POWER STATION

Great Island

Date Of Survey: 18th February 2004

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O.S. Ref: (T.B.C.)	ESB Ref: (T.B.C.)

Architectural Heritage Evaluation:		Categories of Special Interest:	
Record Only		Archaeological (AG)	
Local		Architectural (A)	✔
District		Artistic (AR)	
Regional	✔	Cultural (C)	
National		Historical (H)	
International		Scientific (SC)	✔
		Social (SO)	✔
		Technical (T)	

Summary

Great Island is an oil fired power station.

The property is located on the shores of Waterford Harbour, at the confluence of the Rivers Barrow, Nore and Suir. The main Rosslare to Waterford railway line runs along the northern end of the site.

The complex was partly built on land reclaimed from the sea as a famine relief project during the 19th Century. Construction commenced in 1963 with the first 60MW unit going into service in December 1967. The first stage of development was completed in April 1968 when the second unit also of 60MW capacity was synchronised to the grid.

The second stage of development provided for a further single unit of 120MW and installation of this more technically advanced generating plant was completed and commissioned in May 1972.

Description & Materials

The primary elements of the Power Station complex comprise: two large concrete chimney stacks, administration building, generator hall, boiler house, engine room and associated plant.

In addition surrounding the main building volume are the following external elements: oil storage farm, cooling water pump house, cooling water intake structure/culverts, water treatment house, chimney stacks, 220kV transformer compound, 110kV transformer compound building, jetty access bridge and marine unloading arms.

Administration Building

The administration block is two-storey in scale located at the entrance courtyard and extends a further three storeys to the basement level boiler-house. This building houses administration offices, the project office, staff canteen, laboratories, instrumentation workshop, locker rooms and basement accommodating plant rooms, and mechanical and electrical workshops. The staff canteen on the top floor of the administration building commands extensive views to the south and east with Waterford Harbour clearly visible in the distance.

The building is flat roofed with concrete facing panels and exposed agregate finish, modular aluminium window frames and has a pronounced external structural frame consisting of prutruding concrete columns.

1. View of Power Station from River. **2.** Approach View of Power Station. **3.** View of Jetty.

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Generator Hall

The main process is contained in a single building which varies in volume and form. It varies between 6-8 storeys in scale and is clad in white built-up profiled metal, running the full height of the building without interruption, save for the visually light metal clerestory 'ribbon' windows at the junction of walls and roof which dramatically top light the generator hall and associated spaces.

The generator halls roof is supported on a series of lattice trusses, which combined with extensive use of clerestory glazing, results in the appearance of de-materialisation of the large span members. The lattice theme continues through to structural columns, bracing elements and secondary steelwork. The quality of the articulation and fabrication of these elements is of a high level design standard and specification.

Exhaust/Chimney Stacks

The two chimney stacks, which are approximately 138m in height and visible for many miles around, are linked to the main building volume by a series of large scale ducts.

Water Treatment Building

The water treatment building is two-storey in scale and utilises a steel frame structure. It is clad in white built-up metal cladding, with column elements expressed with translucent glazing.

Process

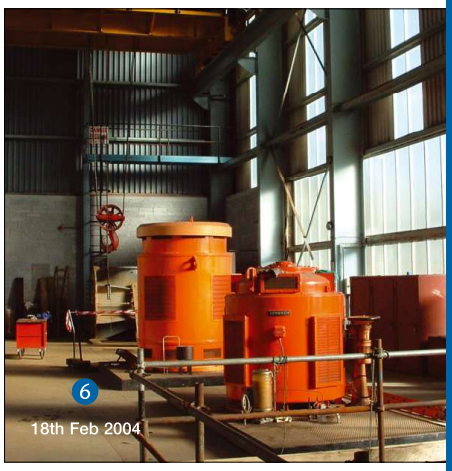
Great Island is an oil fired power station. Fuel oil, delivered by sea tanker to the Station's jetty and pumped to one of five storage tanks, is heated to 135° before being pumped to the burners in each boiler.

Heat from the combustion is absorbed by water in the boiler tubes that surround the furnace. The water circulates to the boiler drum where it flashes to steam. The steam then enters the super-heater section of the boiler where further heat is gained from the flue gases that leave the combustion chamber at 1100°C. Steam leaves the boiler as dry superheated steam through pipework to the turbine. Live steam enters the turbine through control valves and is directed on to blades fixed to the shaft. Energy in the steam dissipates while passing through the turbine thus rotating the shaft, which is coupled to the alternator rotor. Steam is then condensed by water from the nearby Barrow and Suir rivers. The condensate is pumped back to the boiler through a boiler feed pump and feed heating system, thus conserving water and increasing efficiency.

The alternator rotor, which is an electro-magnet rotor, spins within the coils of wire in the stator thus producing electricity. This electricity is sent to a transformer to increase its voltage for transmission to the National Grid.

Background History

ESB opted for a 'sandwich' program for steam development in the mid to late 1960s against a backdrop of uncertainty about oil prices. In principle, stations could be built which would use both fuels, although this would involve extra capital expenditure. Even after the decision had been taken to construct the first of these new stations at Great Island, the question of whether coal or oil was to be used was still undecided. Construction of the station commenced in 1963 with the first 60MW unit going into service in December 1967 and the second 60MW unit being opened in April 1968. In 1972 a further single unit of 120MW was installed.



4. View of Complex from Jetty. **5.** Cooling Water Busmain adjacent to Cooling Water Pump House. **6.** Interior of Cooling Water Pump House. **7.** Detail of Power Station Clerestory Fenestration.

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The main contractor was the Cementation Co. (Ireland) and the structural steelwork was carried out by J & C McGloughlin.

Special Interest - Architectural

The architectural expression of the building reflects the industrial process based approach of the architectural solution, exemplified by the high level clerestory glazing to generating hall with its steel lattice trusses and associated elements.

The expression of the entrance building is of a modernist design, of exposed concrete frame with infill timber glazed screens and localised textured and self-coloured masonry block. Spandrel areas at floor levels are clad in tiled mosaic. There is a strongly expressed cylindrical roof light above parapet level at the entrance foyer. This element provides natural light to the stair volume which features a terrazzo clad in-situ concrete helical stairs.

8. View of Administration Building, Generator Hall and Stores. **9.** Administration Building Façade Detail.
10. Trussed Column Detail. **11.** View of Generator Hall. **12.** Administration Building Helical Stairs.

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Special Interest – Scientific/Environmental

The best international practices in environmental management have been adopted at Great Island. Systems of monitoring and treatment are in place while new silencers have been installed to reduce noise levels.

Great Island was the first ESB station to adopt an effluent treatment system for boiler and air heater washes. Water discharged from the plant is also treated in a neutralising and settling tank, before being discharged safely back into the environment. Licensed disposal companies dispose of solid waste matter. An environmental management group was established to apply for ISO 14001 maximum environmental accreditation and to increase staff awareness of the crucial importance placed on the care and protection of the environment, this was awarded in 1999.

Special interest - Social

The station has been an integral part of the surrounding local community since its original commissioning. It contributes to the local economy by purchasing Irish made materials when possible and by providing employment including use of contractors and temporary staff during major work periods. During the construction more than 350 people were employed on the site with the total capital investment at the time amounting to £14 million.

The station is a strong supporter of local initiatives, sponsoring local schools, sporting clubs and other civic organisations, as well as various charity events.

13. Generator Hall and Gantry Crane. **14.** Mechanical Plant. **15.** Structural Bracing Detail. **16.** Detail of Oil Farm. **17.** T2101 Transformer.