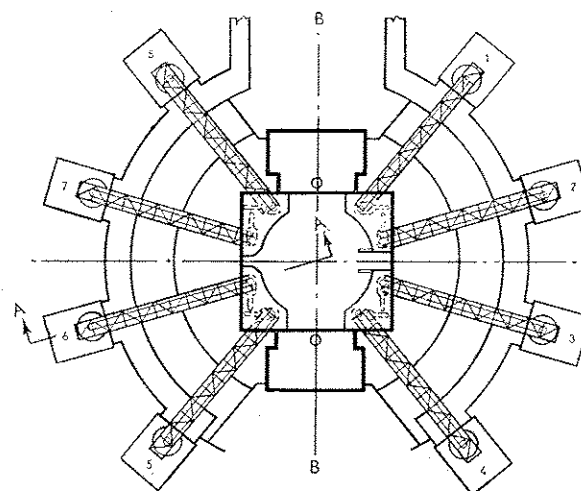
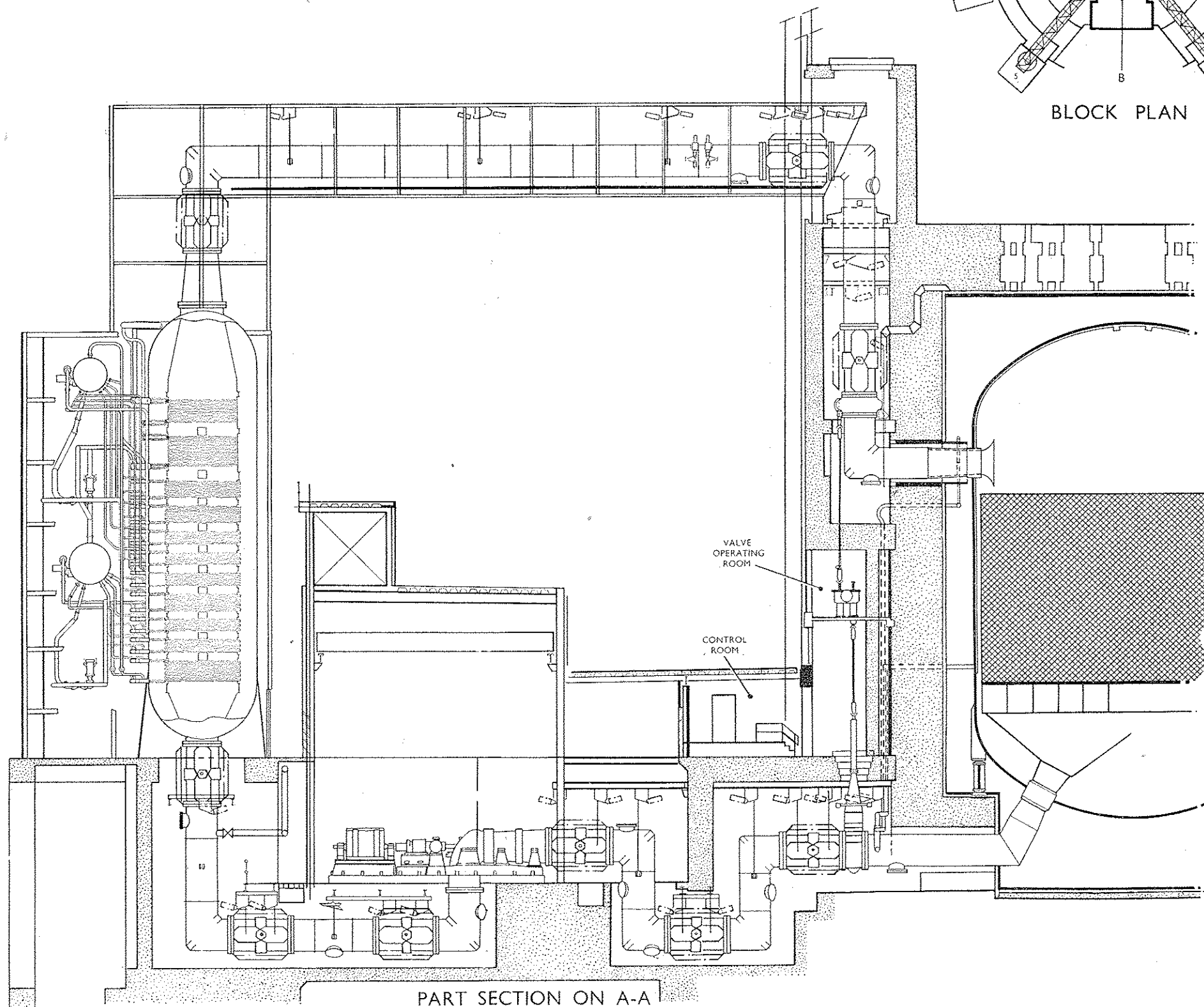


The World's Reactors

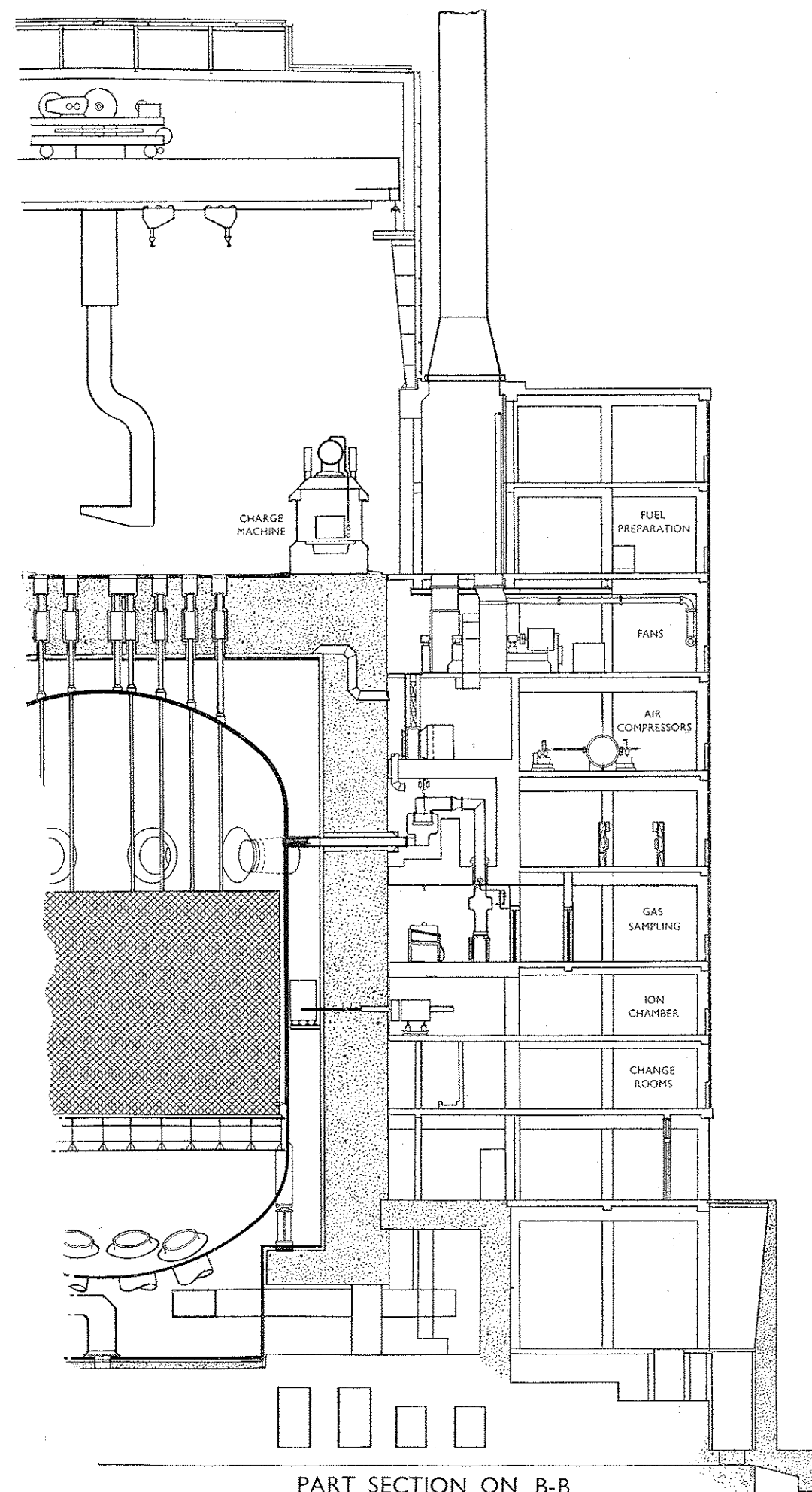
No. 10—BERKELEY POWER STATION



BLOCK PLAN



PART SECTION ON A-A



PART SECTION ON B-B

The World's Reactors

No. 10—BERKELEY POWER STATION

TYPE: Thermal heterogeneous.

PURPOSE: Power production.

LOCATION: Berkeley, Gloucestershire.

OPERATION: No. 1 reactor: mid-1960.
No. 2 reactor: early 1961.
Ground broken: January 7, 1957.

CAPACITY: Maximum continuous electrical rating: 340 MW from two reactors and four turbo-alternator sets.
Guaranteed electrical output: 275 MW.
Distribution to grid: 132 kV.
Internal distribution: 6.6 kV, 415 V and 240 V d.c.
Reactor heat rating: 550 MW.

FUEL: Natural uranium as rods.
Weight of U per reactor: 250 tonnes.
Number of fuel-element channels: 3,000.

CANNING: Magnesium alloy, Magnox A12.
Method of support: graphite struts with zirconium end brackets.

MODERATOR: Graphite.
Core size: 42 ft. diameter, 24 ft. high.
Overall size, including reflector: 48 ft. across corners of 32-sided regular polygon prism, 30 ft. high.
Total weight of graphite per reactor: 2,000 tons.
Graphite support: ball bearings on diagrid 4 ft. 7 in. deep.

LATTICE: Regular square, 8.16-in. pitch.

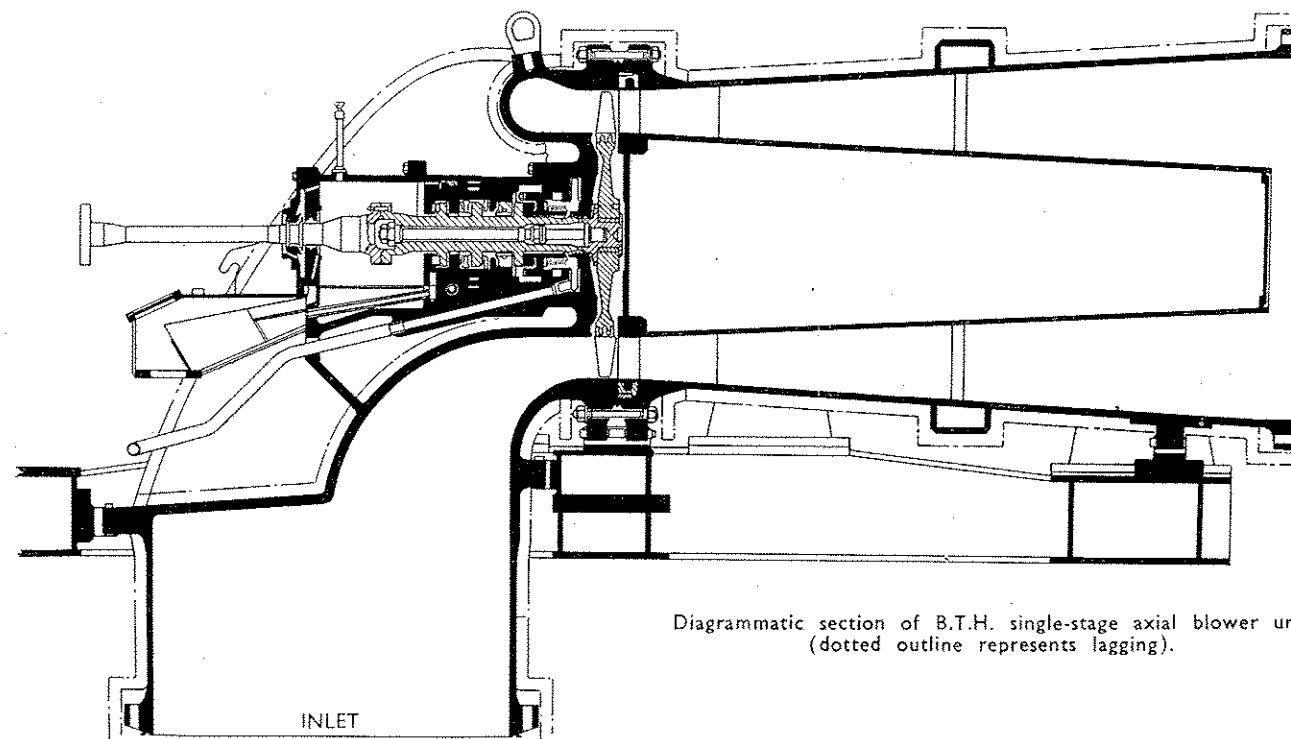
PRESSURE VESSEL: Mild steel.
Shape and dimensions: cylinder, 50 ft. diameter, 80 ft. high.
Thickness: 3 in.
Maximum internal working pressure: 125 p.s.i.
Inner shell: ¼-in. plate.

COOLANT: Carbon dioxide.
Inlet temperature: 320°F.
Outlet temperature: 662°F.
Flow: 22.3×10^6 lb./hr.
Number of ducts: eight inlet, eight outlet per reactor.
Duct diameter: 5 ft.

PUMPING: Eight single-stage axial blowers per reactor.
Drive: a.c. squirrel-cage induction motors with Vulcan-Sinclair scoop control fluid couplings.
Circulator input: 3,000 b.h.p.
Running speed: 2,900 r.p.m.
Speed control range: 5:1.
Electrical power consumption: 17 MW per reactor.

CONTROL: Number of channels: 150 per reactor.

SHIELDING: Thermal: mild steel.
construction: double wall, with air gap between.
sides: outer ½ in., inner ½ in., air gap 1½ in.
top: outer ¾ in., inner 5/16 in., air gap 2 in.
bottom: outer ½ in., inner 4 in., air gap 4 in. (4½ in. at shoulders).
cooling: air, induced draught.
Biological: reinforced concrete.
sides: 8 ft. 6 in.
top: 10 ft. (effective thickness 8 ft.) with 3-in. mild steel top plate.



Diagrammatic section of B.T.H. single-stage axial blower unit (dotted outline represents lagging).

HEAT EXCHANGERS: Number per reactor: eight.
Main shell: 17 ft. 6 in. O.D., 70 ft. high; thickness 1½ in.
Elements: finned-tube boiler and economizer sections; plain tube superheater sections.
Inlet gas temperature: 660°F.
Outlet gas temperature: 318°F.
H.P. steam flow rate: 140,000 lb./hr. per exchanger.
H.P. steam temperature: 612°F.
H.P. steam pressure: 320 p.s.i.a.
L.P. steam flow rate: 65,000 lb./hr. per exchanger.
L.P. steam temperature: 612°F.
L.P. steam pressure: 77 p.s.i.a.

TURBO-GENERATORS: Number of sets per station: four horizontal close-coupled tandem compound mixed-pressure impulse type.
Continuous maximum rating per set: 85 MW.
Speed: 3,000 r.p.m.
Generated voltage: 11.8 kV.
Cooling: hydrogen.

DESIGN AND CONSTRUCTION

A.E.I.-John Thompson Nuclear Energy Co. Ltd.
comprising: Associated Electrical Industries Ltd.
John Thompson Ltd.
Balfour, Beatty and Co. Ltd.
John Laing and Son Ltd.

CONSULTING ENGINEER TO A.E.I.-JOHN THOMPSON

W. S. Atkins and Partners.

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- No. 1. BEPO (April, 1956)
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- No. 9. THE SOUTH OF SCOTLAND ELECTRICITY BOARD STATION (February, 1957)