Fans	Reference No: 2.5

Location in Building:

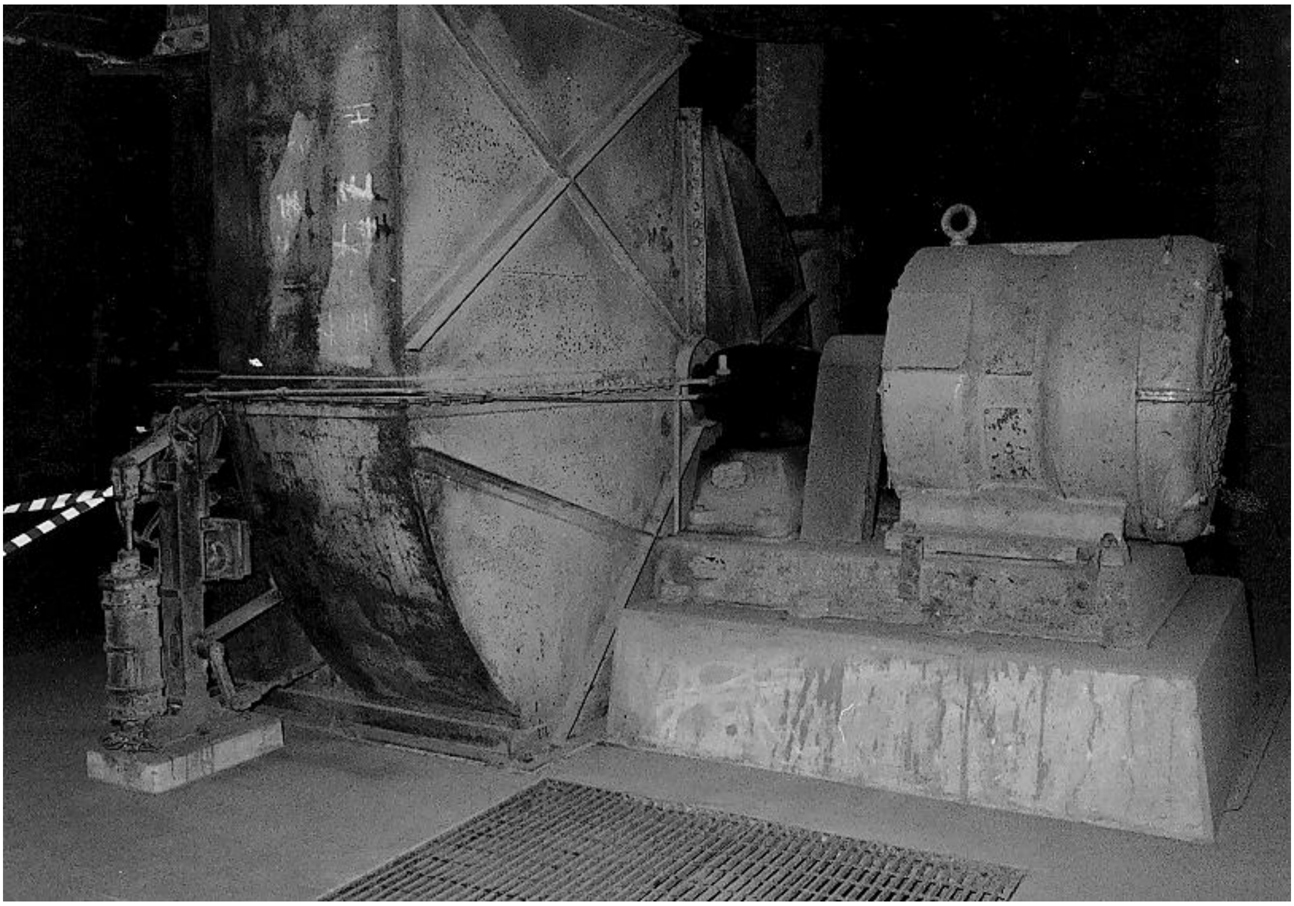
Boiler House, first floor (BH1.1)

Statement of Significance:

The Forced Draft Fans are an integral part of the Steam Raising System. They evidence the operation of the Boiler (Item No. 2.4) and demonstrate the need for massive amounts of air for the combustion of coal in the Furnace (2.4a). The Fans also evidence the predominantly English technology used throughout the power station.

Significance Grading: 1

Photo:



Item: Forced Draft Fans	Reference No: 2.5

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section to contain the new Boilers. The first two Boilers were installed between 1951 and 1952. A further two were installed in 1958.

Description/Function:

The Forced Draft Fans are massive air turbines mounted on the hot Air Ducts (Item No. 2.4f)and located immediately behind the Boiler (Item No. 2.4). They are driven by flexibly coupled 100 horse power motors by Crompton Parkinson.
The hot Air Ducts are divided into primary and secondary Ducts. The Fans force air into the Boilers through the primary duct which passes through the coal Pulverising Mill (Item No. 2.1) and conveys crushed coal fuel to the Furnace (Item No. 2.4a). The secondary Air Ducts provide heated air directly to the Furnace through the secondary and tertiary air inlets.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

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White Bay Heritage Machinery Inventory 2002

Item: The Headers	Reference No: 2.6

Location in Building:

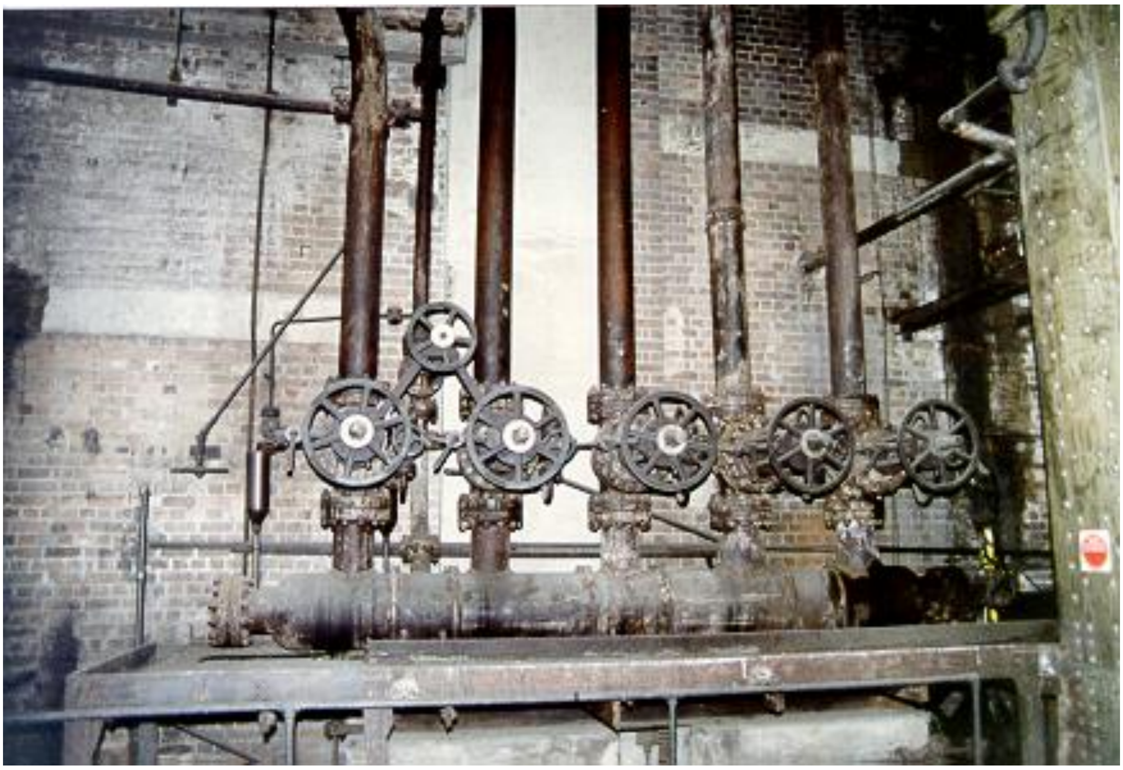
Boiler House, ground floor (BHG 1B)

Statement of Significance:

The Headers are an integral part of the Steam Raising System. Through their associated valves and wheels, they indicate the steam feed to the Turbine Hall and illustrate past industrial processes. The Headers are impressive in their size and configuration and are evocative of the industrial milieu of the early 20th century. The Headers have the potential to yield information on the operation of the Boiler House and the transfer of steam to the Turbine Hall.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: The Headers	Reference No: 2.6

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section to contain the new Boilers. The first two Boilers were installed between 1951 and 1952. A further two were installed in 1958.

Description/Function:

The steam Headers received the initial steam feed from the Boilers (Item No. 2.4) and from here, steam ran to the Turbo Alternator Sets (Item No. 3.2). The steam output was controlled by the valving which could direct the steam flow to Turbo Alternator Sets 1 or 2.
The Headers in the Boiler House consist of a simple (primary) Header pipe with five steam pipes all controlled by valves emanating from it. The lagging and cowling has been removed.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface.
- The lagging and cowling has been removed from the item.
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.
- A Conservation Plan should be prepared for the item.

Conservation Action:

- Initial investigation indicates the following action may be undertaken:
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - The pipes should be dried with hot air.
  - All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
  - Remaining rust should be converted with Emertan or similar.
  - The item should be appropriately coated.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion both internally and externally. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.
- If necessary, the surface should be recoated on a monthly basis.

Item: Oil Heater Pumps and Valves	Reference No: 2.7

Location in Building:

Boiler House, first floor (BH1.1)

Statement of Significance:

The Oil Heater Pumps and Valves are an integral part of the Steam Raising System. They evidence the need for a volatile start-up fuel for pulverised-coal fuelled Boilers and illustrate past industrial processes.

Significance Grading: 2	

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Oil Heater Pumps and Valves	Reference No: 2.7

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section to contain the new Boilers. The first two Boilers were installed between 1951 and 1952. A further two were installed in 1958. The Boilers were usually fed with pulverised or powdered coal. However during the coalminers' strikes of the 1940s and 1950s, bunkering oil was used to fire the Boilers and maintain the power supply. Oil was also used as the start-up fuel when a Boiler was being fired from coal.

Description/Function:

This machinery was used to start the Boilers (Item No. 2.4) after they had been shut down for any reason. Oil was pumped into the Boiler at 110 pounds per square inch with quantities of air. The oil entered the Furnace section and when firing temperature was reached, pulverised coal fuel mixed with air was introduced.

Intactness and Condition:

- The items appear to be structurally sound.
- The paint system has broken down and the items exhibit a degree of corrosion.

Conservation Policy:

- The items are to be retained in situ and conserved.
- A Conservation Plan should be prepared for the item.

Conservation Action:

- Initial investigation indicates the following action may be undertaken:
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from their immediate vicinity with an industrial vacuum cleaner.
  - All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
  - Rust areas should be treated with a rust converter.
  - The item should have an appropriate surface finish applied.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

White Bay Heritage Machinery Inventory 2002

Item: Stacks	Reference No: 2.8

Location in Building:

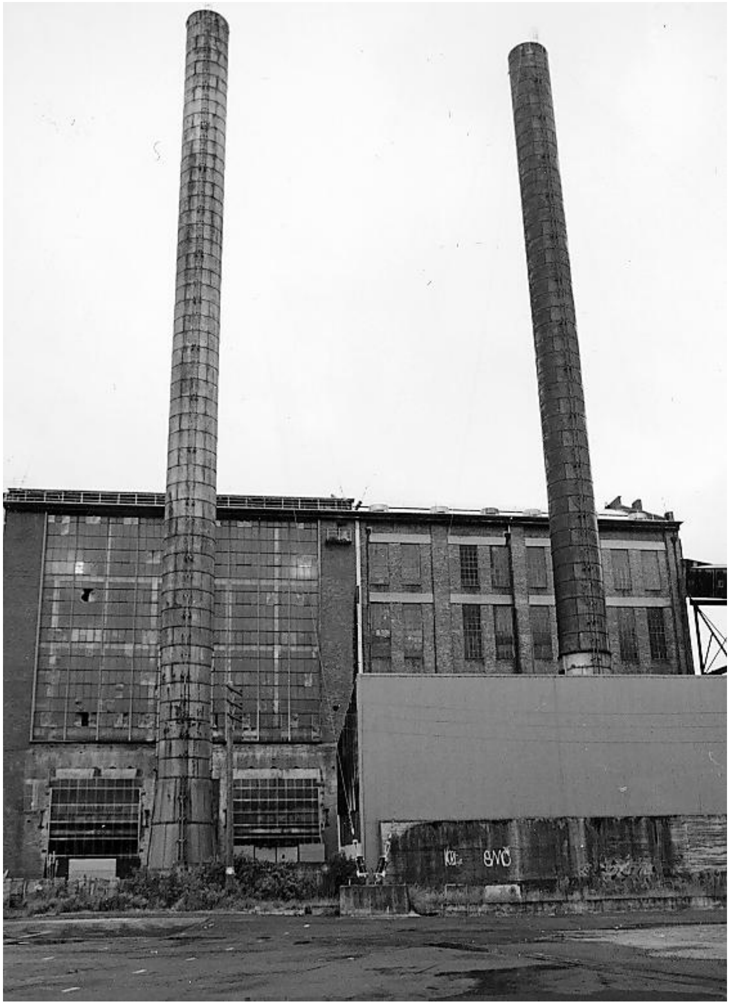
Chimney 1 and Chimney 2

Statement of Significance:

The chimney Stacks are an integral part of the Steam Raising System. They are amongst the most visible landmarks in the area. The Stacks are the most evocative of the power station's elements and are associated with power generation by many people. The Stacks are now rare industrial structures in a region in which they were once common.

Significance Grading: 1

Photo:



Item: Stacks	Reference No: 2.8

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section to contain the new Boilers. The first two Boilers were installed between 1951 and 1952. A further two were installed in 1958.

The two stacks were also constructed between 1951 and 1958, as part of the high pressure system which included the Parsons generators.

Description/Function:

The Stacks were installed with these Boilers in the early 1950s and are approximately 80m high fabricated from riveted steel plate, tapering from base to approximately 9m above ground, then is cylindrical to the top. The flue from the precipitators connected approximately 10m above ground in a narrow slot approximately 1m wide and 8m high on the south side. The base section below the flue entry collected any heavy ash that fell within the Stack and this was removed through a small door on the western side located approximately 1.5m above the ground. The bracing is internal but does not extend to the top of each Stack.

The concrete footings for the Induced Draft Fans are located on the ground on the north and south sides of each Stack but no machinery remains. These fans sucked the gases and micro particles from out of the Boiler, through the electrostatic precipitators (also removed from their former location between the Boiler House and the Stacks) and forced it up the Stack.

Intactness and Condition:

- The items appear to be structurally sound.
- The items exhibit a light bloom of rust on the surface (internally) with some very badly corroded elements.
- The paint system has broken down and the items exhibit a degree of corrosion.

Conservation Policy:

- The items are to be retained in situ and conserved.
- The items should be the subject of a Conservation Plan prior to any action which intervenes in the fabric.

Conservation Action:

- The items are to be investigated in detail prior to any action which intervenes in the fabric of each item.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- If necessary, the surface should be recoated.

Item: Soot Blower Cabinet	Reference No: 2.9

Location in Building:

Boiler House, first floor (BH1.1)

Statement of Significance:

The Soot Blower Cabinet is integral to the operation of the Steam Raising System. As the operating panel for the remote control for the Soot Blower (now removed), it is the visible evidence of the need to control the deposition of soot on the Boiler tubes. The retention of one example only of the original thirteen Soot Blower Cabinets, in the light of the removal of the Soot Blowers, contributes to the historic and research value of this rare item.

Significance Grading: 2

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Soot Blower Cabinet	Reference No: 2.9

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler House was demolished in order to construct a new "B" Section to contain the new Boilers. The first two Boilers were installed between 1951 and 1952. A further two were installed in 1958.

Description/Function:

Some of the ash particles suspended in the air, called soot, within the Boiler settles upon the top surfaces of the water tubes within the Boiler chamber. Soot is a thermal insulator and, for continued Boiler efficiency, this soot must be regularly removed. For this purpose, a set of Soot Blowers, compressed-air lances which were inserted into the Boiler along special tracks, was installed in the Boiler. The only remaining element of

the Soot Blowers is the operating panel.
Intactness and Condition: • The item appears to be structurally sound. • The item exhibits a light bloom of rust on its internal surface.
Conservation Policy: • The item is to be retained in situ and conserved. • The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:
• The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
• Initial investigation indicates the following action may be undertaken:
  • The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  • Heavy rust is to be brushed to sound metal and a rust converter applied.
  • Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.
  • All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  • No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule: • The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis. • The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

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White Bay Heritage Machinery Inventory 2002

Item: Boiler Control Room	Reference No: 2.10

Location in Building:

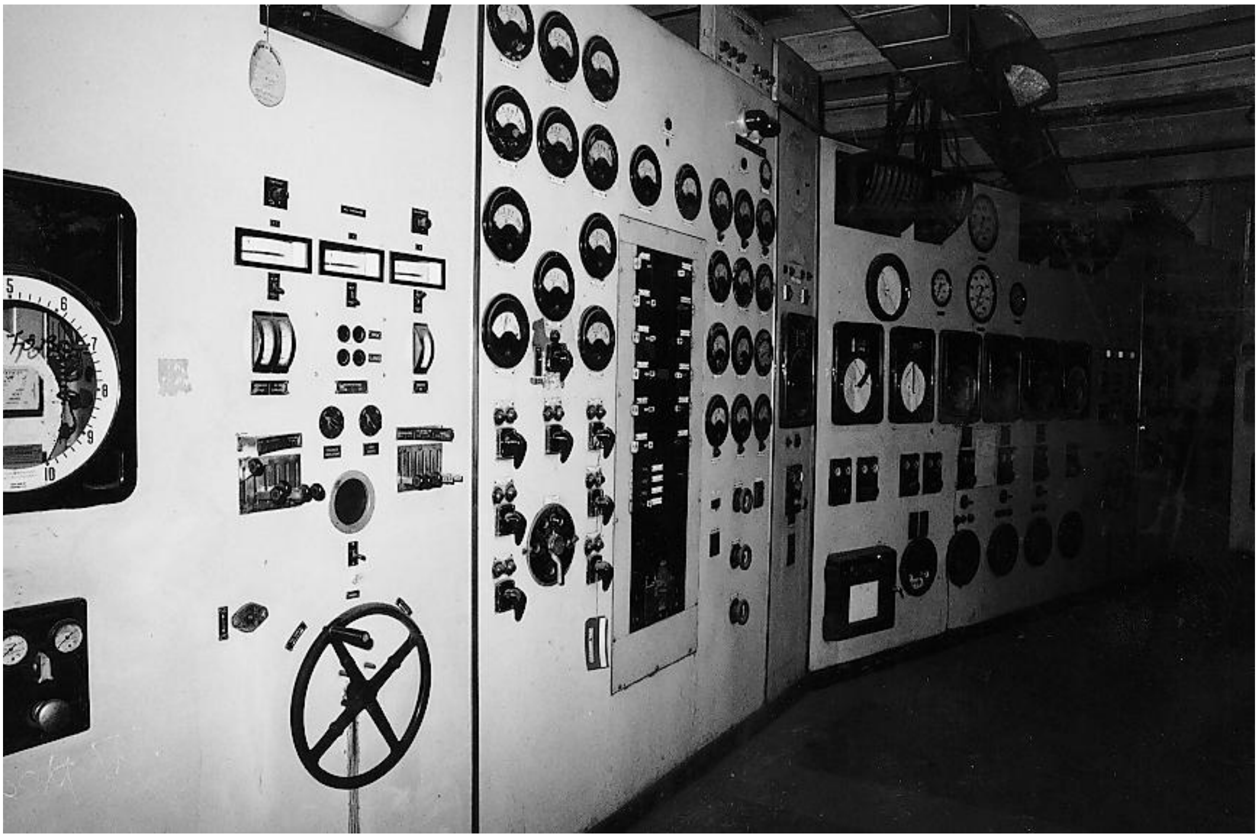
Boiler House, first floor (BH1.5)

Statement of Significance:

The Boiler Control Room is an integral part of the Steam Raising System. The Boiler Control Room retains remnant evidence of operation of the original four boiler systems and has the ability to provide information on the processes of steam generation associated with electrical power. The Boiler Control Room is a rare example of a mid twentieth century semi-automatic materials flow control system and is evidence of the industrial technology of the mid-20th century.

Significance Grading: 1

Photo:



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Item: Boiler Control Room	Reference No: 2.10

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The Boiler Control Room was installed in 1947.

Description/Function:

The Boiler Control Room contains panels of meters and switches for monitoring and controlling the operation of the Boiler. Gauges indicate water and temperature measurements and vacuum readings for inches of air. The switches control coal feed to the mills (Item No. 2.1), air dampers and fuel flow.

Intactness and Condition:

- The item appears to be structurally sound and in remarkably good condition in regard to its age.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a Conservation Plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- To be included in the Conservation Plan.

Item: Power Generating System	Reference No: 3.0

Location in Building:

Turbine Hall

Statement of Significance:

a. The Power Generating System, as an integral and vital element of the White Bay Power Station, has a strong association in the early history of the development of electrical energy and the electrification of the mass transit system in Sydney.

c. The Power Generating System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.

e. The Power Generating System contributes to our understanding of the use of steam in the generation of electrical energy. The use of the latest technology in steam powered Turbo-Alternators and associated elements during the inter-war and post-war periods demonstrates the vital role of electricity in the development and expansion of Sydney.

f. The Power Generating System includes elements, such as the last Parsons Turbo-Alternator, which are no longer extant within the Power Generating System in NSW.

g. The Power Generating System is representative of the similar systems used during the 20th century in the generation of electrical energy. The system retains elements that are representative of the developmental history of the process of electrical generation.

The Power Generating System is an integral part to White Bay Power Station. It has a strong association with the history of the development of electrical energy and the electrification of Sydney tram and rail systems. When introduced, it was the latest technology in steam power generation.

Significance Grading: 1

Photo:

N/A

Fax: (02) 9319 4383

White Bay Heritage Machinery Inventory 2002

Item: Power Generating System	Reference No: 3.0

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

A 50 000 kW Parsons Turbo-Alternator set, ordered in 1948, was commissioned in July 1951, shortly before White Bay Power Station came under the control of the Electricity Commission. A second was installed in 1955 although it was used only as a stand-by unit until the installation of four new steam-generating units (boilers) was completed in 1958.

Description:

The Power Generating System consists of:

3.1 Steam Control Valves
3.2 The Turbo Alternator Set
3.3 Cooling Fans
3.4 Overhead Cranes

Intactness and Condition:

See individual items

Conservation Policy:

See individual items

Conservation Action:

See individual items

Maintenance Schedule: See individual items

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White Bay Heritage Machinery Inventory 2002

Item: Steam Control Valves	Reference No: 3.1
Location in Building: Turbine Hall, first floor (TH1 B1)	
Statement of Significance: The Steam Control Valves are an integral element of the Power Generating System. The Steam Control Valves, through their size and configuration, are immediately identifiable as power station elements and are evocative of superseded steam power generation technologies.	
Significance Grading: 1	

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Steam Control Valves	Reference No: 3.1

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

A 50 000 kW Parsons Turbo-Alternator set, ordered in 1948, was commissioned in July 1951, shortly before White Bay Power Station came under the control of the Electricity Commission. A second was installed in 1955 although it was used only as a stand-by unit until the completion of the high pressure Boiler House in 1958.

Description/Function:

The Steam Control Valves control the inlet and passage of steam through the Turbine. They are primarily utilised during start-up and shut-down to allow the steam into the Turbine slowly and progressively. This is essential to allow temperatures and pressures throughout the Turbine to stabilise at each increment of speed to maintain balance and minimise wear.

Intactness and Condition:

- The item appears to be structurally sound.
- The paint system has broken down and the item exhibits a slight degree of corrosion.
- No inspection of the interior of the turbine or alternator was possible.

Conservation Policy:

- The items are to be retained in situ and conserved.
- The items should be the subject of a conservation plan prior to any action which intervenes in the fabric.
- The item should remain operable.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Any action will have to address the internal as well as the external fabric of the item.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied.

Item: The Turbo Alternator Set	Reference No: 3.2

Location in Building:

Turbine Hall, first floor (TH 1)

Statement of Significance:

The Parson’s Turbo-Alternator set is an integral part of the Power Generating System and is regarded as the heart of the power station. Through its massive size and unusual configuration, it has landmark qualities within the Turbine Hall. When installed, the Parsons Turbine was regarded as state-of-the-art and, at that time, it was one of the largest Turbo-Alternators providing power to the state electricity grid. The Parsons turbo alternator evidences the continuing influence of English technology on the design and fit-out of the White Bay Power Station.

Significance Grading: 1

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: The Turbo Alternator Set	Reference No: 3.2

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

A 50 000 kW Parsons Turbo-Alternator set, ordered in 1948, was commissioned in July 1951, shortly before White Bay Power Station came under the control of the Electricity Commission. A second was installed in 1955 although it was used only as a stand-by unit until the completion of the high pressure boiler house in 1958.

Description/Function:
The Parsons Turbo-Alternator set is a three cylinder horizontal steam turbine which has an operating speed of 3000 rpm. Steam at 600 pounds per square inch pressure and 835 degrees Fahrenheit from the Headers (Item No. 2.6) enters the high-pressure cylinder, then exhausts into the medium pressure cylinder and then, via the massive cast iron ducts, into the low-pressure cylinder from where it exhausts to the Condenser (Item No. 5.3). The Turbine was fitted with five high pressure oil bearings all of which were supplied by the oil pumps located in the basement. The Alternator is direct-coupled to the Turbine producing 50 Megawatts at maximum continuous rating, generating three-phase power at 11 kV and 50 cycles per second. The Alternators are cooled by an air cooling system, with large air fans situated below the machines within the foundation blocks at Basement level.

Intactness and Condition:

- The item appears to be structurally sound.
- The item appears to be functional should a power source be available.

Conservation Policy:

- To be conserved and retained in situ.
- Interpretation to acknowledge integral place in the Power Generating System as well as the operational history of White Bay Power Station.
- A Conservation Plan addressing both internal and external fabric, should be prepared.

Conservation Action:

- The item is to be investigated in detail prior to any action, which intervenes in the fabric of the item, is undertaken.
- No ancillary items or attachments including wiring, signage or cards should be removed.
- The pieces should be brushed clean with a soft bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied.

White Bay Heritage Machinery Inventory 2002

Item: Cooling Fans	Reference No: 3.3

Location in Building:

Turbine Hall, first floor (TH 1)

Statement of Significance:

The Sirocco Cooling Fans are an integral part of the Power Generating System. They illustrate the provision of air to the Turbo-Alternator to cool and their operation components which heats up under load. The cooling fans have the ability to provide information on the design and operation of Turbo-Alternator sets.

Significance Grading: 2

Photo:

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Item: Cooling Fans	Reference No: 3.3

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

A 50 000 kW Parsons Turbo-Alternator set, ordered in 1948, was commissioned in July 1951, shortly before White Bay Power Station came under the control of the Electricity Commission. A second was installed in 1955 although it was used only as a stand-by unit until the completion of the high pressure Boiler House in 1958.

Description/Function:

The Sirroco Ventilating Fans are located adjacent to the Condensors (Item No. 5.3) and Sluice Gates (Item No. 5.1) in the basement of the Turbine Hall. They are flexibly mounted on 75-horse-power Motors and were designed to reduce the build up of heat on components of the Turbo-Alternator Set (Item No. 3.2). Specification plates appear to be missing.

Intactness and Condition:

- The item appears to be structurally sound.
- The item appears to be functional should a power source be available.

Conservation Policy:

- To be conserved and maintained in situ.
- Conservation Plan is to be prepared for this item.
- Interpretation to acknowledge integral place in the Power Generating System as well as within the operational history of White Bay Power Station.

Conservation Action:

- The item is to be investigated in detail prior to any action, which intervenes in the fabric of the item, is undertaken.
- No ancillary items or attachments including wiring, signage or cards should be removed.
- Initial investigation indicates the following action may be undertaken:
  - The pieces should be brushed clean with a soft bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.
- If necessary, the surface should be recoated on a monthly basis.

White Bay Heritage Machinery Inventory 2002

Item: Overhead Cranes	Reference No: 3.4

Location in Building:

Turbine Hall (TH 2)

Statement of Significance:

The three Overhead Cranes are integral to the continuing maintenance of the elements associated with the Power Generating System. The set of Cranes illustrates the on-going process of systems upgrading associated with power stations. The Cranes are demonstrative of the move away from a dependence on equipment manufactured in England to locally-made machinery.

Significance Grading: 1

Photo:

Item: Overhead Cranes	Reference No: 3.4

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

In the original Turbine Hall, the two overhead cranes each had a capacity of 50 tons. When the Turbo-Alternator sets were installed between 1951 and 1955, a new crane with a capacity of 75 tons was installed in the north end of the Turbine Hall.

Description:

There are three Overhead Cranes or EOHTs (electric overhead travelling cranes) in the Turbine Hall. The most modern (1948-49) is made by WA Hodgkin and Company Pty Ltd, Cranemakers, Sydney, NSW. The serial number is E5053 and it is marked as rated to 75 tons on the main hoist and 5 tons on the auxiliary hoist. The Crane gantry is formed using a set of Warren-truss girders made from large C-section and angle-section steel with riveted gusset plates. Each of the girders of the gantry comprises a large section truss beam and a lighter section truss beam, with a riveted plate connection between the top chords and a truss connection between the bottom chords. The drive cabin is slung beneath the inner-most of the two trusses but it is not currently accessible. The driver was probably equipped with three motor controllers — one for longitudinal movement, one for lateral movement and one or two for the hoists. This Crane was installed in the early 1950s.

The second Crane (1916-17) is by Babcock and Wilcox Ltd, Makers, London and Renfrew. It is rated to 50 tons and operates utilising Lancashire Dynamo & Motor Co. 600 volt DC motors. The Crane gantry is comprised of a pair of parallel girders, each comprised of a rivetted plate inner beam and a trussed outer beam, with trussed connections between the top chords and the bottom chords.

There is a third Crane beyond but the makers name and capacity are not visible. It is probably the second original Crane identified in Myers (op. cit.) as built by Herbert Morris, with the riveted truss bridge girders supplied by the Sydney Steel Company. It is also rated to 50 tons and operates utilising Lancashire Dynamo & Motor Co. 600 volt DC motors.

Intactness and Condition:

- The item appears to be structurally sound
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- A Conservation Plan should be prepared for the item.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action should be undertaken:
  - All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
  - Remaining rust should be converted with Emertan or similar.

- Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.
- All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
- No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- If necessary, the surface should be recoated.

Item: The Feedwater System	Reference No: 4.0

Location in Building:

Pump House

Statement of Significance:

a. The Feedwater System is illustrative of the development of steam as a means to generate electrical power.

c. The Feedwater System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.

e. The Feedwater System is a vital element in the overall functioning of the power station and integral to the functioning of the Boiler and steam raising system.

f. The Feedwater System is integral in the provision of electrical energy through the harnessing of steam. The White Bay Power Station retains the most complete set of early feedwater facilities surviving in the NSW power station system.

g. The Feedwater System is representative of the use of steam in the generation of electrical energy.

The Feedwater System is an integral part of the power station complex. It demonstrates the technology by which feedwater is constantly re-cycled via a change in state. It has the ability to enhance our understanding of the technology of power generation that is not available from other sources.

Significance Grading: 1

Photo:
N/A

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White Bay Heritage Machinery Inventory 2002

Item: The Feedwater System	Reference No: 4.0

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler house was demolished in order to construct a new "B" Section to contain the new Boilers. The first two Boilers were installed between 1951 and 1952. A further two were installed in 1958. The higher steam pressure produced by the four new Boilers and the associated Feedwater System, powered the two new 50 000 kW Turbo-Alternators installed in the Turbine Hall between 1951 and 1955.

Description:

The Feedwater System is concerned with the supply of water to the Boilers (Item No. 2.4), where it is converted to steam, and it commences with the extraction of Condensate from the Condensers (Item No. 5.3). Condensate is delivered from the Condensers to the Deaerator (Item No. 4.4), which removes any dissolved oxygen, after which it is termed “feedwater”. The feedwater is then pumped by the Feedwater Pumps, both Steam (Item No. 4.2) and Electric (Item No. 4.1), to the Feed Heaters then to the Economiser (Item No. 2.4d), which raise the temperature to a level close to boiling. The feedwater leaves the Feedwater Pumps at high pressure, allowing considerable temperature rise before the water boils to steam. From the Economiser, the feedwater is led into the main tubes of the Boiler. The Feedwater System included, in operation, a raw water storage tank, a demineralisation plant and a reserve condensate tank, located within the upper level of the pump gallery between the Boiler House and Turbine Hall.

The Feedwater System consists of:

4.1 Electric High Pressure Feedwater Pumps
4.2 Steam High Pressure Feedwater Pumps
4.3 The Condensate Pump
4.4 The De-aerators
4.5 Monitor and Metering Cabinets
4.6 Feedwater and Condensate Tanks

Intactness and Condition:

See individual items

Conservation Policy:

See individual items

Conservation Action:
See individual items
Maintenance Schedule:
See individual items

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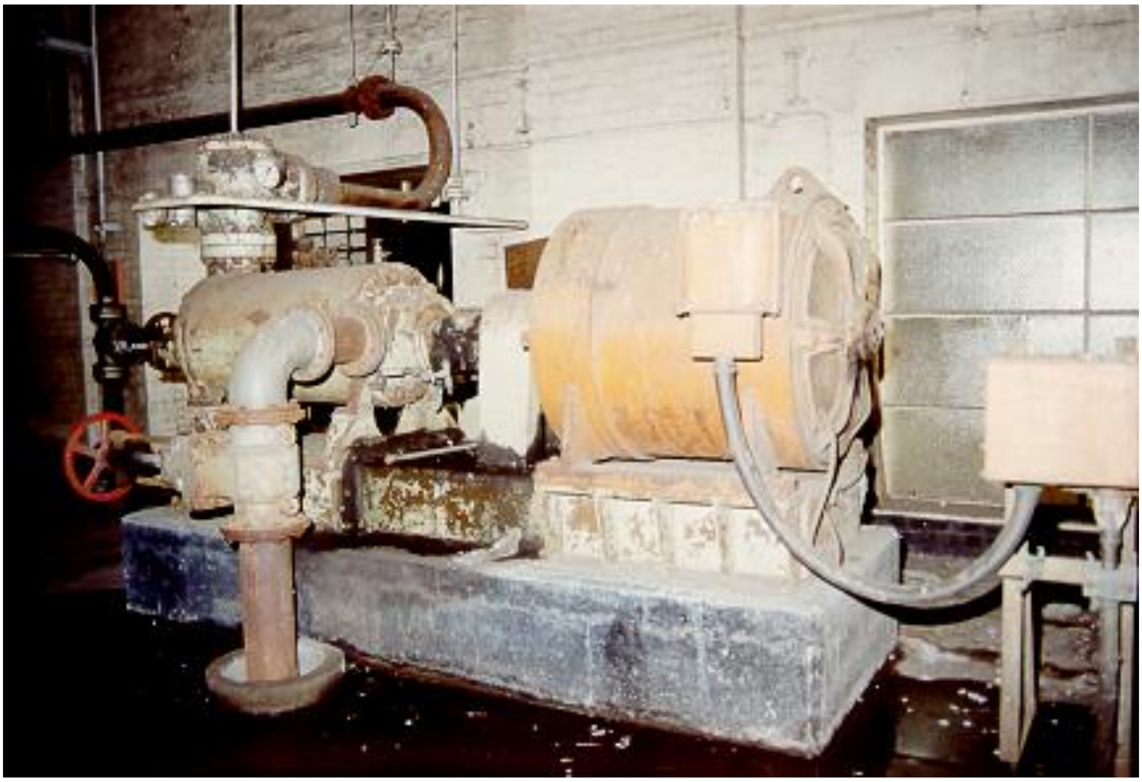
White Bay Heritage Machinery Inventory 2002

Item: Electric High Pressure Feedwater Pumps	Reference No: 4.1
Location in Building: Pump House, first floor (PH 1.1)	
Statement of Significance: The Electric High Pressure Feedwater Pumps are an integral part of the Feedwater System. They demonstrate the technique by which feedwater is constantly re-used in power generation. The Electric High Pressure Feedwater Pumps are large, of extremely sturdy construction and have a robust quality not evident in similar items. They are representative of Electric High Pressure Feedwater Pumps which were used in power stations in the mid-twentieth century.	
Significance Grading: 1	

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Electric High Pressure Feedwater Pumps	Reference No: 4.1

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler house was demolished in order to construct a new "B" Section to contain the new Boilers. The first two Boilers were installed between 1951 and 1952. A further two were installed in 1958. The higher steam pressure produced by the four new Boilers and the associated Feedwater System, powered the two new 50 000 kW Turbo-Alternators installed in the Turbine Hall between 1951 and 1955.

Description/Function:

The three Electric High Pressure Feedwater Pumps are located on the first floor of the Pump House. Each pump comprises a multi-stage centrifugal Pump powered by an Electric Motor supplied with 2,200 volts from the house electricity supply. Specification plates appear to be missing.

Intactness and Condition:

- The item appears to be structurally sound.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- Initial investigation indicates the following action should be undertaken.
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - Remaining rust should be converted with Emertan or similar.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.
  - The item should have its surface appropriately recoated with a preservative.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.
- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated. This should be done on monthly basis.
- If necessary, the surface should be recoated on monthly basis.

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White Bay Heritage Machinery Inventory 2002

Item: Steam High Pressure Feedwater Pumps	Reference No: 4.2

Location in Building:

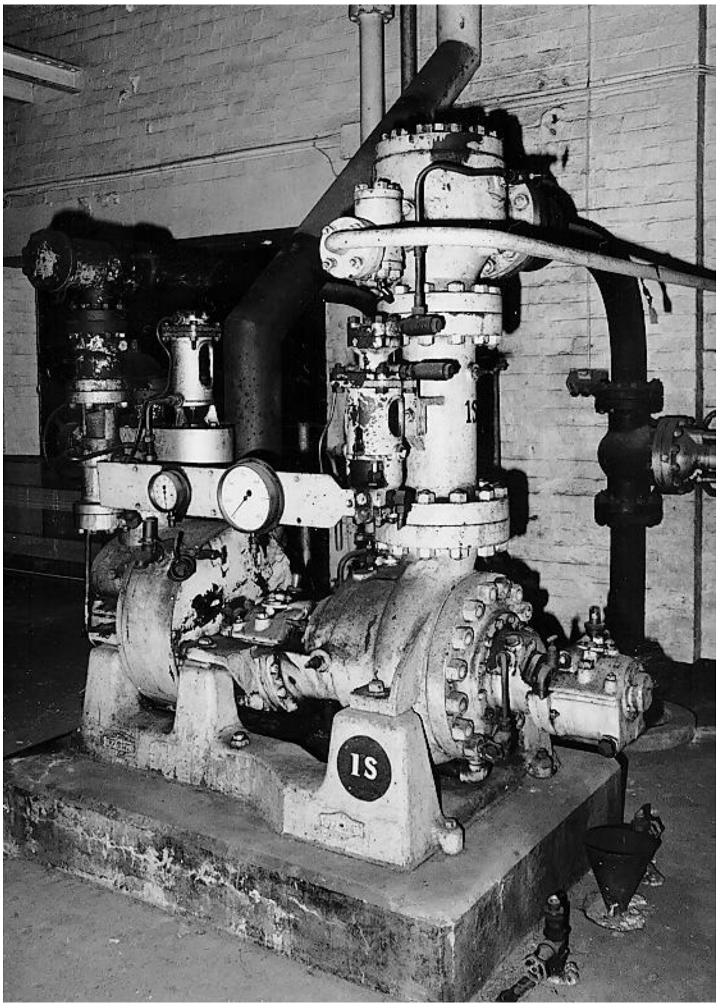
Pump House, first floor (PS 1.1)

Statement of Significance:

The Steam High Pressure Feedwater Pump is an integral of the Feedwater System. It demonstrates the technology by which feedwater is constantly re-used in power generation. Steam Feedwater Pumps are now rare, having been replaced in almost all power stations by electrically-driven models. The Steam High Pressure Feedwater Pump is large, of extremely sturdy construction and has a robust quality not evident in many other items. It is representative of steam pumps which were used in power stations up to the mid-twentieth century. The Steam High Pressure Feedwater Pump has the ability to provide information on the design of steam-driven, high-pressure pumps and their operation.

Significance Grading: 1

Photo:



Item: Steam High Pressure Feedwater Pumps	Reference No: 4.2

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two Boilers were ordered for White Bay Power Station in 1946, prior to its aquisition by the Electricity Commission. The higher steam pressure produced by the four new Boilers, installed between 1951 and 1958, and the associated Feedwater System, powered the two new 50 000 kW Turbo-Alternators installed in the Turbine Hall between 1951 and 1955.

Description/Function:

The two Steam High Pressure Feedwater Pumps are located on the first floor of the Pump House. Each pump comprises a multi-stage centrifugal Pump powered by a steam engine motor supplied with primary steam from the Boiler. Specification plates appear to be missing.

Intactness and Condition:

- The item appears to be structurally sound.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- Initial investigation indicates the following action should be undertaken:
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - Remaining rust should be converted with Emertan or similar.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.
  - The item should be appropriately surface coated.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.
- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated. This should be done on monthly basis. If necessary, the

surface should be recoated on a monthly basis.

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White Bay Heritage Machinery Inventory 2002

Item: Condensate Pumps	Reference No: 4.3

Location in Building:

Turbine Hall, ground floor (TH G)

Statement of Significance:

The Condensate Pumps are integral elements of the Feedwater System. The Condensate Pumps are relatively compact, well-designed centrifugal Pumps representative of the medium-capacity, electrically-driven type. The Condensate Pumps demonstrate the technology by which feedwater is constantly re-used in power generation.

Significance Grading: 1

Photo:

White Bay Heritage Machinery Inventory 2002

Item: Condensate Pumps	Reference No: 4.3

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler house was demolished in order to construct a new "B" Section to contain the new Boilers. The first two Boilers were installed between 1951 and 1952. A further two were installed in 1958. The higher steam pressure produced by the four new Boilers and the associated Feedwater System, powered the two new 50 000 kW Turbo-Alternators installed in the Turbine Hall between 1951 and 1955.

Description/Function:

Extant steam after passing through the three phases of the Turbine enters the pipes of the Condenser where it is converted to water. The water is then pumped by the Condensate Pumps through the high pressure and low pressure Economisers and the De-aerators to the High Pressure Feedwater Pump which force the now reheated water back into the Boiler.

The two identical Condensate Pumps are centrifugal pumps direct-coupled to electric Motors. Specification plates appear to be missing.

Intactness and Condition:

- The items appear to be structurally sound.
- The items appear to be functional should a power source be available.

Conservation Policy:

- The items are to be retained in situ and conserved.
- The items should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- Initial investigation indicates the following action may be undertaken.
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - Remaining rust should be converted with Emertan or similar.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.

- The item should be repainted

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: The De-aerators	Reference No: 4.4

Location in Building:

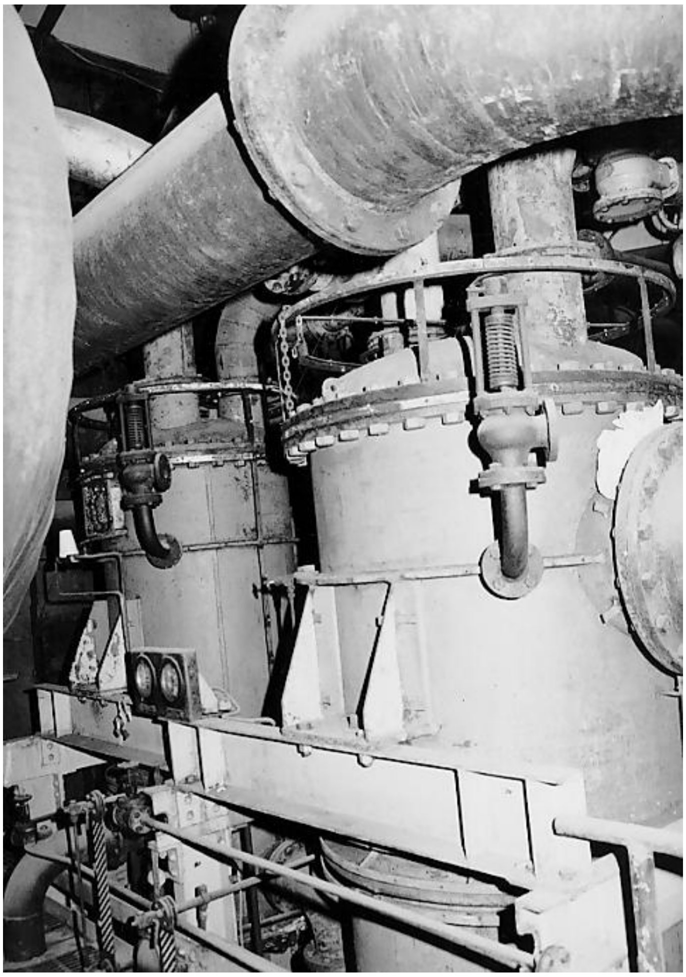
Turbine Hall, ground floor (THG)

Statement of Significance:

The De-aerators are integral elements to the efficient functioning of the Feedwater System. They are characteristic examples of mid-twentieth century technology typically used in power stations of the era. The De-aerators are impressive in their size and configuration and are evidence of the industrial technology of the early 20th century.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: The De-aerators	Reference No: 4.4

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. A section of the old Boiler house was demolished in order to construct a new "B" Section to contain the new Boilers. The first two Boilers were installed between 1951 and 1952. A further two were installed in 1958. The higher steam pressure produced by the four new Boilers and the associated Feedwater System, powered the two new 50 000 kW Turbo-Alternators installed in the Turbine Hall between 1951 and 1955.

Description/Function:

There are two Deaerators with associated equipment standing in the northern end of the Pump Gallery basement. Specification plates appear to be missing. These are large steel cylinders approximately 10 metres high with domed tops, located in the Turbine Hall Basement and projecting into the floor space of the level above. Condensate is admitted into the cylinder, in which the ambient pressure is below atmospheric pressure, as a spray, with steam utilised to heat the Condensate, encouraging the release of dissolved oxygen and other gasses. The Deaerator includes a number of associated subsidiary elements such as a vent condenser (to first cool and condense the gasses extracted, prior to their entry into the pumping unit), an air ejector (an pump to extract the gases) and an air ejector cooler (to condense any steam still present in the gasses). Much of the interior of the Deaerator cylinder operates as a storage tank for the deaerated feedwater, which is drawn from the Deaerator by the Feedwater Pumps (Item No. 4.1, 4.2).

Intactness and Condition:

- The item appears to be structurally sound.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.
- The plan should address both internal and external fabric.

Conservation Action:

- Initial investigation indicates the following action should be undertaken:
  - All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
  - Remaining rust should be converted with Emertan or similar.
  - Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

White Bay Heritage Machinery Inventory 2002

Item: Monitor and Metering Cabinets	Reference No: 4.5

Location in Building:

Pump House, first floor (PH 1.2A)

Statement of Significance:

The Monitor and Metering Cabinets are representative of mid-twentieth century electrical control and metering equipment within discrete industrial complexes and illustrate a range of ancillary electrical processes and equipment. They represent technological developments in the supply of electricity from the beginning of the 20th century through to the middle part of the century.

Significance Grading: 3

Photo:

Item: Monitor and Metering Cabinets	Reference No: 4.5

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1983 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Description:

Two steel electrical cabinets standing against the west wall of the Pump Gallery. The southern has a black enamel coating and has three fascia panels, each with a large central circular mounting for a dial recorder, only the northern of which is intact. The two northern panels also have gauges (one of which is missing). The northern cabinet has three large and seven small circular dial gauges and two pairs of control valves and switches. These cabinets are associated with the feedwater supply system.

Intactness and Condition:

- The northern of the cabinets is complete but the finish of the casing is poor.
- The southern cabinet has missing and damaged instruments.

Conservation Policy:

- These items should be retained in situ and conserved in association with their mechanical counterparts.

Conservation Action:

- All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
- No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. Areas of chipped paint should be retouched.

White Bay Heritage Machinery Inventory 2002

Item: Feedwater and Condensate Tanks	Reference No: 4.6
Location in Building: In the airspace above first floor level in the Pump Gallery between the Boiler House and Turbine Hall. (PH2.5)	
Statement of Significance: The Feedwater and Condensate Tanks are integral elements of the Feedwater System. The tanks are representative of the size, design and layout of water storage arrangements in a large Boiler House. The Feedwater and Condensate Tanks demonstrate the technology by which feedwater is constantly re-used in power generation.	
Significance Grading: 3	

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Feedwater and Condensate Tanks	Reference No: 4.6

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1983 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery. The Feedwater and Condensate Tanks retained water for conversion to steam in the boilers and date from the upgrade of the station in the 1950s.

Description:

The Feedwater and Condensate Tanks are a set of welded steel water tanks of varying sizes supported on a frame of RSJs in the airspace above the Pump Gallery floor. The storage of feedwater at the high level allowed for gravitational feed to the Boilers in the event of a catastrophic system failure affecting the pumping systems and was a generally economical operating arrangement.

Intactness and Condition:

- The Feedwater and Condensate Tanks appear to be structurally sound.

Conservation Policy:

- The Feedwater and Condensate Tanks are to be retained in situ and conserved.

Conservation Action:

- All items exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
- Remaining rust should be converted with Emertan or similar. Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.
- All wiring, attachments and connections should remain in place, be appropriately cleaned and sealed. No ancillary items or attachments such as piping, signage or cards should be removed. The item should be repainted

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: Circulating Water System	Reference No: 5.0

Location in Building:

Turbine Hall Basement

Statement of Significance:

a. The Circulating Water System illustrates the development of steam as a means to generate electrical power and demonstrates the necessity, during the early period of power generation, of locating power stations near to a reliable and constant water source.

c. The Circulating Water System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.

e. The Circulating Water System is integral to the generation of electricity by the use of steam power and evidences the way in which steam was converted to water through the massive cast iron Condensers.

f. The Circulating Water System is an integrated system comprising integral elements which are no longer extant at any suburban or rural power station. It incorporates elements which demonstrate the technological advances of their time and which are now no-longer in use in the generation of electricity.

g. The Circulating Water System consists of an integrated system comprising elements which demonstrate the technologies of their time and it represents the requirement, during the early phase of electricity generation, to locate power stations in coastal areas.

The Circulating Water System is an integral part of the power station operational complex. The system evidences the way in which steam was converted to water in order to recycle it through the massive cast iron Condensers. The Circulating Water System demonstrate the technologies of the time and has the potential to yield information on the technology of power generation that is no longer available from other sources.

Significance Grading: 1

Photo:
N/A

White Bay Heritage Machinery Inventory 2002

Item: Circulating Water System	Reference No: 5.0

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. The first Boilers were installed between 1951 and 1952. A further two were installed in 1958. The higher steam pressure produced by the four new Boilers powered the two new 50 000 kW Turbo-Alternators installed in the turbine hall between 1951 and 1955. The new components of the Circulating Water System (the sluice gates and motors, circulating water pumps and the Condensers) reflect the condensing requirements of the new Parsons Turbo-Alternators.

Description:

Power stations have two distinct water systems: Circulating (cooling) Water and Feedwater. Steam exhausted from the Turbines is cooled in the pipes within the Condenser by water which flows around the Pipes. The steam is converted to liquid water (Condensate) and, after treatment, is sent back into the Boilers by the Feedwater System. The Circulating Water System circulates cooling water through the Condensers.

The Circulating Water System consists of:

5.1 Sluice Gates and Motors
5.2 Circulating Water Pumps
5.3 Condensers
5.4 Circulating Water Penstocks (northern set only)

Intactness and Condition:

See individual items

Conservation Policy:

See individual items

Conservation Action:

See individual items

Maintenance Schedule: See individual items

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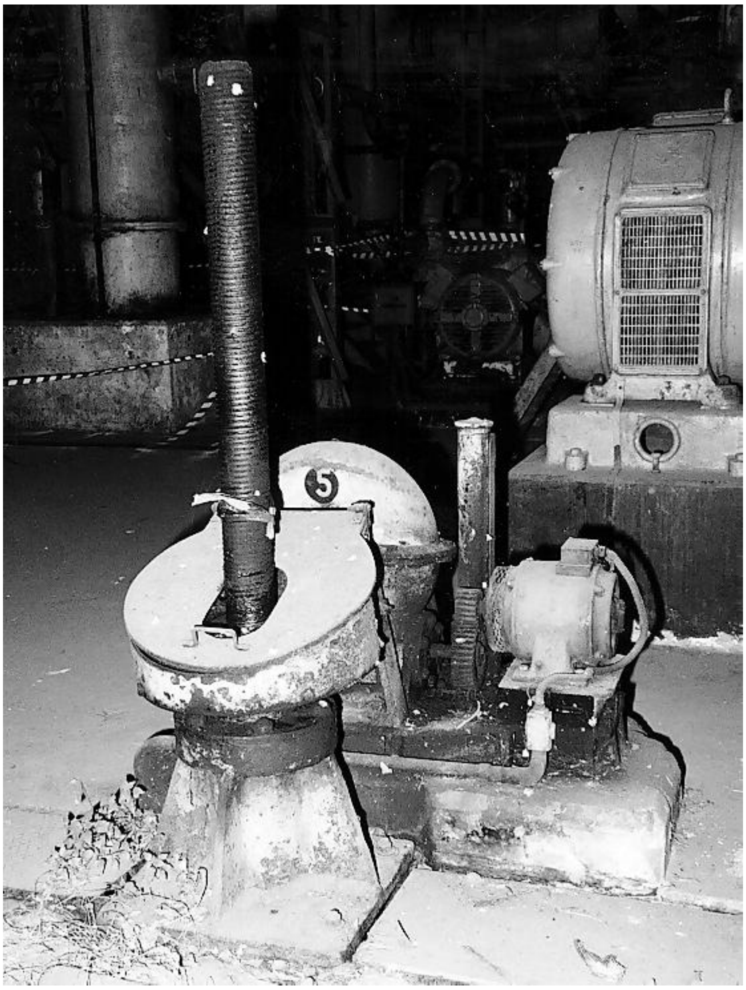
White Bay Heritage Machinery Inventory 2002

Item: Sluice Gates and Motors	Reference No: 5.1
Location in Building: Turbine Hall, basement floor (TH 1 B.1)	
Statement of Significance: The Sluice Gates and Motors are integral parts of the Circulating Water System. The Sluice Gates and Motors evidence the way circulating water is controlled throughout the power station and admitted to the Condenser Pump Wells. They are unusual in appearance and construction and are evocative elements in the basement of the Turbine Hall. Their operation is simple and effective and easily interpreted.	
Significance Grading: 1	

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Sluice Gates and Motors	Reference No: 5.1

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. The first Boilers were installed between 1951 and 1952. A further two were installed in 1958. The higher steam pressure produced by the four new Boilers powered the two new 50 000 kW Turbo-Alternators installed in the turbine hall between 1951 and 1955. The new components of the Circulating Water System (the Sluice Gates and Motors, Circulating Water Pumps and the Condensers) reflect the condensing requirements of the new Parsons Turbo-Alternators.

Description/Function:

Water entered the inlet conduit via a pump and a set of circulating screens which removed foreign matter. The circulating water was directed to the large pumps, which forced water through the Condensers (Item No. 5.3), by mild steel and timber Sluice Gates. The Sluice Gates could exclude water from passing into the suction wells beneath the pumps and to the conduits in the power station, and could isolate each of the Condensers serving Turbo-Alternator Set 1 (Item No. 3.2) or Turbo-Alternator Set 2 for maintenance of the well or the pump.

Intactness and Condition:

- The items appear to be structurally sound.
- The items exhibit a light bloom of rust on their surface with areas of deeper corrosion and with some very badly corroded elements.

Conservation Policy:

- The items are to be retained in situ and conserved.
- The items should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- According to the Conservation Plan.

Item: Circulating Water Pumps	Reference No: 5.2

Location in Building:

Turbine Hall, basement floor (TH 1 B.1)

Statement of Significance:

The Circulating Water Pumps are an integral part of the Circulating Water System. The Circulating Water Pumps have the ability to provide information on the operations of the Condensers (Item No. 5.3).

Significance Grading: 1

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Circulating Water Pumps	Reference No: 5.2

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. The first Boilers were installed between 1951 and 1952. A further two were installed in 1958. The higher steam pressure produced by the four new Boilers powered the two new 50 000 kW Turbo-Alternators installed in the turbine hall between 1951 and 1955. The new components of the Circulating Water System (the Sluice Gates and Motors, Circulating Water Pumps and the Condensers) reflect the condensing requirements of the new Parsons Turbo-Alternators.

Description/Function:

The Circulating Water Pumps are large, vertically-mounted, positive-displacement pumps direct-coupled to massive AC electric motors mounted in the Turbine Hall basement. The Circulating Water Pumps currently at White Bay cannot be described or assessed because water has flooded the pump wells and the pumps cannot be adequately accessed. Specification plates appear to be missing.

Intactness and Condition:

- The items may be structurally sound but the pump would certainly be suffering heavy corrosion because of prolonged immersion in saline water.
- The motors appear to be structurally sound but the shafts exhibit heavy corrosion.

Conservation Policy:

- The items are to be retained in situ and conserved.
- The items should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- Initial investigation indicates the following action may be undertaken:
  - The above ground pieces should be brushed clean with a bristle brush and all dust and grime removed from their immediate vicinity with an industrial vacuum cleaner.
  - Remaining rust should be converted with Emertan or similar.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.
  - The item should be recoated with an appropriate surface coating.

Maintenance Schedule:

- According to the Conservation Plan.

White Bay Heritage Machinery Inventory 2002

Item: Condensers	Reference No: 5.3

Location in Building:

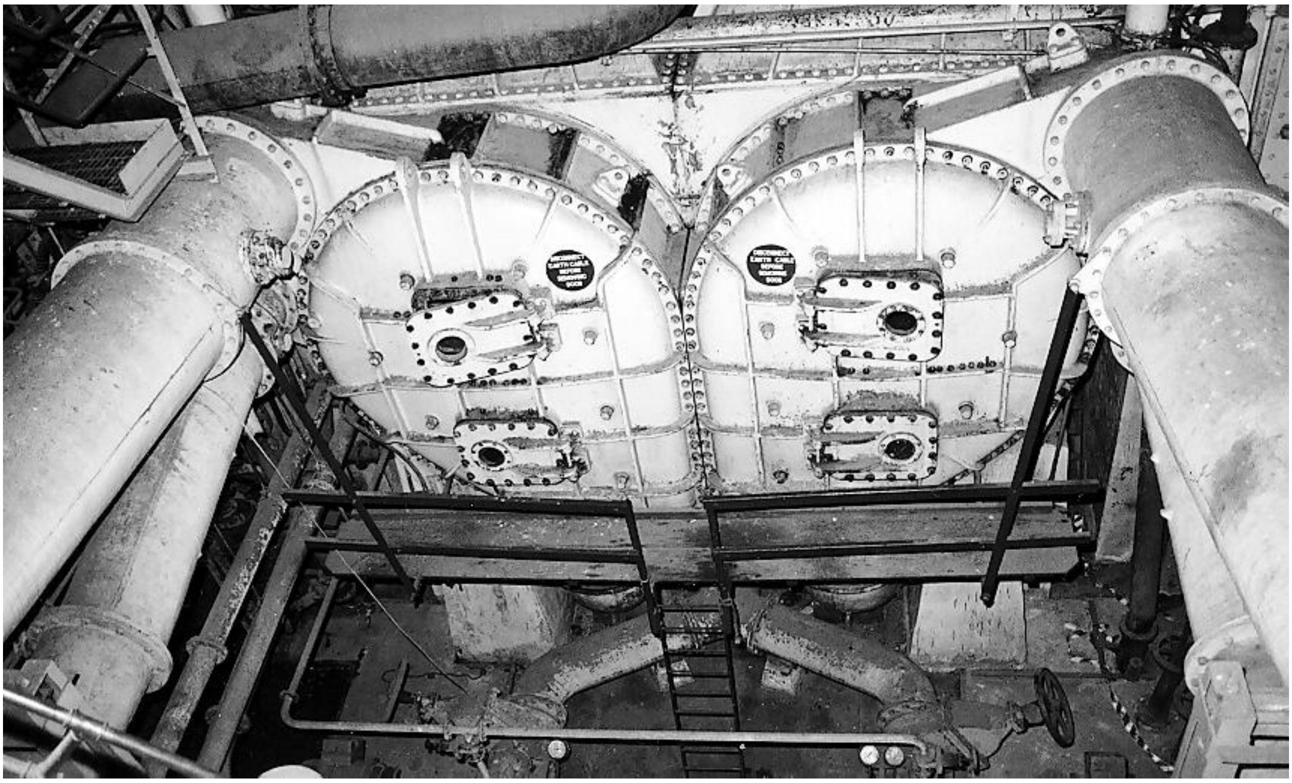
Turbine Hall, basement floor (TH1 B.1)

Statement of Significance:

The Condensers (Item No. 5.3) are an integral part of the Circulating Water System. The Condensers are massive, cast-iron structures which have landmark qualities in the Turbine Hall Basement. The Condensers have the ability to provide information on the design and operation of Condensers and the conversion of steam into water for re-circulation to the Boilers (Item No. 2.4).

Significance Grading: 1

Photo:



Item: Condensers	Reference No: 5.3

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Two steam generating units were ordered for White Bay Power Station in 1946, prior to the station being acquired by the Electricity Commission of NSW. The first Boilers were installed between 1951 and 1952. A further two were installed in 1958. The higher steam pressure produced by the four new Boilers powered the two new 50 000 kW Turbo-Alternators installed in the turbine hall between 1951 and 1955. The new components of the Circulating Water System (the Sluice Gates and Motors, Circulating Water Pumps and the Condensers) reflect the condensing requirements of the new Parsons Turbo-Alternators.

Description/Function:

The Condensers are massive cast iron chambers containing steam pipes submerged in a jacket of cold water. The pipes convey steam from the turbine exhaust, which is condensed in the pipes owing to the cold water which flows around the pipes. The condensed water, Condensate, was pumped away by the Condensate Pumps (Item No. 4.3) and the Feedwater System.

Cold salt water from Inlet Conduit was pumped into the base of each condenser by the Circulating Water Pumps (Item No. 5.2), passing up through the Condensers and into the high level outlet pipe, thence flowing into the Outlet Conduit.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface (internal condition unknown).

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a Conservation Plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- All visible copper, brass and polished steel components should be polished and their surface appropriately treated.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: Circulating Water Penstocks (northern set only)	Reference No: 5.4
Location in Building: External – Within the Circulating water channel, adjacent to Stormwater Canal on north side of Power Station site. (Penstock Yard)	
Statement of Significance: The Penstocks were components of the Circulating Water system and were important to the overall operation of the power station. They are representative examples of small motor-driven lock-gates of the mid-twentieth century.	
Significance Grading: 3	

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Circulating Water Penstocks (northern set only)	Reference No: 5.4

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1983 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery. The penstocks operated as gates on the circulating water canals, allowing the circulating water system to be cleaned and maintained if required. They date from the upgrade of the station in the 1950s

Description:

The penstocks comprise a pair of motor-driven lock gates, with one set installed into each of the circulating water canals on the northern side of the power station. The gates are of steel, travelling vertically in steel channels on the sides of the canals and are actuated by the screw effect of threaded shafts turned by small unitary electric motors mounted above the gates on a frame of RSJs.

• Intactness and Condition: • The penstocks appear to be structurally sound. They exhibit light rust on most surfaces, with areas of deeper corrosion. The motors and gates haven't been operated for many years.
Conservation Policy: • The item is to be retained in situ and conserved.
Conservation Action: • Initial investigation indicates the following action should be undertaken: • Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar. All wiring, attachments and connectors should remain in place, be appropriately cleaned and sealed. No ancillary items or attachments such as wiring, signage or cards should be removed. The item should be repainted • Public safety issues arising from the canal will need to be addressed.
Maintenance Schedule: • The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: The Power Reticulation System	Reference No: 6.0

Location in Building:

Turbine Hall

Statement of Significance:

a. The Power Reticulation System, as an integral element of the White Bay Power Station, has a strong association in the early history of the development of electrical energy and the electrification of the mass transit system in Sydney.

c. The Power Reticulation System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.

e. The Power Reticulation System is a vital element in the understanding of the technological developments in the reticulation and management of electrical energy throughout the twentieth century. The Power Reticulation System demonstrates the most sophisticated technology relating to electrical distribution management prior to the introduction of transistors and integrated circuits.

f. The Power Reticulation System retains elements which are contemporary with the earliest phase in the provision of electrical power in Sydney. As such these elements are rare in a system which has become increasingly dependant on automatic systems.

g. The Power Reticulation System is representative of the similar systems used during the 20th century in the generation of electrical energy. The system retains elements that are representative of the developmental history of the process of electrical distribution.

The Power Reticulation System retains elements which are over forty years old and which are evocative of the technological developments in the management of the reticulation of electrical power. Elements associated with the Power Reticulation System demonstrate the development of electrical power reticulation from the early-to-mid twentieth century and represents the most sophisticated technology relating to electrical distribution management prior to the introduction of transistors and integrated circuits.

Significance Grading: 1

Photo:

N/A

White Bay Heritage Machinery Inventory 2002

Item: The Power Reticulation System	Reference No: 6.0

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The higher steam pressure produced by the four new Boilers installed at the Power Station between 1951 and 1958 powered the two new 50 000 kW Turbo-Alternators in the Turbine Hall. The electrical Power Reticulation System was subsequently modified to reflect the increased output of the alternators.

Description/Function:

The Power Reticulation System controls the electrical current produced by the Alternators in the Turbine Hall and delivers it to the consumers of the current, which in the latter half of the operation of White Bay Power Station, was into the Interconnected State Grid. Prior to this, the electrical power was primarily delivered directly to the electric railway and tramways systems. At White Bay, the Power Reticulation System comprises the transformers, reactors, cables, busbars and switches in the Switch House, as well as the Main Control Room. The Main Control Room houses all the control and monitoring gear associated with the distribution of the electrical power generated at White Bay.

The majority of the individual elements of the Power Reticulation System, especially the transformers, reactors and switches, have been removed from the White Bay Switch House as part of the decontamination and make-safe process, owing to the potential health hazards associated with the fluids utilised in this equipment.

The Power Reticulation System consists of:

6.1 Control Room (a, b and c)
6.2 Rheostats
6.3 Cables and Chasers
6.4 Motor-Driven Oil-bath Switches
6.5 Oil Circuit Breaker

Intactness and Condition:
See individual items

Conservation Policy:
See individual items

Conservation Action: See individual items
Maintenance Schedule: See individual items

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White Bay Heritage Machinery Inventory 2002

Item: Control Room (a, b and c)	Reference No: 6.1
Location in Building: Control room, adjacent to Robert Street on the extreme northwest of the main building. (CSI.1, CS2.1)	
Statement of Significance: The Main Control Room is an integral element in the reticulation of electrical power. It retains elements which demonstrate the transition from the early phase of power reticulation to the increasingly sophisticated developments in electrical distribution in the mid twentieth century. The Main Control Room illustrates the increasingly complex processes in the reticulation of electrical power and its visual character is strongly reminiscent of the industrial technology of the early 20th century.	
Significance Grading: 1	

Photos:

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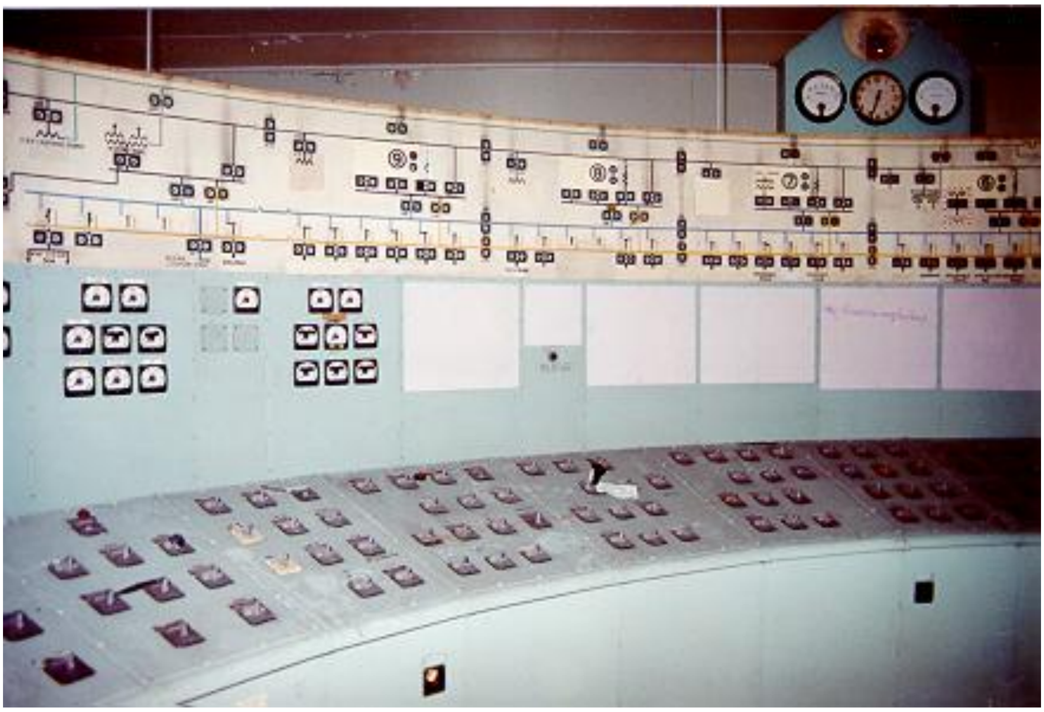
White Bay Heritage Machinery Inventory 2002

Item: Control Room (a, b and c)	Reference No: 6.1



History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

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Item: Control Room (a, b and c)	Reference No: 6.1

History (continued):

The higher steam pressure produced by the four new Boilers installed at the Power Station between 1951 and 1958 powered the two new 50 000 kW Turbo-Alternators in the Turbine Hall. The electrical Power Reticulation System was subsequently modified to reflect the increased output of the alternators.

Description/Function:

The Main Control Room at White Bay is adjacent to Robert Street on the west side of the Turbine Hall building. Constructed after the power station became the property of the Electricity Commission in 1953, the Control Room, and its associated substation continued to operate at White Bay after the generating equipment had closed down. Dials in the Control Room indicate that electricity had been imported into the system, as well as exported from it.

The equipment in the Control Room consists of the main semi-circular Control Panel, with the control switches set out in front of it on a slightly-cambered, semi-circular switchboard attached to the Control Panel. In front of this, within the semi-circular area, are set two timber desks for the Control Room Operators, the one of the left having a timber-encased manual telephone exchange board. The Control Room was linked via telephone and alarm systems to all other sections of the power house, including the Boiler House, Boiler House foreman, the generating room and the generating foreman.

The Control Panel has a series of lights and gauges to indicate the distribution areas of the current. There is also, on a central pediment above the main board, an electric clock, a megawatt dial and a steam pressure dial, vital indicators of the output characteristics of generated electricity.

Behind and beside the Control Panel are a series of electrical cabinets, most of which have meters, dials and switches on their fascia. The selection of watt-hour meters, voltage and amp meters, alarm relays, trip meters, current relay meters, trip links and fuses, are all significant items indicating the development of electric power reticulation in the second half of the twentieth century.

Intactness and Condition:

- The item appears to be in excellent physical condition.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- The item should be cleaned with a dry rag on a weekly basis.
- Any extraneous material should be removed from the item on a weekly basis.

Item: Rheostats	Reference No: 6.2

Location in Building:

Control Room, first floor (CS1.4)

Statement of Significance:

The Rheostats were integral elements in the Power Reticulation System and are among the few surviving relics directly associated with the early Turbo-Alternator sets formerly located in the south end of the Turbine Hall. The Rheostats are rare examples of their type and are evocative of the Power Reticulation System and have the ability to provide information on the operation of the earlier, low pressure, Turbo-Alternators.

Significance Grading: 2

Photo:

Item: Rheostats	Reference No: 6.2

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

A 50 000 kW Parsons Turbo-Alternator set, ordered in 1948, was commissioned in July 1951, shortly before White Bay Power Station came under the control of the Electricity Commission. A second was installed in 1955 although it was used only as a stand-by unit until the completion of the high pressure Boiler House in 1958. The four new Boilers powered the new Turbo-Alternators with higher steam pressure than was possible with the nine Boilers located in the earlier section of the Boiler House. These continued to power the low pressure Turbo-Alternator sets located in the south end of the Turbine Hall until 1975, after which they were progressively phased out and removed.

Description/Function:

There are series of six Rheostats numbered five to ten. These were formerly used to provide the field for the exciters on the Turbo-Alternators five to ten. They are basically a current regulator that advanced the current as the speed of the Turbo-Alternator was advanced. The rheostats are by Brayson Bros Pty Ltd, Sydney, Australia. Two Rheostats bear the legends 'Rheostat No. E55267A', 200 ohms, 5 to 1 amps and, Rheostat No. E55267A, 200 ohms, 5 to 1 amps. The only other legends are instructions as to declutching the handle.

These Rheostats are contained in cabinets standing about 1m high and are about 600mm wide and 800mm deep, with a handle on the face which carries two electrodes, an inner and outer. One of these electrodes bears on an inner continuous circular electrode attached to the marble face of the Rheostat cabinet. The outer electrode bears in a circular ring of individual point electrodes attached to the marble face.

Intactness and Condition:

- The items appear to be in excellent physical condition.

Conservation Policy:

- The items are to be retained in situ and conserved.
- The items should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:
• The item should be monitored or any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis. • The items should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. All visible copper, brass and polished steel components should be polished and their surface appropriately treated. This should be done on a monthly basis.

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White Bay Heritage Machinery Inventory 2002

Item: Cables and Chasers	Reference No: 6.3
Location in Building: Control Room, first floor (CS1.1)	
Statement of Significance: The cables and their chasers were an integral element in the Power Reticulation System and are among the few relics directly associated with the original Switch House. They are representative of mid-twentieth century electrical distribution equipment within discrete industrial complexes and these cables are believed to be the first use of their type in Australia. They are associated with technological developments in the supply of electricity from the beginning of the 20^{th} century through to the middle part of the century.	
Significance Grading: 2	

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Cables and Chasers	Reference No: 6.3

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Description/Function:

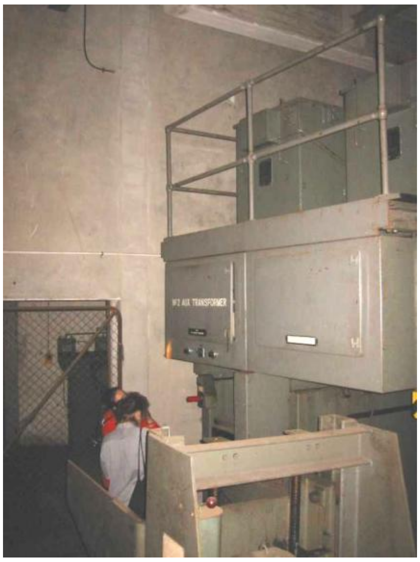
The cables are run in groups along the sides of the bricked walls of the internal cable tunnels, supported by light metal brackets tacked against vertical timber posts lining the wall at approximately one metre intervals. Main power cables are set into concrete channels known as chasers formed against the walls. The cabling formed the linkages between the Control Room and the switches throughout the Switch House and, ultimately, provide the reticulation of electricity to the wider community.

Intactness and Condition: • The items appear to be in excellent physical condition.
Conservation Policy: • The items are to be retained in situ and conserved. • The items should be the subject of a conservation plan prior to any action which intervenes in the fabric.
Conservation Action: • The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
Maintenance Schedule: • The item should be monitored or any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis. • The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. All visible copper, brass and polished steel components should be polished and their surface appropriately treated. This should be done on a monthly basis.

Item: Motor Driven Oil Bath Switches	Reference No: 6.4
Location in Building: No. 1 Tie Bank Group – Switch House (SH2.4) Motor Driven Oil-bath Switches for No. 2 Auxiliary Transformer – Switch House (SHG.5) Bus Bar Circuit Breakers – Switch House (SHG.4)	
Statement of Significance: The Motor Driven Oil-bath Switches are representative of mid twentieth century electrical control, metering and distribution equipment within discrete industrial complexes and illustrate a range of ancillary electrical processes and equipment. They represent technological developments in the supply of electricity from the beginning of the 20th century through to the middle part of the century.	
Significance Grading: 3	

Photo:

No. 1 Tie Bank Group



Motor Driven Oil Bath Switches for No.2 Auxiliary Transformer

Bus Bar Circuit Breaker

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White Bay Heritage Machinery Inventory 2002

Item: Motor Driven Oil Bath Switches	Reference No: 6.4

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Unlike Ultimo Power Station, direct current (DC) was only distributed internally at White Bay Power Station and alternate current (AC) was supplied to the tramway and railway systems.

Description/Function:
The switches in the Switch House include the Transformer and Oil Circuit Breaker Switches, Tie Bank Group and Bus Bar Circuit Breaker.

The No. 2 Auxiliary Transformers were manufactured by Cook & Ferguson Manchester England. The Manufacturer's Plate states: TYPE SE t, No. 111 87, PHASE 3, KW 33, AMPS 800.
The Oil Circuit Breakers below was also manufactured by Cook & Ferguson Manchester England. The Manufacturer's Plate states: TYPE: ES, No. 9859, KV 33. AMPS 800, PHASE 3, ~ 50, BREAKING CAPACITY 1000, MVA ATKV 33, SYM.K.V 13.1, ASYM. K.A. 16.4, MAKING CAPACITY KA: 33.4, SHORT TIME CURRENT 1 SEC KA 13.1, 3 SECS KA 13.1, BS-116-1952.

The Bus Bar Circuit Breaker was manufactured by the English Electric Company Ltd. The Manufacturer's Plate states; B.S.S. 116, Serial No. 75072W/108671C PIPE O.L.F. 413, 33,000 VOLTS, 1,200 AMPS, 50. CYCLES, RUPTING CAPACITY 1.500.000 KVA, SOLEROID OIL 120 DC VOLTS, 3.5 AMPS, STAFFORD WORKS ENGLAND.

The General Electric Manufacturer's Plate states: The General Electric Co. Ltd of England. Oil circuit Breaker to B.S.S 116-1937. TYPE K8, FORM SB, SERIAL No. 45737, VOLTS 33,000, 1200 AMPS, 50 CYCLE, BREAKING CAPACITY 1000 MVA, SYMETRICAL 17,500, ASYMETRICAL 21 875 AMPS, MAKING CAPACITY 44,450 AMPS, SHORT TIME AMPS 1 SEC 17, 500. 5 SEC 17, 500, CLOSING COIL 120, SHORT TIME COIL 120 VOLTS DC.

Intactness and Condition:

- The item appears to be structurally sound

Conservation Policy:

- The item is to be retained in situ and conserved.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
- No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. This should be done on an annual basis.
- Areas of chipped paint should be retouched on an annual basis.

Item: Oil Circuit Breakers	Reference No: 6.5

Location in Building:

Pump House - Ground floor

Statement of Significance:

The Motor Driven Oil-bath Circuit Breakers are representative of mid twentieth century electrical control, metering and distribution equipment within discrete industrial complexes and illustrate a range of ancillary electrical processes and equipment. They represent technological developments in the supply of electricity from the beginning of the 20th century through to the middle part of the century.

Significance Grading: 2

Photo:

Item: Oil Circuit Breakers	Reference No: 6.5

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1983 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

Description:

A set of motor-driven oil-bath electrical switches set in steel cabinets. The fascias are plain, with a row of status lights. Each is labelled with its function, i.e. 1A Feed Pump, No. 2 Auxiliary Group Tie, Tie Group No. 2 Station Transformer, No. 1 Auxiliary Group Tie. The 1A Feed Pump switch has a recorder mounted on its fascia.

Intactness and Condition:

- These switches appear to be intact and in fair condition. They are structurally sound.

Conservation Policy:

- These items should be retained in situ and conserved.

Conservation Action:

- All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
- No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. Areas of chipped paint should be retouched.

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Item: Ash Handling System	Reference No: 7.0

Location in Building:

North-east exterior to Boiler House

Statement of Significance:

a. The Ash Handling System, as an integral element of the White Bay Power Station, has a strong association in the early history of the development of electrical energy and the electrification of the mass transit system in Sydney.

c. The Ash Handling System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.

e. Component parts of the Ash Handling System have some potential to contribute to our understanding of the technology associated with the removal of the waste products of using fossil fuels.

f. The Ash Handling System retains elements specifically designed for the disposal of industrial waste which have become increasingly rare within the modern industrial milieu.

g. The Ash Handling System is an integrated system comprising elements which demonstrate the technologies of their time and it represents the nature and general form of Ash Handling Systems installed in many coal-fired power stations in NSW.

The Ash Handling System is a relic of early attempts to efficiently dispose of industrial waste and to reduce pollution and demonstrates changing attitudes to, and methods in the management of industrial pollution The system has been depleted by the removal of the precipitators which were integral and vital component parts. Those elements which are retained are demonstrative of an operational system developed specifically for White Bay.

The individual elements associated with the Ash Handling System, the Kibble Sets (Item No. 7.1), the Ash Trucks (Item No. 7.2), the Ash Tower and Hoppers (Item No. 7.3) and the Battery Charging System (Item No. 7.4) are representative elements associated with the Ash Handling System. These individual elements are the only extant elements associated with the Ash Handling Operational System and as such they have a high degree of significance due to this association. Those elements that have been removed include the precipitators and the Induction Fans (footings are in situ).

Significance Grading: 2

Photo: N/A

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White Bay Heritage Machinery Inventory 2002

Item: Ash Handling System	Reference No: 7.0

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

White Bay Power Station entered into its third phase of development shortly before it was incorporated under the Electricity Commission's control. The installation of the new steam raining units and Turbo-Alternators was not completed until the late 1950s. Most of the machinery and equipment used in the Ash Handling System was installed as part of the construction of the Boiler House and the installation of associated components during the 1950s.

Description/Function:

The Ash Handling System takes ash from the base of the Boiler furnaces and from the fly ash collectors, including the Precipitators, and collects and stores it for removal off site. Ash was collected at the base of the Boiler Furnaces in a water trough through which ran a drag-link conveyor and the resulting slurry was deposited in an Ash Hopper, where it was thickened and then trucked off site. Fly ash in the exhaust gases was largely removed by electrostatic precipitators (completely removed) installed at the base of the chimney Stacks (Item No. 2.8). Ash collected by the precipitators was united with the furnace ash for disposal.

The Ash Kibbles and associated Trucks were a contingency system, available if there was any trouble with the water trough system. Ash could be dumped straight from the ash collector at the bottom of the Furnace (Item No. 2.4a) into the Kibbles and carried outside.

The Ash Handling System consists of:

7.1 Ash Kibble Sets
7.2 Ash Trucks
7.3 Ash Tower

Intactness and Condition:

See individual items

Conservation Policy: See individual items
Conservation Action: See individual items
Maintenance Schedule: See individual items

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White Bay Heritage Machinery Inventory 2002

Item: Ash Kibble Sets	Reference No: 7.1
Location in Building: North-east exterior to Boiler House	
Statement of Significance: The Kibble Sets are integral elements of the Ash Handling System. They demonstrate one of the ash handling processes utilised at White Bay and are evocative of the labour-intensive, by today's standards, nature of the system when in operation.	
Significance Grading: 3	

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Ash Kibble Sets	Reference No: 7.1

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

White Bay Power Station entered into its third phase of development shortly before it was incorporated under the Electricity Commission's control. The installation of the new steam raining units and Turbo-Alternators was not completed until the late 1950s. Most of the machinery and equipment used in the Ash Handling System was installed as part of the construction of the Boiler House and the installation of associated components during the 1950s.

Description/Function:

The waste product at the end of the electricity generation process, ash, passed through the ash chutes from the Boilers (Item No. 2.4) to large buckets or Kibbles. The Kibbles were carried by special battery-powered Trucks (Item No. 7.2) to the Ash Tower (Item No. 7.3). The final process entailed deposition into the Ash Hoppers from whence it was taken off site by Trucks. The Kibbles, measuring approximately 2m by 3m by 2.5m, were removed by battery-powered trucks to a crane where they placed on motor carriers. The Kibbles were fitted with trunnion pins to facilitate lifting.

Intactness and Condition:

- The items appear to be structurally sound.
- The items exhibit a light bloom of rust on their surface.

Conservation Policy:

- The items are to be retained in situ and conserved.

Conservation Action:

- Initial investigation indicates the following action may be undertaken.
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - All parts exhibiting rust should be brushed with a wire brush to sound (not clean) metal..
  - Remaining rust should be converted with Emertan or similar.
  - Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

Item: Ash Trucks	Reference No: 7.2

Location in Building:

North-east exterior to Boiler House

Statement of Significance:

The Ash Trucks are integral elements of the Ash Handling System. They provide evidence of the labour intensive methods of removal of ash from the Boiler. The Ash Trucks are early examples of electrically powered industrial vehicles.

Significance Grading: 2

Photo:

White Bay Heritage Machinery Inventory 2002

Item: Ash Trucks	Reference No: 7.2

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

White Bay Power Station entered into its third phase of development shortly before it was incorporated under the Electricity Commission's control. The installation of the new steam raining units and Turbo-Alternators was not completed until the late 1950s. Most of the machinery and equipment used in the Ash Handling System was installed as part of the construction of the Boiler House and the installation of associated components during the 1950s.

Description/Function:

The purpose built, low loading, rigid frame, battery powered Ash Trucks removed the Ash Kibbles (Item No. 7.1) from beneath the Boiler ash discharge chute and conveyed it to the Kibble Crane located on the Ash Tower (Item No. 7.3). The Kibbles were lowered onto motor lorries and the ash dumped. The Ash Trucks were placed in the Ash Truck Cage for recharging of batteries overnight.

Intactness and Condition:

- The items exhibit a light bloom of rust on their surface but otherwise appears to be in good order.
- The items appear to be complete.

Conservation Policy:

- The paint system has broken down and the item exhibits a degree of corrosion.
- The item appears to be functional should a power source be available.
- A conservation plan should be prepared for the items.
- The items should be restored to operating condition.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- This will depend on the recommendations contained in the Conservation Plan.

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White Bay Heritage Machinery Inventory 2002

Item: Ash Tower	Reference No: 7.3

Location in Building:

North-east exterior to Boiler House

Statement of Significance:

The Ash Tower is an integral part of the Ash Handling System and the efficient disposal of the ash waste. The Ash Tower is an evocative visual and aesthetic element of the power station which is now a rare element of the industrial environment where it was once common.

Significance Grading: 1

Photo:

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Item: Ash Tower	Reference No: 7.3

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

White Bay Power Station entered into its third phase of development shortly before it was incorporated under the Electricity Commission's control. The installation of the new steam raining units and Turbo-Alternators was not completed until the late 1950s. Most of the machinery and equipment used in the Ash Handling System was installed as part of the construction of the Boiler House and the installation of associated components during the 1950s. The ash tower was manufactured by the Department of Railways in 1952/3.

Description/Function:

The Ash Tower is a four-storey high steel-framed tower attached to the north-east corner of the Boiler House which primarily contains two Ash Storage Tanks, which are large cylindrical steel Hoppers into which the ash collected in the various collectors and Hoppers around the Boilers was conveyed. The Hoppers are mounted in the upper section of the tower running over , standing over a large truck-loading bay, occupying the southern half of the Tower. At White Bay Power Station, ash was transported off-site and disposed of in various ways, including as landfill.
The northern side of the Ash Tower contains, on the eastern side, a concrete walled two-storey building (commencing above ground on the first floor level). Above this, the next level of building covers the full extent of the northern half of the Ash Tower is clad in corrugated iron with a skillion roof and appears to contain two internal floors. Access into this building was not possible and its contents is unknown.

The western side of the northern half of the tower is largely open, with a steel framed stair and a large RSJ projecting out on the northern side as a cathead bream. This beam has a substantial electric hoist installed on it, which has a rigid lifting beam fitted with twin-hooks suspended from the cable of the winch. These twin hooks fit the trunnions of the Ash Kibbles and the winch provided vertical lifting for the emptying of the Kibbles into Trucks.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface with areas of deeper corrosion and some possibly in irreparable condition.

Conservation Policy:

- The item is to be retained in situ and conserved
- Interpretation to acknowledge integral place in the Power Generating System as well as within the operational history of White Bay Power Station.
- The item should be the subject of a Conservation Plan prior to any action which intervenes in the fabric.

Conservation Action:

- All items exhibiting rust should be brushed with a wire brush to sound (not clean) metal.
- Remaining rust should be converted with Emertan or similar.
- Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar, according to the Conservation Plan.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

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Item: The House Electrical & Auxiliary Power Supply System	Reference No: 8.0

Location in Building:

Switch House

Statement of Significance:

a. The House Electrical and Auxiliary Power Supply System , as an integral element of the White Bay Power Station, has a strong association with the early history of the development of electrical energy and the electrification of the mass transit system in Sydney.

c. The House Electrical and Auxiliary Power Supply System is comprised of an evocative series of structures and machines reminiscent of the industrial milieu of the early 20th century.

e. The House Electrical and Auxiliary Power Supply System is a vital component part in the production of electrical energy and consists of component parts which relate closely to the in-house supply of electricity and to the reticulation of electricity into the wider Sydney community. The diverse elements within this system represent the technological developments in the supply of electricity from the beginning of the 20th century through to the middle part of the century.

f. The House Electrical and Auxiliary Power Supply System retains elements which are no longer extant within the modern system of electrical power generation. These elements contribute to the overall rarity of the machinery and equipment extant at White Bay.

g. The House Electrical and Auxiliary Power Supply System is representative of mid twentieth century electrical control, metering and distribution equipment within discrete industrial complexes and illustrates a range of ancillary electrical processes and equipment.

The House Electrical and Auxiliary Power Supply System demonstrates the historical development of increasingly complex methods of electrical energy production and reticulation. The power station retains elements contemporary with the earliest phase in electrical power generation through to the most sophisticated technology relating to electrical distribution management prior to the introduction of transistors and integrated circuits. The system retains diverse elements that are now extremely rare and have a high technical value, particularly as they are in situ at the power station.

Significance Grading: 1

Photo:
N/A

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White Bay Heritage Machinery Inventory 2002

Item: The House Electrical & Auxiliary Power Supply System	Reference No: 8.0

History/Function:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tramway and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Unlike Ultimo Power Station, direct current (DC) was only distributed internally at White Bay Power Station and alternate current (AC) was supplied to the tramway and railway systems. Batteries, Battery Boosters and Rectifiers for charging the Batteries and modifying electrical current remain from the early twentieth century. Switchboards and Motor-Generators from the second inter-war phase also remain, in addition to equipment that replaced obsolete machinery in the 1950s, 1960s and 1970s.

Description:

White Bay Power Station, as well as supplying high-voltage electricity to the Interconnected State Grid, utilised electricity networks within the building to power lights, motors and miscellaneous equipment. As well, an emergency network was installed to provide light and power to the building in the event of a major disruption to the usual supply methods.

The primary networks were the 240 volt AC normal domestic supply, reticulated around the building to various distribution boards, the 120 volt DC House Lighting and Control Supply, the 600 volt DC Supply for the original heavy-duty Electric Motors installed in the building, such as the Overhead Cranes, and the 415 volt AC supply for the more modern heavy-duty Electric Motors and supply to the Rectifiers. Many of these networks are no longer intact or able to be traced owing to the level of removal of equipment in the last decade. Evidence of the various networks is retained in various components, especially Switchboards, located in various places throughout the power station buildings.

The House Electrical and Auxiliary Power Supply System consists of:

8.1 Disused No. 1 Battery Booster
8.2a) Motor-Generator Set 2
8.2b) No. 2 Motor-Generator Switchboard
8.3 Motor-Generator No. 3
8.4 Motor-Generator No. 4
8.5 Battery Charger Unit (Mercury Arc Rectifier)
8.6 No. 1 Booster
8.7 Rectifier Sets 1 and 2
8.8 Switchboard
8.9 Batteries
8.10 Pedestal Drill
8.11 Selenium Rectifier for charging Ash Carts
8.12 Switch House Lighting Board
8.13 Switchboard in Motor-Generator Room
8.14 Battery Charging Switchboard
8.15 Air Compressor
8.16 25 Cycle Switches

Intactness and Condition: See individual items
Conservation Policy: See individual items
Conservation Action: See individual items
Maintenance Schedule: See individual items

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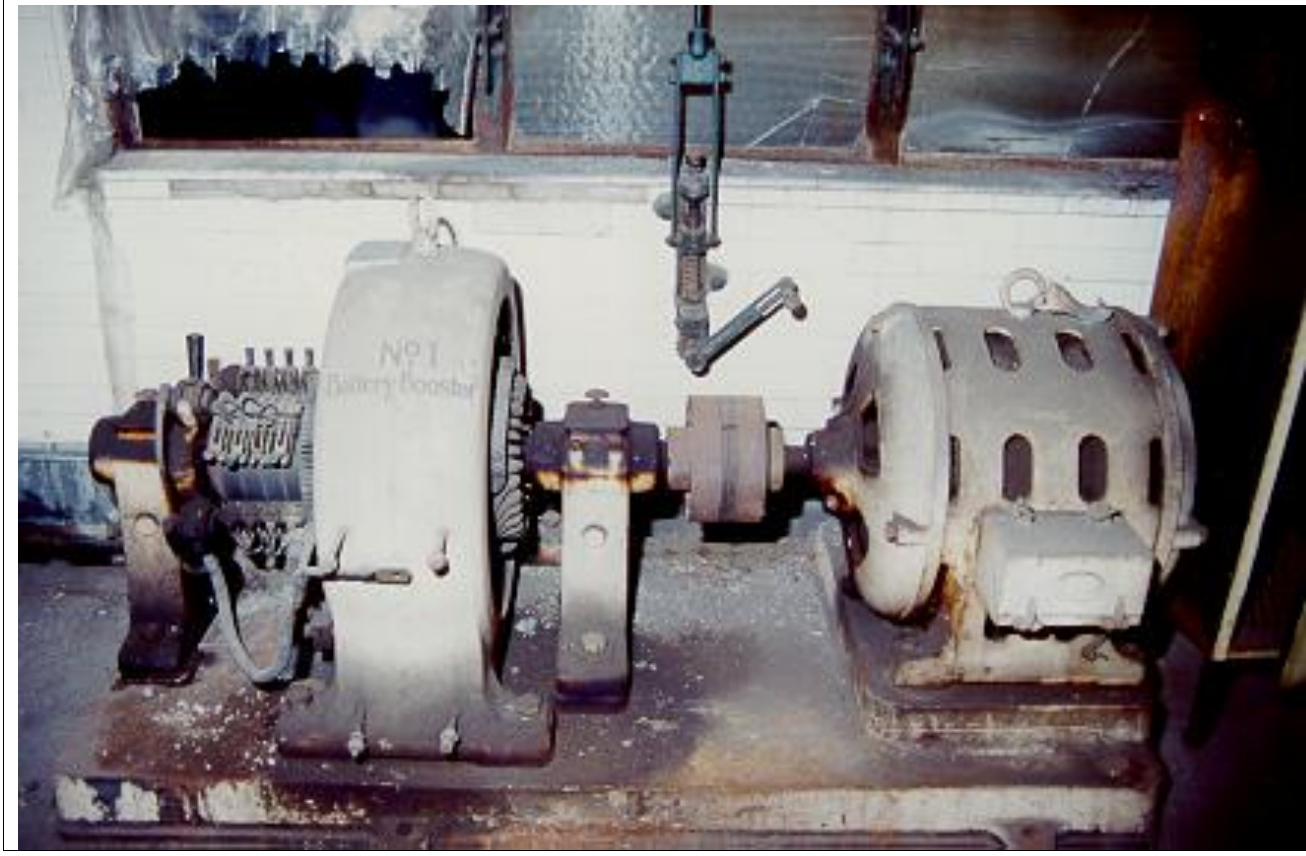
White Bay Heritage Machinery Inventory 2002

Item: Disused No. 1 Battery Booster	Reference No: 8.1
Location in Building: Switch House (4.12)	
Statement of Significance: The Disused No. 1 Booster is an integral element in the in-house House Electrical and Auxiliary Power Supply System . It is representative of the influences of English technology and engineering design.	
Significance Grading: 2	

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Disused No. 1 Battery Booster	Reference No: 8.1

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Elements of Batteries, Boosters and Rectifiers for charging the Batteries and modifying electrical current, remain from the early twentieth century. Switchboards and Motor-Generators from the second inter-war phase also remain, in addition to equipment that replaced obsolete machinery in the 1950s, 1960s and 1970s.

Description/Function:

The Disused No. 1 Battery Booster has been moved into the Workshop, immediately south of the Motor-Generator room, from an unknown location and it is not permanently mounted on the floor. The Battery Booster produced direct current for charging to the Batteries. The Motor is a 415 volt 3-phase 50 cycle AC Motor operating at 960 rpm manufactured in 1925 by the Electric Construction Co Ltd of Wolverhampton. The 125 kW Dynamo was also manufactured by the Electric Construction Ltd of Wolverhampton in 1925, producing 1000 amps at 125 volts. The most outstanding feature of this is the completely open commutator and brushwork.

Intactness and Condition:

- The item appears to be structurally sound.
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken.
  - The piece should be brushed clean with a bristle brush and neutral pH detergent and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.
- Areas of chipped paint should be retouched. This should be done on an annual basis.
- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated.

Item: Motor Generator Set 2	Reference No: 8.2a

Location in Building:

Switch House (4.9)

Statement of Significance:

The Motor-Generator set is amongst the oldest items in the power station and represents an era when direct current was generated though a generator powered by an AC motor. The item evidences early electrical power technology and was the forerunner of the Rectifier. The item represents early manufacturing technology through the massive cast iron bed, bearing blocks and cowling.

Significance Grading: 1

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Motor Generator Set 2	Reference No: 8.2a

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Unlike Ultimo Power Station, direct current (DC) was only distributed internally at White Bay Power Station and alternate current (AC) was supplied to the tramway and railway systems. The Motor Generator No. 2 Set was introduced to facilitate DC power to various items throughout the station in the 1920s.

Description/Function:

The largest of the Motor-Generators at White Bay, designated as MG No. 2, is now located in the former Control Room and was manufactured by the General Electric Corp. of Birmingham, England. It is a 415-volt, 3-phase Motor, operating at 50 cycles and 750 rpm, flexibly-coupled to the General Electric 125kW DC Generator, operating at 750 rpm producing 125 volts and 1000 amps.

Intactness and Condition:

- The item appears to be structurally sound
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a Conservation Plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken.
    - The piece should be brushed clean with a bristle brush and neutral pH detergent and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
    - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
    - No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated on a monthly basis.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.
- Areas of chipped paint should be retouched on an annual basis.

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White Bay Heritage Machinery Inventory 2002

Item: No. 2 Motor-Generator Switchboard	Reference No: 8.2b

Location in Building:

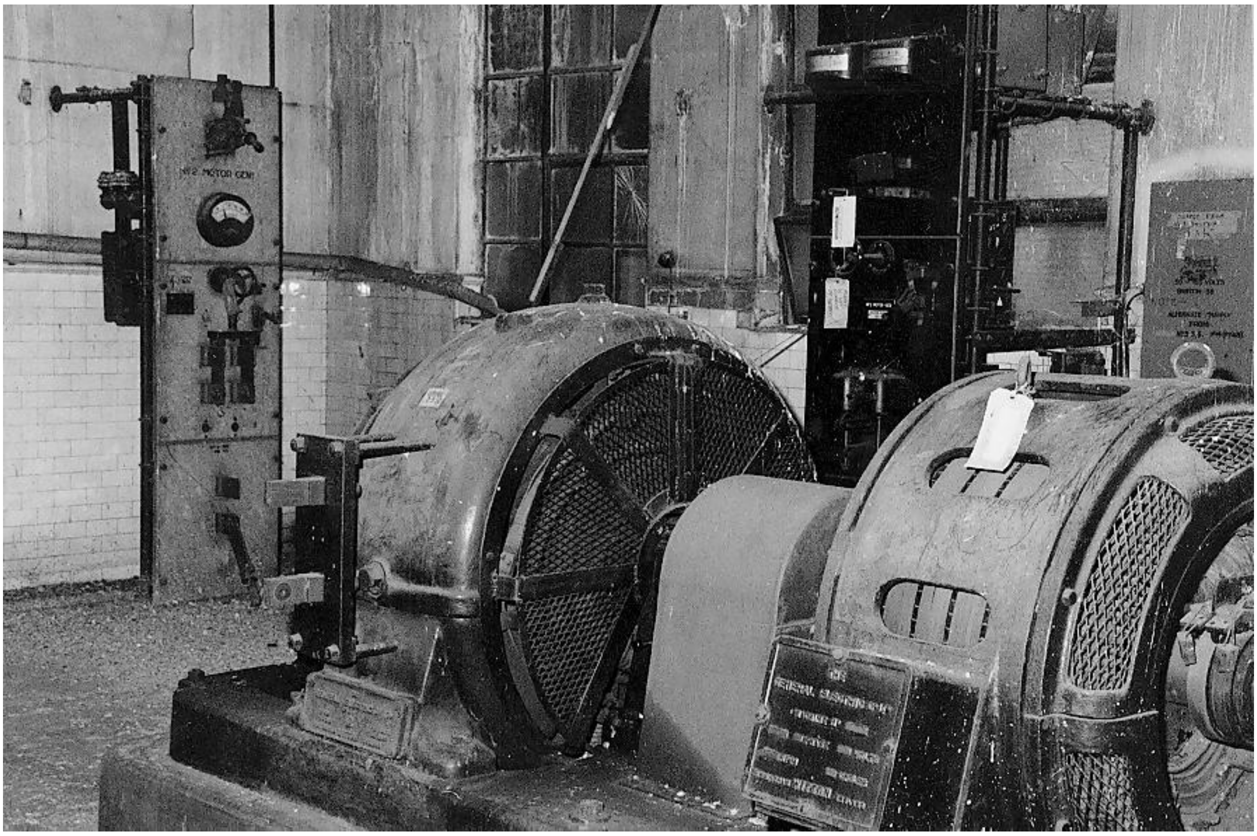
Switch Board (4.9)

Statement of Significance:

The No. 2 Motor-Generator Switchboard is among the oldest items associated with the House Electrical and Auxiliary Power Supply System at the station. The Switchboard is representative of the influences of English technology and engineering design.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: No. 2 Motor-Generator Switchboard	Reference No: 8.2b

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Unlike Ultimo Power Station, direct current (DC) was only distributed internally at White Bay Power Station and alternate current (AC) was supplied to the tramway and railway systems. The Motor Generator No. 2 Set was introduced to distribute DC power to various items throughout the station in the 1920s.

Description/Function:

There are two Switchboards associated with Motor-Generator No. 2, now located in the former Control Room. The 120 volt DC feeder Board of white marble is standing against the east wall and the 415 50-cycle Board of slate is against the south wall. Both Boards stand about 2.5 metres high. The AC Board is equipped with a circuit breaker, a main knife switch and a voltage regulating handle. Mounted on the upper panel is a direct-current ammeter and a Thompson AC ammeter, both by General Electric Co, of Schenectady, New York, USA.

Intactness and Condition: • The item appears to be structurally sound. • The paint system on some parts has broken down and the item exhibits a degree of corrosion.
Conservation Policy: • The item is to be retained in situ and conserved. • The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:
• The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
• Initial investigation indicates the following action may be undertaken:
  • The piece should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  • All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  • No ancillary items or attachments such as wiring, signage or cards should be removed

Maintenance Schedule: • The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on a monthly basis. • All visible copper, brass and polished steel components should be polished and their surface appropriately treated on a monthly basis. • The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

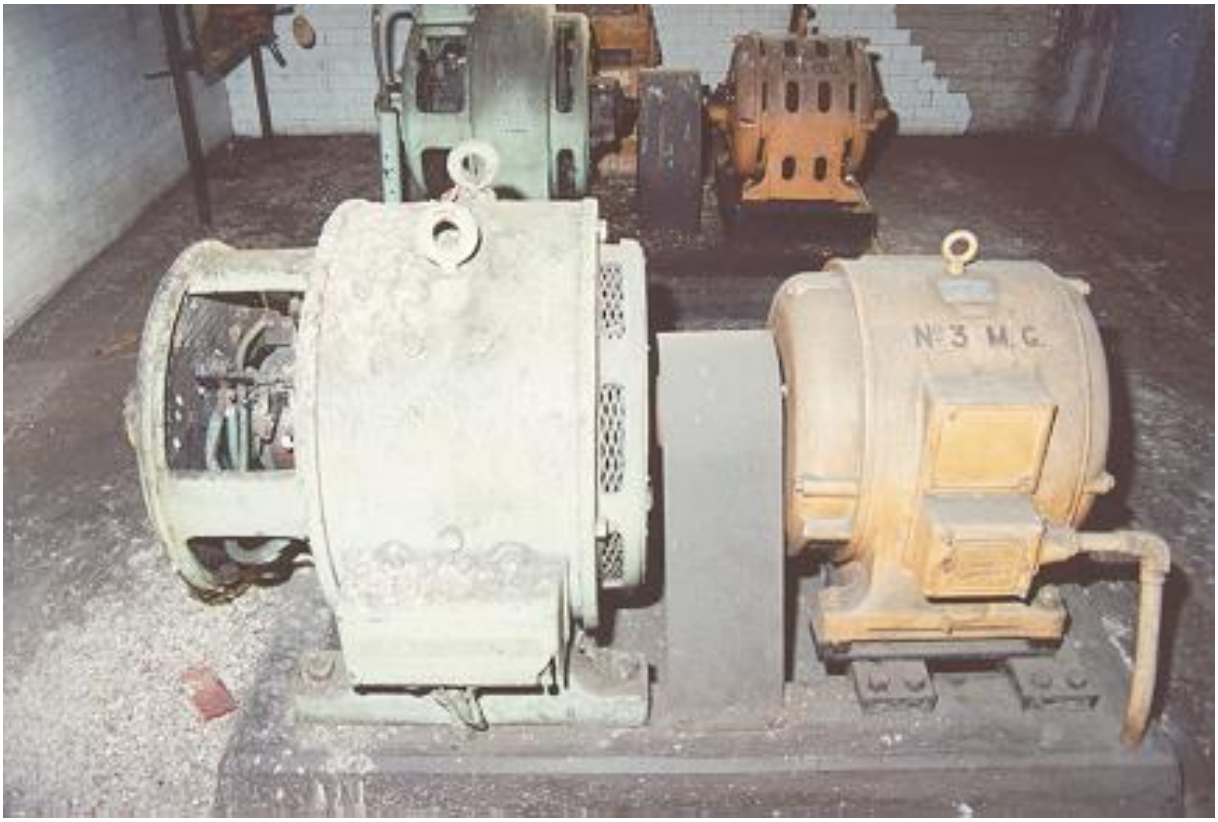
Item: Motor-Generator 3 MG	Reference No: 8.3
Location in Building: Switch House, located between the No. 1 Booster and No. 4 Motor-Generator (4.10).	

Statement of Significance:

The Crompton Parkinson Motor-Generator No. 3 is an integral element in the in-house House Electrical and Auxiliary Power Supply System . It is representative of the influences of English technology and engineering design. It enriches early electrical machine technology though its open brushwork and commutator (now partially enclosed).

Significance Grading: 1

Photo:



Item: Motor-Generator 3 MG	Reference No: 8.3

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Elements of Batteries, Boosters and rectifiers for charging the Batteries and modifying electrical current, remain from the early twentieth century. Switchboards and Motor-Generators from the second inter-war phase also remain, in addition to equipment that replaced obsolete machinery in the 1950s, 1960s and 1970s.

Description/Function:

MG No. 3 is located between the No. 1 Booster and No. 4 Motor-Generator in the Motor-Generator room on the south side of the former Control Room. It has a 415 volt, 3-phase motor by Crompton Parkinson of Australia, operating at 705 rpm, which is flexibly coupled to a shunt-wound DC Generator, manufactured by Westinghouse Electric and Manufacturing Co Ltd, Manchester, England. It has a capacity of 12.5 kilowatts, producing 100 amps at 110 volts. A painted sign on this indicates it was last overhauled on 3 May 1954. This machine appears to be one of the original 25 cycle Motor-Generator sets (see Myers) which has subsequently had its Westinghouse 25 cycle AC Motor replaced with a Crompton Parkinson 50 cycle AC Motor after 25 cycle power ceased to be produced at White Bay.

Intactness and Condition:

- The item appears to be structurally sound.
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken.
  - The piece should be brushed clean with a bristle brush and neutral pH detergent and water and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on a monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated on a monthly basis.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis. Areas of chipped paint should also be retouched annually.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied annually. This should

be done on an annual basis.

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White Bay Heritage Machinery Inventory 2002

Item: Motor-Generator 4 MG	Reference No: 8.4

Location in Building:

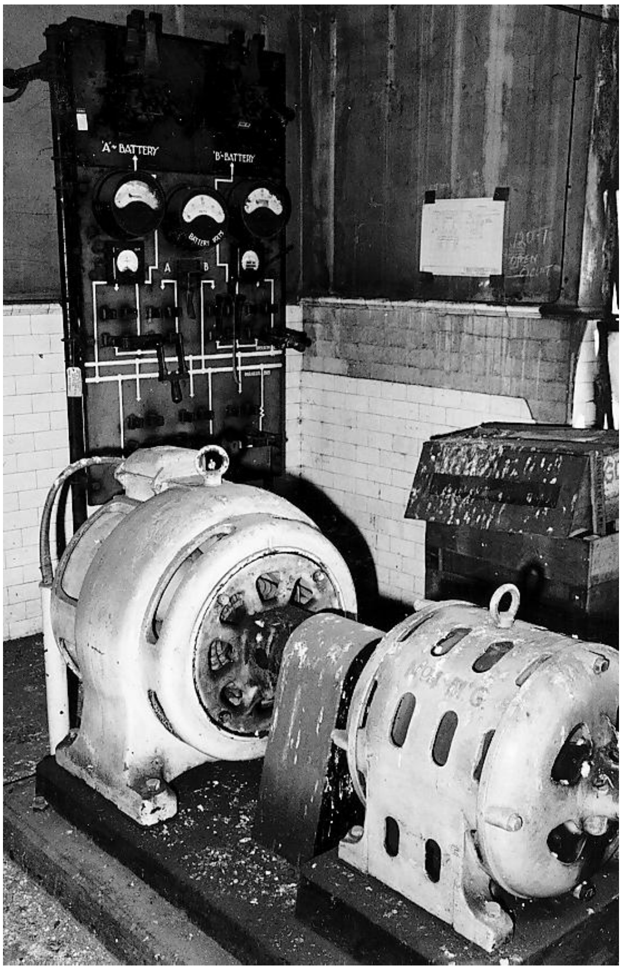
Switch House (4.10)

Statement of Significance:

The Motor-Generator No. 4 is an integral part of the in-house House Electrical and Auxiliary Power Supply System . It is representative of the inter-war period of electrical generation at White Bay Power Station and of the influence of English technology and engineering.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Motor-Generator 4 MG	Reference No: 8.4

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

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Description/Function:
Located in the Motor-Generator room on the south side of the former Control Room, MG No. 4 has a 415 volt, 3-phase Motor, producing 25 HP and operating at 1050 rpm, by Electric Construction Co Ltd, of Wolverhampton, UK, dated 1925. It is flexibly coupled to an Electric Construction Co Ltd DC Dynamo, again dated 1925, which is rated at 125–165 volts, operating at 960 rpm, producing at 100 amp maximum.

Intactness and Condition:

- The item appears to be structurally sound.
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken:
  - The piece should be brushed clean with a bristle brush and neutral pH detergent and water and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on a monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated on a monthly basis.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis. Areas of chipped paint should also be retouched annually.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied annually. This should be done on an annual basis.

Item: Battery Charger Unit – Mercury Arc Rectifier	Reference No: 8.5

Location in Building:

Switch House (4.10)

Statement of Significance:

The Battery Charger Mercury-Arc Rectifier is an integral element in the in-house House Electrical and Auxiliary Power Supply System . It is representative of the influences of English technology and engineering design. It has particular and impressive aesthetic qualities.

Significance Grading: 2

Photo:

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Item: Battery Charger Unit – Mercury Arc Rectifier	Reference No: 8.5

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

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Description/Function:

The Rectifier Cabinet (2m high and about 700mm square) is identified as manufactured by Electric Control and Engineering Ltd, Australia. The primary input voltage was 415 volts, 3-phase at 50 cycles and the output was 160 DC volts maximum and 100 amperes max. In the event that the drain on the Batteries became excessive, there were a number of Motor-Generators that could be used to supplement the current supplied by the Batteries. Overall, however, Batteries were preferred, as Motor-Generators deliver power at an uneven rate.

Intactness and Condition:

- The item appears to be structurally sound.
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken:
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    - No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied.
- Areas of chipped paint should be retouched.

Item: No 1 Booster	Reference No: 8.6

Location in Building:

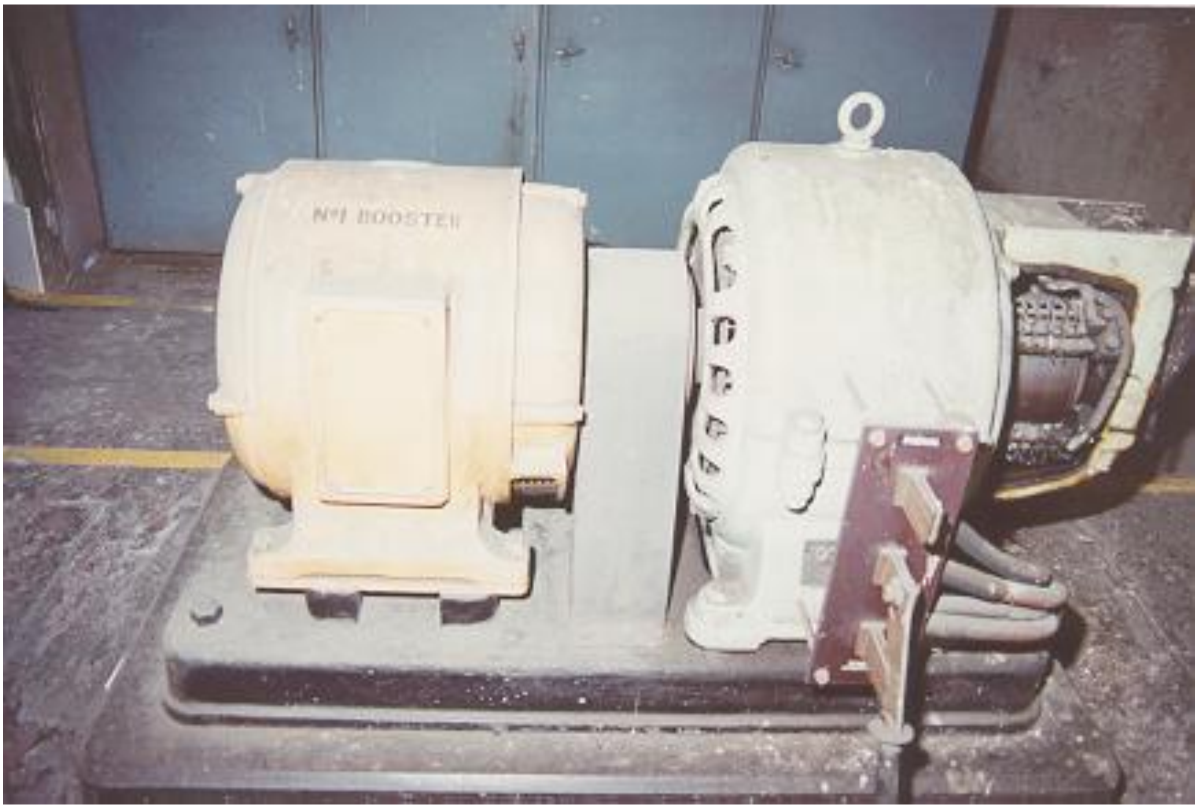
South wall Switch House (4.10)

Statement of Significance:

The Battery Booster Set No. 1 is one of the oldest items in the Boiler House. It represents an era where direct current was generated through a Generator powered by an AC Motor. The item evidences early electrical power technology though its open brushwork and commutator.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: No 1 Booster	Reference No: 8.6

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Elements of Batteries, Battery Boosters and rectifiers for charging the Batteries and modifying electrical current, remain from the early twentieth century. Switchboards and Motor-Generators from the second inter-war phase also remain, in addition to equipment that replaced obsolete machinery in the 1950s, 1960s and 1970s.

Description/Function:

The No. 1 Battery Booster motor is by Crompton Australia (Australia) Pty Ltd. It is a 3-phase, 450 volt, 50 cycle Motor operating at 720 rpm, which is flexibly coupled to a shunt-wound DC Generator producing 100 amps at 50 volts, manufactured in 1912 by Lancashire Dynamo and Motor Co Ltd, Trafford Park, Manchester. This machine appears to be one of the original 25 cycle Motor-Generator sets (see Myers) which has subsequently had its L. D. & M Co. 25 cycle AC Motor replaced with a Crompton Parkinson 50 cycle AC Motor after 25 cycle power ceased to be produced at White Bay.

The No. 1 Booster was used to boost the current from the Batteries for the house system, while the two Motor-Generator sets were used as back-up for battery charging in case of failure by the ECE rectifier.

Intactness and Condition:

- The item appears to be structurally sound
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken:
  - The pieces should be brushed clean with a bristle brush, neutral pH detergent and water and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on a monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated on a monthly basis.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis. Areas of chipped paint should also be retouched annually.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied annually. This should be done on an annual basis.

Item: Rectifier 1 and 2	Reference No: 8.7

Location in Building:

Former main control room (Switch House)

Statement of Significance:

The Mercury-Arc Rectifiers No. 1 and No. 2 were integral to the in-house House Electrical and Auxiliary Power Supply System . They are representative of the influences of English technology and engineering design in Australia. They have particular and impressive aesthetic qualities, however, the removal of bottles has compromised their integrity to a notable degree.

Significance Grading: 3

Photo:

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Item: Rectifier 1 and 2

Reference No: 8.7

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Unlike Ultimo Power Station, direct current (DC) was only distributed internally at White Bay Power Station and alternate current (AC) was supplied to the tramway and railway systems. Elements of Batteries, Battery Boosters and rectifiers for charging the Batteries and modifying electrical current, remain from the early twentieth century. Switchboards and Motor-Generators from the second inter-war phase also remain, in addition to equipment that replaced obsolete machinery in the 1950s, 1960s and 1970s.

Description/Function:

A further two Hewittic Arc Rectifiers of the bottle type, designated as Rectifier No. 1 and Rectifier No. 2 are located in the 120 Switchboard room. These are both in steel cabinets fitted with ammeters and voltmeters. These Rectifiers were used to supply power directly to the Overhead Travelling Cranes, the Office lift, the Switchhouse lift and the Boiler House lift at 600V DC. These Rectifiers did not act, however, through a bank of Batteries but directly supplied the Cranes and Lifts.

Intactness and Condition:

- The item appears to be structurally sound however the bottles are no longer present.
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved. Replacement bottles should be sought.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken:
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on a monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated on a monthly basis.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis. Areas of chipped paint should also be retouched annually.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied annually. This should be done on an annual basis.

Item: Switchboard (marble) in Motor-Generator Room	Reference No: 8.8

Location in Building:

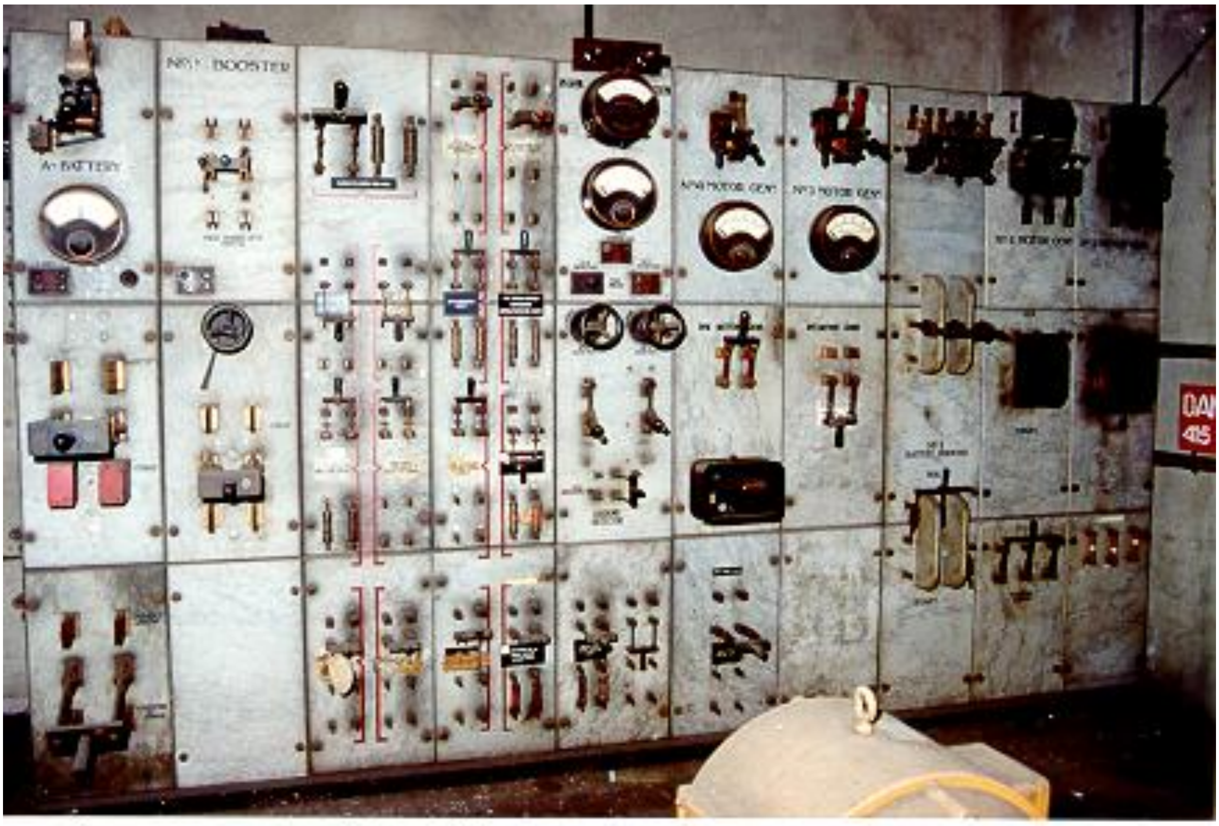
Switch House (4.10)

Statement of Significance:

The marble Switchboard is an example of an early twentieth century switchboard evidencing voltmeters and ammeters of now rare configurations, copper knife switches and open air circuit breakers. The item is evocative of early electrical Switch House technology and has impressive aesthetic qualities.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Switchboard (marble) in Motor-Generator Room	Reference No: 8.8

History:

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The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Elements of Batteries, Battery Boosters and rectifiers for charging the Batteries and modifying electrical current, remain from the early twentieth century. Switchboards and Motor-Generators from the second inter-war phase also remain, in addition to equipment that replaced obsolete machinery in the 1950s, 1960s and 1970s.

Description/Function:

The centrepiece of the former Control Room is the 10x3 (30) piece white marble Switchboard against the north wall. This board is for the distribution of the 120 volt DC current used throughout the station for lighting and control. It is fitted with several open-air circuit breakers, three ammeters, a voltmeter, a ground detector and a number of emergency control switches for Control Room operating supply, lift operating supply and overall operating supply.

Located against the east wall in the former Control Room is the Switch House Lighting

Board, which includes the 120 volt DC emergency supply Contactor and the 240 volt AC normal supply Contactor.

Intactness and Condition:

- The item appears to be structurally sound.
- The paint system has broken down and the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken:
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on a monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated on a monthly basis.
- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis. Areas of chipped paint should also be retouched annually.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied annually. This should be done on an annual basis.

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White Bay Heritage Machinery Inventory 2002

Item: Batteries	Reference No: 8.9

Location in Building:

Switch House (4.12)

Statement of Significance:

The extant battery of lead-acid Wet Cells is a remnant of an originally much-larger battery system. The system of Batteries at the power station evidences the need for an auxiliary or emergency supply of power for the power station in case of failure of the main supply. The remaining wet cells illustrate the method by which electrical power was stored in the early twentieth century.

Significance Grading: 2

Photo:

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Item: Batteries	Reference No: 8.9

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Unlike Ultimo Power Station, direct current (DC) was only distributed internally at White Bay Power Station and alternate current (AC) was supplied to the tramway and railway systems. Elements of Batteries, Battery Boosters and rectifiers for charging the Batteries and modifying electrical current, remain from the early twentieth century. Switchboards and Motor-Generators from the second inter-war phase also remain, in addition to equipment that replaced obsolete machinery in the 1950s, 1960s and 1970s.

Description/Function:

The Battery Room, on the south side of the Battery Workshop, has been denuded of Batteries, except for a remnant group of six lead-lined, wooden-framed Battery cells, numbered 51 to 56. The lead is still in place, although in poor condition, and there has been significant deterioration of the timber boxes. These open celled Batteries are now rare in Sydney and have a high degree of significance. All components of the wet cells have shown considerable deterioration and great care will be required to ensure their survival. The floor of the Battery Room is lined in lead, including the guttering along each wall. The floor is cambered from the centre to the gutters and the lead lining rises about 300mm up the four walls.

Intactness and Condition:

- The item appears to be in poor condition with timber and metallic parts badly effected by acid attack.
- The paint system has broken down and all components of the item exhibits a degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- According to the Conservation Plan.

Item: Pedestal Drill	Reference No: 8.10

Location in Building:

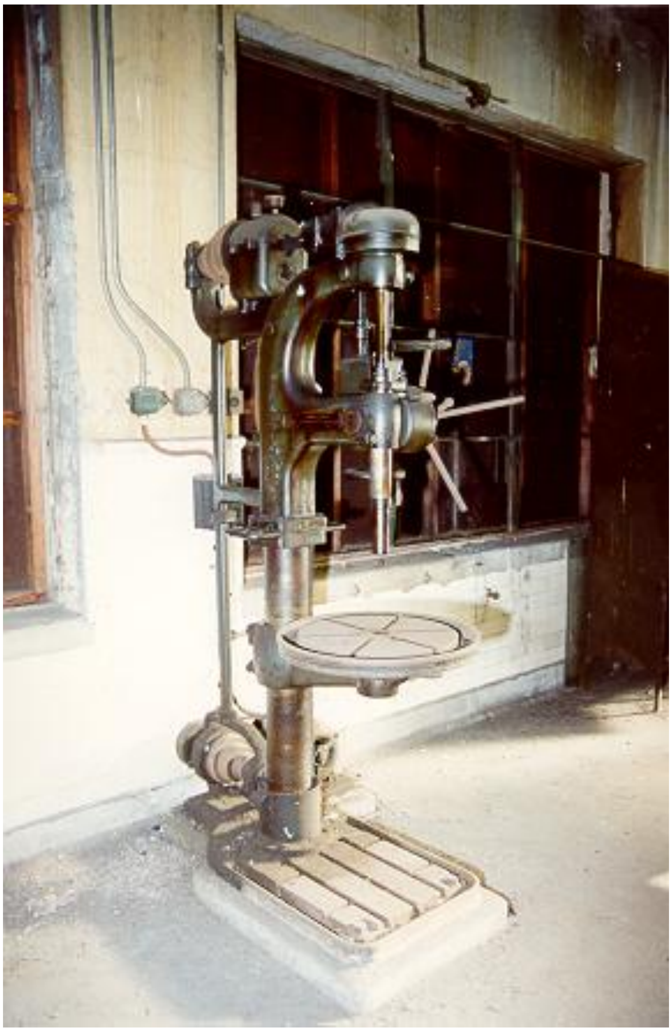
Switch House (4.11)

Statement of Significance:

The Pedestal Power Drill evidences the need of an in-house Workshop. The item is representative of a class of power tools which could be powered by a stand alone motor or a lineshaft belt. It is a beautifully designed and constructed precision power tool manufactured in Australia prior to 1920.

Significance Grading: 2

Photo:



Fax: (02) 9319 4383

White Bay Heritage Machinery Inventory 2002

Item: Pedestal Drill	Reference No: 8.10

History:

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Description/Function:

There is a single, rather magnificent Pedestal Drill by PRP (Paul Roberts and Parsons Pty Ltd of Sydney) located in the Battery Workshop. This precision instrument appears to date from the period of the First World War and, because it is Australian-made, is a very significant item.

Intactness and Condition:

- The item appears to be structurally sound and in good order and is in operating condition.

Conservation Policy:

- The item is to be retained in situ and conserved.

Conservation Action:

- Initial investigation indicates the following action should be undertaken.
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - Remaining rust should be converted with Emertan or similar.
  - Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.

Maintenance Schedule:
• The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

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White Bay Heritage Machinery Inventory 2002

Item: Selenium Rectifiers for charging Ash Carts	Reference No: 8.11
Location in Building: Boiler House, southeast corner, first floor (BHG. 1A)	
Statement of Significance: The Selenium Rectifier for charging Ash Trucks is integral to the House Electrical and Auxiliary Power Supply System . It provides a link with the Ash Handling System and the efficient disposal of the ash waste from the Electrical Generating System. The Battery Charging System indicates the method of charging the Batteries of the Ash trucks.	
Significance Grading: 2	

Photo:

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White Bay Heritage Machinery Inventory 2002

Item: Selenium Rectifiers for charging Ash Carts	Reference No: 8.11

History:

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Description/Function:

The Selenium Rectifier for charging Ash Trucks is integral to the Auxiliary Electrical System and provides a link with the Ash Handling System. The Battery Charging System indicates the method of charging the Batteries of the Ash Carts.

Two Selenium Rectifiers are located in the north-east corner of the Boiler House. These took power at 415 volts AC and converted it to DC, probably at 600 volts. However, there is no indication as to where the DC current was used. The Selenium Rectifiers are approximately 1.8m high and the cabinets are approximately 800mm by 800mm. Immediately above the name plate on the front panel of the cabinets are a green and a red light, flanked by two dials, one showing the charging current in amperes DC and the other is a voltmeter in volts DC, measuring the outgoing current. The incoming current was 415 volts. There is a start/stop button on the right-hand side and, on the left, is a simple gauge running from one through to five. Below is the main on/off switch, above a handle attached to a semi-circular half drum. The handle moves through a slot in the drum and its precise function is unknown. Also unexplained is the function of two bakelite knobs approximately 70mm in diameter, located on either side of the on/off switch. One has the inscription 'Fine' above it, the other has inscription 'Coarse'. The arrow pointing to the right in both cases says 'Raise'.

Intactness and Condition:

- The items appear to be structurally sound.
- The items exhibit a light bloom of rust on this surface.
- The paint system has broken down and the item exhibits a degree of corrosion.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- In the interim, the pieces should be brushed clean with a bristle brush and all dust and grime removed from their immediate vicinity with an industrial vacuum cleaner.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.

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White Bay Heritage Machinery Inventory 2002

Item: Switch House Lighting Board	Reference No: 8.12

Location in Building:

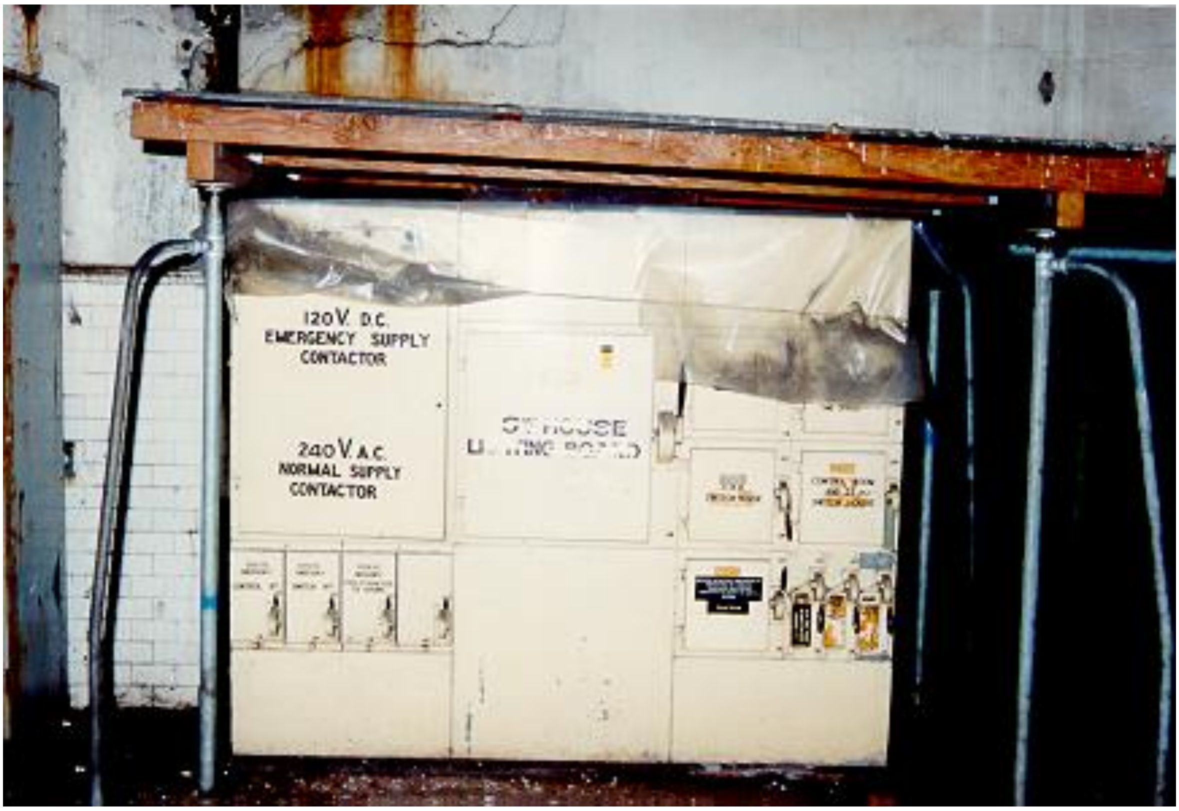
Switch House, east wall (4.9)

Statement of Significance:

The Switch House Lighting Board was an integral part of the House Electrical and Auxiliary Power Supply System and is a representative example of a mid-twentieth century powerboard which is complete and intact.

Significance Grading: 2

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Switch House Lighting Board	Reference No: 8.12

History:

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Description/Function:

Located in the former Control Room on the east wall there is the Switch House Lighting Board which is 120 volt DC Emergency Supply Contactor. The 240 volt AC normal supply Contactor is also mounted on this Board. Power, both normal and emergency, supply, were distributed to the Switch House from this Board. This Switchboard is relatively new, superseded an earlier one and was probably installed in the 1960s and 1970s.

Intactness and Condition:

- The item appears to be structurally sound.
- The item exhibits a light bloom of rust on its surface.
- The paint system has broken down and the item exhibits a degree of corrosion.
- The item appears to be functional should a power source be available.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.

Item: Switchboard in Motor-Generator Room	Reference No: 8.13

Location in Building:

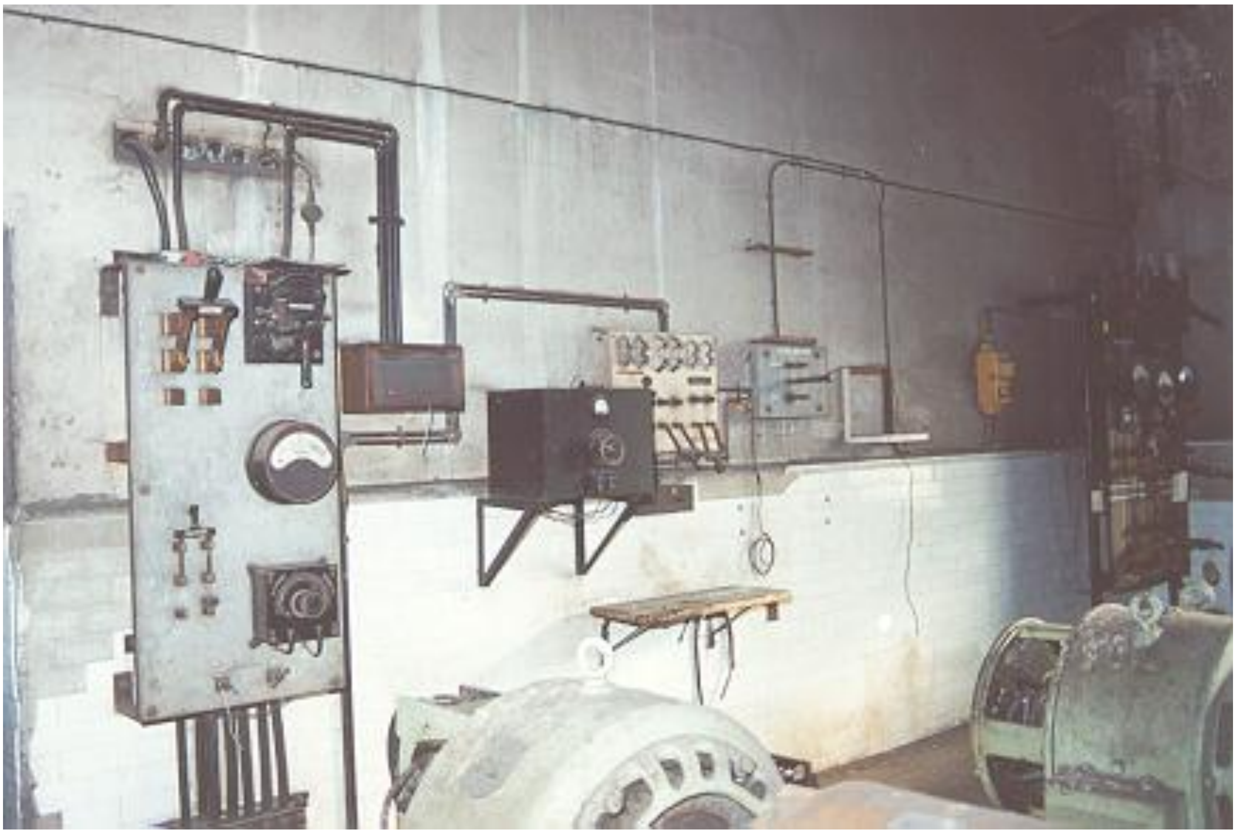
Switch House (4.10)

Statement of Significance:

The Switchboard in the Battery room is an integral part of the House Electrical and Auxiliary Power Supply System and is a representative example of an early twentieth century electrical switchboard which is complete and intact.

Significance Grading: 2

Photo:



Item: Switchboard in Motor-Generator Room	Reference No: 8.13

History:

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Description/Function:

This small Switchboard was part of the inhouse House Electrical and Auxiliary Power Supply System and was used to control current from the Booster sets (Item No. 8.1 and Item No. 8.6) which boosted the supply of DC power when the demand exceeded the capacity of the Batteries (Item No. 8.9). The marble Board is equipped with the ammeter, a rheostat, and main knife switch, an auxiliary knife, and an open air circuit breaker.

Intactness and Condition:

- The item appears to be structurally sound.
- The paint system has broken down and some parts of he item exhibits a very slight degree of corrosion.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken.
  - The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated. This should be done on monthly basis.

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White Bay Heritage Machinery Inventory 2002

Item: Battery Charging Switchboard	Reference No: 8.14

Location in Building:

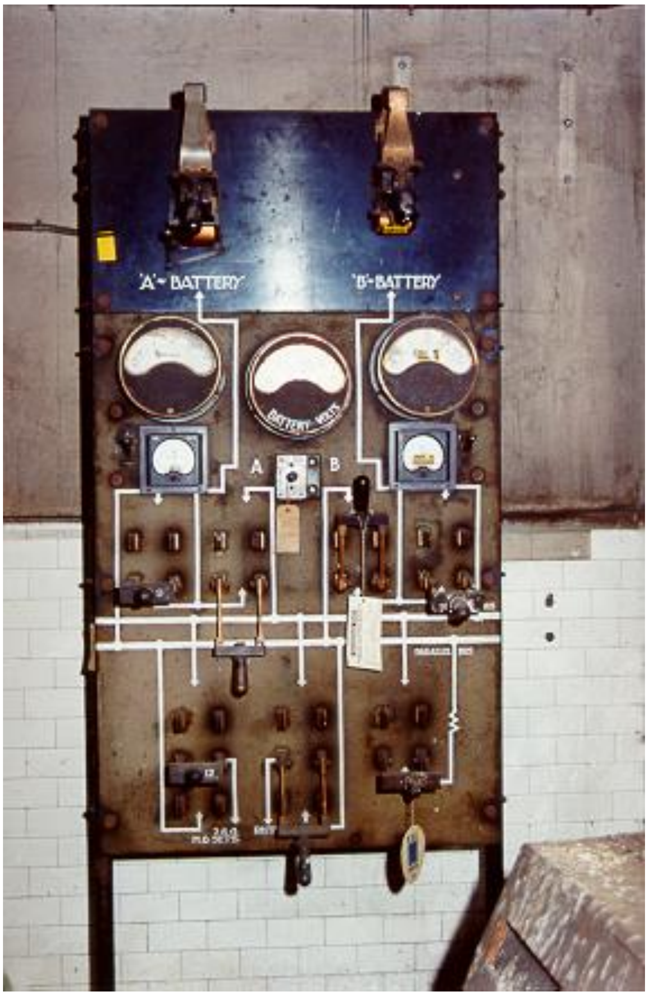
Switch House (4.10)

Statement of Significance:

The Battery Charging Switchboard is an integral part of the House Electrical and Auxiliary Power Supply System and is a representative example of an early twentieth century electrical switchboard which is complete and intact.

Significance Grading: 1

Photo:



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White Bay Heritage Machinery Inventory 2002

Item: Battery Charging Switchboard	Reference No: 8.14

History:

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Description/Function:

The 120 volt power house supply was used to power select pieces of equipment throughout the power station and was stored in two Batteries of wet cells (Item No. 8.9). These wet cells were trickle charged almost constantly. Current for the charging was distributed through the Battery Charging Switchboard which also rectified the voltage of each Battery of cells. The Board was equipped with two ammeters, one voltmeter, seven knife switches to distribute current and two open air circuit breakers.

Intactness and Condition:

- The item appears to be structurally sound.
- The paint system may need conservation.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.
- Initial investigation indicates the following action may be undertaken.
  - The pieces should be brushed clean with a soft bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
  - All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
  - No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- The item should be thoroughly cleaned with a dry rag and the surrounding area cleaned with an industrial vacuum cleaner. This should be done on monthly basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated on a monthly basis.

Item: Air Compressor	Reference No: 8.15

Location in Building:

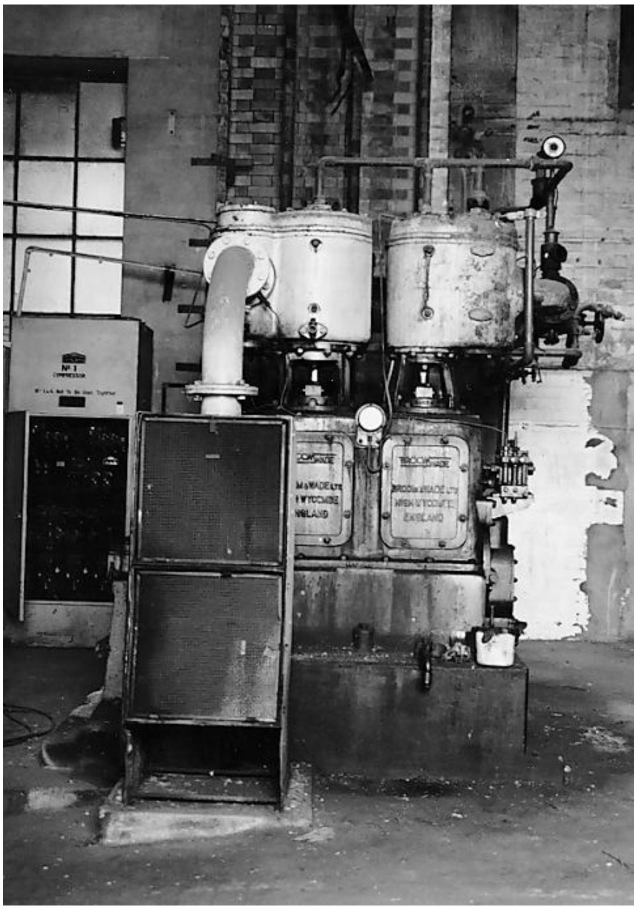
Switch House, ground floor (G.12)

Statement of Significance:

The Air Compressor is an integral element in the House Electrical and Auxiliary Power Supply System . It is representative of air compressors used in power stations during the twentieth century and is a contributing element to the understanding of House Electrical and Auxiliary Power Supply System s.

Significance Grading: 3

Photo:



Godden Mackay Logan Pty Ltd, 78 George Street, Redfern NSW 2016 Phone: (02) 9319 4811 Fax: (02) 9319 4383

White Bay Heritage Machinery Inventory 2002

Item: Air Compressor	Reference No: 8.15

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Unlike Ultimo Power Station, direct current (DC) was only distributed internally at White Bay Power Station and alternate current (AC) was supplied to the tramway and railway systems. The air compressor is an element of the post-war development and expansion and, the increased use of automation in the electrical power industry.

Description/Function:

The Air Compressor is associated with the functioning of the Main Control Room and dates to its construction after WWII. It is manufactured by Broom & Wade Ltd, High Wycombe England with an English Electric motor from their Bradford Works. Although undated, it is characteristic of the period of the 1950s and is associated with the increasingly automated system at this time. Compressed air was used to power switching devices in high temperature environments such as the Babcock and Wilcox boilers.

Intactness and Condition:

- The item appears to be structurally sound and in good order. It appears to be in operating order if a power source were connected.

Conservation Policy:

- The item is to be retained in situ and conserved.
- The item should be the subject of a conservation plan prior to any action which intervenes in the fabric.

Conservation Action:

- The item is to be investigated in detail prior to any action which intervenes in the fabric of the item.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All covers should be removed and the item dried with preheated air. All surfaces should be coated with a suitable preservative. Any corrosion product should be removed, the residual neutralised and a suitable coating applied. This should be done on an annual basis.

Item: 25 Cycle Switches	Reference No: 8.16

Location in Building:

CS1.2 and CS2.2

Statement of Significance:

The 25 Cycle Supply (feeder) Switches are a relic of the era when White Bay Power Station and Ultimo Power Station were operated jointly by the Railway Commissioners to supply the electrified tramways and railways of Sydney. The 25 Cycle Switches have the ability to provide information on the operation of early tramway electrical systems and are representative examples of motor-driven and manual oil-immersion switches.

Significance Grading: 3

Photo:

Fax: (02) 9319 4383

White Bay Heritage Machinery Inventory 2002

Item: 25 Cycle Switches	Reference No: 8.16

History:

White Bay Power Station was constructed by the NSW Railway Commissioners (1912-1917) to supply electricity to the Tram and Railway systems. It was one of five power stations constructed during the early twentieth century in urban Sydney and was the last to close down in 1984 (the others being Ultimo, Balmain, Pyrmont and Bunnerong). The power station underwent a program of expansion during the inter-war years and, another following WWII. In 1953 the power station was compulsorily acquired by the Electricity Commission of NSW to provide electrical energy to the now fully integrated domestic and industrial grid. The power station today comprises the Coal handling Shed, the Boiler House (No.3), the Turbine Hall and the Switch House and retains a single representative sample of the eight operational systems and their contributory elements of machinery.

The three phases of development within White Bay Power Station are reflected in the remaining power supply systems components. Unlike Ultimo Power Station, direct current (DC) was only distributed internally at White Bay Power Station and alternate current (AC) was supplied to the tramway and railway systems.

Description/Function:

The 25 Cycle Supply (feeder) Switches are more closely associated with the earlier period of electricity production at White Bay when it functioned in conjunction with the power house at Ultimo in supplying DC power to the tramways. They are motor-driven oil-bath switches that run vertically between all three floors.

The large part of the 25 Cycle Switches have been removed from the power station, so that now only a sample is retained on the first floor. These are likely to be the Switches described in Myers as being manufactured by General Electric (USA) or BTH (High Tension Switches) or by Ferguson Pailin (Low Tension Switches).

Intactness and Condition:

- The 25 Cycle Switches are in excellent condition
- The item appears to be functional should a power source be available

Conservation Policy:

- The item is to be retained in situ and conserved.

Conservation Action:

- The pieces should be brushed clean with a bristle brush and all dust and grime removed from its immediate vicinity with an industrial vacuum cleaner.
- Areas of bare metal and converted rust should be coated with a sealant such as Shell Ensis D or similar.
- All wiring, auxiliary attachments and connectors should remain in place, be appropriately cleaned and sealed.
- No ancillary items or attachments such as wiring, signage or cards should be removed.

Maintenance Schedule:

- The item should be monitored for any sign of corrosion. Corrosion products should be neutralised and a protective coating applied. This should be done on an annual basis.
- All visible copper, brass and polished steel components should be polished and their surface appropriately treated. This should be done on a monthly basis.
- The item should be cleaned with a dry rag on a weekly basis.

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Appendix B

White Bay Power Station Missing Machinery

Appendix B White Bay Power Station Missing

The following list contains an itemised account of all items which were present in the station at the time of the last report (1989) but which were not located or identified during the course of this project.

The following symbols are refers to specific items.

* - Refers to items identified in Pacific Power WBPS Management Plan as "items to be conserved"

(1>) - Refers to items identified in the Significance of WB & Balmain PS to Sydney's Industrial Heritage as "conserve one set"

Coal Handling

- Iron lamp on Coal Handling shed
- Bag filters
- Reactors (north side)
- Chutes from Mills to #2 Boiler*
- Chute from Hopper to Mill for #2 Boiler*
- Chutes (from bunkers through weighing machines, mills and to boilers)
- Chain blocks
- Oil tank

Ash Handling

- Ash Hoppers *
- Precipitator units *
- Precipitator motors and compressors

Boiler House

- Coal Mills (3) for Boilers #2, #3, #4
- Headers associated with Boilers #3, #4
- Water ring main and isolating valves - assoc. with Boiler #1
- Water ring main and isolating valves - assoc. with Boilers #3 and #4

- Oil Heaters and pumps (under Boiler #2)
- Boiler #2*
- Boiler #3
- Boiler #4
- Force draft fan Boiler #2
- Force draft fan, Boiler #3,
- Force draft fan, Boiler #4
- Induced draft fan Boiler #2
- Induced draft fan, Boiler #3
- Induced draft fan, Boiler #4
- Carry over pipes associated with Boiler #1 {related to boiler superheater}
- Carry over pipes associated with Boiler #2
- Carry over pipes associated with Boiler #3
- Carry over pipes associated with Boiler #4
- Sootblower cubicle associated with Boilers #2 & #3
- Boiler inlet valves associated with Boilers #1 & #2
- Damper operator associated with Boiler #1
- Pump Power switchboard *
- Power Gauges and Meters *
- Air Ducts (1>)
- Air reservoir
- Steam pipes
- No. 2 steam feedwater pump (1>)
- Electric pump (5) (1>)
- Reducing valves (1>)

Pumphouse

- Electric feedwater pumps - Turbine #1
- Electric feedwater pumps - Turbine #2
- Steam feedwater pumps - Turbine #1
- Steam feedwater pumps - Turbine #2
- Reducing valves (assoc. with Turbine #1 and Boilers #1, #2)
- Reducing valves (assoc. with Turbine #2 and Boilers #3, #4)
- Ring main valves assoc. with Turbine #1
- Ring main valves assoc. with Turbine #2
- Pump gauges (assoc. with Turbine #1)
- Pump gauges (assoc. with Turbine #2)
- Supply board
- Switches & gauges assoc with Turbine #1
- Power switchboard (pump room)

Turbine Hall

- Loading Dock (included steel cables on wall and old cable spools on floor)
- Condensers assoc. with Turbine #1
- Condensers assoc. with Turbine #2
- Condensate Pump assoc. with Turbine #1
- Condensate Pump assoc. with Turbine #2
- Test Equipment switchboard/Syd Uni
- Ventilating fans (assoc. with Turbine #1)
- Ventilating fans (assoc. with Turbine #2)
- Turbo-alternator set #2
- Circulating water pumps (3) assoc. with Turbine #1
- Circulating water pumps (3) assoc. with Turbine #2

- Power gauges and meters -assoc. with Turbine #1
- Power gauges and meters -assoc. with Turbine #2
- Gauges/steam inlets to turbine and bi-pass valves (#1)
- Gauges/steam inlets to turbine and bi-pass valves (#2)
- 50 MW Turbine
- Parsons Turbine
- No. 2 turbine (1>)
- Gauge cabinet
- University test equipment/ rectifiers
- Lathe

Switch House

- Battery charger (mentioned three times - two identified as 7.14 and 7.13)
- 120V DC Switchboard
- 120V DC main switchboard (battery control room)
- 120V DC small switchboard (battery control room)
- 3 small generator sets

Old Control Room/recreation room

- Handmade Rheostats
- Large Drill press

Battery Room

- Battery 120V

Switch House 3rd floor

- 25 cycle gear
- 25 cycle supply switch *
- 33kV Circuit Breakers/metal clad bulk oil (1959's)

Switch House 2nd floor

- Cable ducts from Gensets to 33kV business section
- Air cooled Reactors
- Tool room with a range of tools

Switch House Ground floor

- No 2 Air Compressor Broomwade Ltd UK
- No 3 Air Compressor Ingersoll Rand Australia
- No 4 Air Compressor Ingersoll Rand Australia
- Metal clad English Electric circuit breakers (90 WB older than Level 3)
- No 1 Generator circuit breaker
- Miscellaneous material/workshop

Control Room Building

- Fire Pump
- Pyrotenax Cable tunnel
- DC Supply Panels (to various 11kV feeder groups)
- Field Rheostat No 1 Generator (1918)
- DC Supply Panels (to various 11kV feeder groups)
- Field Rheostat No 1 Generator (1918)
- DC Supply Panels No 1 & 2 Generator (1918)
- Field Rheostats (at Base of Stairs)
- Field Rheostats #3
- Field Rheostats #4
- Field Rheostats #5
- Field Rheostats #6
- Field Rheostats #7
- Field Rheostats #8

- 7.5 kV switchgear General Electric Motors USA

Location Unknown

Beam Balance (900mm wide) use for coal calorific value testing

Transformer Bay

Transformers

Transformers 11kV

Old transformers

Test Equipment Switchboard

University Experiment Equipment

Uni Experiment - Air Compressor

Auxiliary Machinery and Plant

Lift motor (Ancillary machinery and plant)

Worthington water pump (basement)

No. 2 Battery Charging Panel (basement)

Electric shaper

Hand winch

Bending machine

Electric welding set

Power hacksaw

Repairs/Replacements

Existing roof/cladding

Turbine House power (for lighting/etc)

Removal of asbestos lagging

Sheeting on Control Room roof

Internal doors - Control Room

Appendix C

NSW State Heritage Inventory Database Report – White Bay Power Station

NSW Heritage Office

Listing Heritage Items

› **State Heritage Inventory Search Results**

White Bay Power Station

Note: There are incomplete details for a number of items listed on the State Heritage Register. The Heritage Office intends to develop or upgrade statements of significance for these items as resources become available.

Item

Name of Item: White Bay Power Station
Type of Item: Built
Group/Collection: Utilities - Electricity
Category: Electricity Generator/Power Station - coal/gas/oil
Primary Address: Victoria Road, Rozelle, NSW 2039
Local Govt. Area: Leichhardt

Property Description:

Lot/Volume Code	Lot/Volume Number	Section Number	Plan/Folio Code	Plan/Folio Number
LOT	2	-	DP	598974
LOT	3	-	DP	598974
LOT	40	-	DP	791553

All Addresses

Street Address	Suburb/Town	LGA	Parish	County	Type
Victoria Road	Rozelle	Leichhardt			Primary
Robert Street	Rozelle	Leichhardt			Alternate

Owner/s

Organisation Name	Owner Category	Date Ownership Updated
Sydney Harbour Foreshore Authority	State Government	

Assessment Criteria Items are assessed against the **State Heritage Register (SHR) Criteria** to determine the level of significance. Refer to the Listings below for the level of statutory protection.

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Heritage Act - State Heritage Register		01015	02 Apr 99	27	1546
Heritage Act - s.170 NSW State agency heritage register		74	18 Mar 98		
Regional Environmental Plan		11	21 Nov 97	125	9386

References

None

Study Details

Title	Year	Number	Author	Inspected by	Guidelines Used
Section 170 register	1998	74	Pacific Power		Yes

Procedures /Exemptions

Section of Act	Description	Title	Comments	Action Date
57(2)	Exemption to allow work	Standard Exemptions	I, the Minister for Planning, pursuant to section 57(2) of the Heritage Act 1977 on recommendation of the Heritage Council of New South Wales grant standard exemptions from section 57(1) of the Heritage Act, 1977 described in the schedule gazetted on 7 March 2003, Gaz No. 59 pages 4066-4070. To view the schedule click here.	Mar 7 2003

Source of information for this entry

Name: NSW Heritage Office
Email: watters@heritage.nsw.gov.au

Web Page: www.heritage.nsw.gov.au

Administration

Database Number: 5001335

Every effort has been made to ensure that information contained in the State Heritage Inventory is correct. If you find any errors or omissions please send your comments to the Database Manager.