

CANDU 950

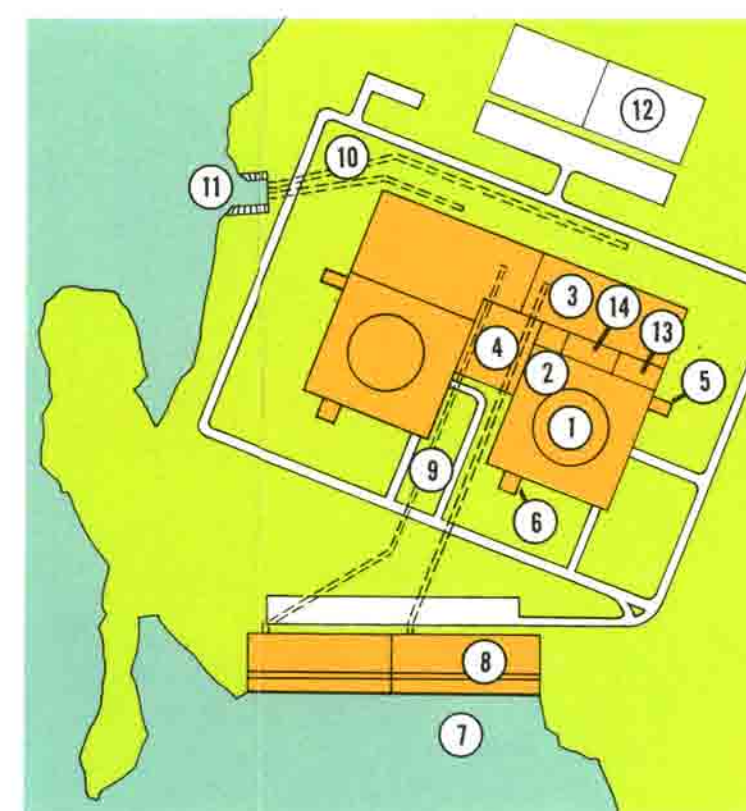
JOHN WAY

CANDU 950: Technical Data

The data listed below refers to one reactor-turbine unit of a typical two-unit station.

REACTOR TYPE	Heavy water cooled and moderated horizontal pressure tube reactor. On-load refuelling.
POWER AND EFFICIENCY	Fission power: 3394 MWt Net power output: 950 MWe Typical thermal efficiency: 30.4 per cent
REACTOR CORE	Effective radius: 3953 mm Length: 5944 mm Cell arrangement: square array of 600 Lattice pitch: 286 mm Reflector thickness: 700 mm, average at mid-point Fuel channels: 600 Material: zirconium (2.5% wt) niobium Min. inside dia.: 104 mm Shield and closure plugs: stainless steel
CALANDRIA	Length: 7800 mm overall Shell: all-welded stainless steel Tubes: annealed zircaloy-2
SHIELD TANK	Construction: rectangular, double-wall carbon steel Material: demineralized water, deoxygenated carbon steel plate, and carbon steel balls Shielding: 730 mm
FUEL ASSEMBLIES	Fuel material: natural UO ₂ Cladding: zircaloy 4, graphite-coated i.d. Fuel pellet diameter: 12.16 mm (nominal) No. in element: 37 (nominal) Elements: 37 per bundle Nominal bundle size: length 495.3 mm; dia. 102.4 mm No. in core: 7200 Nominal mass of U in reactor: 135 Mg Average burnup (design centre value): 180 MWh/kg
REACTOR CONTROL	Adjuster rods: 27 stainless steel Mechanical control absorbers: 4 cadmium/stainless steel Liquid zone controllers: 8 vertical, compartmented, (H ₂ O)
REACTOR SHUTDOWN	Shut-off rods: 36 cadmium/stainless steel electro-magnetic, clutch-coupled Drive mechanism: 8 horizontal nozzle tubes Liquid injection: gadolinium nitrate Poison:
MODERATOR SYSTEM	Moderator: D ₂ O Moderator volume: 380,10 ³ litre Design temperature: 100°C
PRIMARY COOLANT SYSTEM	Number of loops: two, independent Primary coolant: D ₂ O Fuel channel flow (maximum): 25.5 kg/s Inlet header: 266°C, 11.5 MPa (abs) Outlet header: 310°C, 10 MPa (abs)
STEAM GENERATOR	Number: 8 (4 per loop) Total steam output (8 steam generators): 1610 kg/s Feedwater inlet: 177°C Steam pressure: 5.0 MPa (abs) Steam temperature: 264°C Quality: 99.75% (min)
PRIMARY COOLANT PUMPS	Number: 4 (two per loop) Type: single-stage centrifugal Rating: 11 800 kW Flow rate: 3400 kg/s
TURBINE GENERATOR	Type: 1 double-flow h.p., 3 double-flow l.p. cylinders 4.9 MPa (abs); 263°C Speed: 1800 min ⁻¹ Generator: direct-coupled, H ₂ O-cooled 1320 MVA; p.f. 0.85; 22 kV; 60 Hz
REACTOR BUILDING	Containment structure: cylindrical, pre-stressed concrete reinforced concrete Internal structure: reinforced concrete Inside diameter: 52 m Height (top of base slab to underside of upper dome): 62.5 m Design pressure: 138 kPa(g) Containment free volume: 100 000 m ³

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CANDU 950 power station cutaway key

1. Reactor building no. 1
2. Reactor building no. 2
3. Administration building
4. Dousing water
5. Dousing water spray headers
6. Steam lines
7. Reactor building crane
8. Steam generators
9. Primary heat transport pumps
10. Reactivity mechanisms main deck
11. Degasser
12. Pressurizer
13. Reactor inlet header
14. Reactor outlet header
15. Fuelling machine
16. Reactor calandria
17. Auxiliary air lock
18. Horizontal reactivity mechanisms
19. Fuel transfer ports
20. Primary heat transport system heavy water storage tank
21. Steam lines to turbine
22. High pressure emergency core cooling tanks
23. Chillers
24. Sampling cabinets
25. Emergency power generators
26. Power switchgear and control
27. Secondary control room
28. Secondary control cable room
29. Emergency water supply tanks
30. Irradiated fuel storage bay
31. Receiving bay
32. Irradiated fuel storage trays
33. Manbridge and hoist
34. Canal lock
35. Canal trolley
36. Irradiated fuel transfer canal
37. Irradiated fuel bay crane
38. Equipment removal area
39. Fuelling machine pit
40. Main air lock
41. Decontamination centre
42. Irradiated fuel bay heat exchangers
43. Liquid waste tanks
44. Spent resin tanks
45. Heavy water storage tanks
46. Ventilation and exhaust equipment
47. New fuel storage room
48. Control room air conditioning equipment
49. Main control room
50. Control equipment room
51. Cable room
52. Turbine building no. 1
53. Turbine building no. 2
54. High pressure turbine
55. Low pressure turbines
56. Generator
57. Isolated phase busbar
58. Deaerator
59. Deaerator storage tank
60. Reserve feedwater tank
61. Moisture separator reheaters
62. Heating and ventilation plant room
63. Condensers
64. Motor control centres
65. Clarifier
66. Turbine oil storage tanks
67. Heavy water upgrading tower
68. Standby power generators
69. Reactor and service buildings common foundation mat

