## THE WORLD'S REACTORS No.50

## OCONEE NUCLEAR POWER STATION

DESIGNER & CONTRACTOR Overall project management: **Duke Power Company** Nuclear steam supply system Babcock & Wilcox Company

OWNER OPERATOR

Duke Power Company, Charlotte, North Carolina

LOCATION

Clemson, South Carolina

Pressurized water reactor, three units

Information listed below refers to one reactor-turbine unit unless otherwise stated

CONSTRUCTION SCHEDULE

Unit 1 Unit 2 Unit 3 Nov. 1967 Sept. 1968 Oct 1968 Dec. 1970 Dec. 1972 Jan 1973 May 1971 May 1972 June 1973 Construction start Reactor critical Commercial operation

922MW

34.5%

886 MW(e)

128 in (3·25 m) 144 in (3·66 m)

2 568 MW(t) (8 765 × 10<sup>6</sup> Btu/h)

2·25% 9 600

MWd/te MWd/te

17.63 kW/ft (537 W/cm)

2·65% 14 250

2 185 psig (154 kg/cm²)

Two, vertical, once through

604°F (318°C)

1 per reactor

CAPACITY Gross generation Net electrical output

Overall station net efficiency

REACTOR CORE Thermal output Core diameter (equivalent) Core height (active) Number of fuel assemblies Fuel rod lattice pitch Average thermal output Maximum thermal output

207 486 lb (94·1 te) Weight of fuel as UO2 UO<sub>2</sub> sintered pellets 0·370 in (9·40 mm) Fuel material 0.70 in (17.8 mm) Pellet length Zircaloy 4 0.0265 in (0.673 mm) Clad material Clad thickness 0.430 in (10.9 mm) Rod diameter

Number of rods per assembly Maximum fuel central temp. Maximum clad surface temp. Feed enrichment

Fuel discharge burnup

CONTROL ROD ASSEMBLIES 5% Cd—15% In—80% Ag 304 SS, cold worked Neutron absorber Cladding material Number of assemblies

Number of rods per assembly Length of poison section

AXIAL POWER SHAPING ASSEMBLIES 5% Cd-15% In-80% Ag Neutron absorber 304 SS, cold worked Cladding material Number of assemblies Number of rods per assembly

36 in (1.4 m) Length of poison section BURNABLE POISON ASSEMBLIES Unit 2, first cycle

Neutron absorber Boron Zircaloy 4 Cladding material Number of assemblies Number of rods per assembly 134 in (3·4 m) Length of poison section

PRIMARY COOLANT SYSTEM Pressurized H2O, two loops

Operating pressure Reactor inlet temperature Reactor outlet temperature Steam generators

with integral superheat Four, vertical, single shaft Coolant pumps 352 000 US gal/min (8 520 m³/min Total reactor flow or 301 000 UK gal/min) REACTOR PRESSURE VESSEL 171 in (4·3 m)

Inside diameter Inside height Average wall thickness

500 in (12·7 m) 8 in (203 mm) Outside diameter across nozzles 249 in (6.3 m) SA-533, Grade B, clad with 18-8 stainless steel 2 500 psig (176 kg/cm²) 650°F (343°C) Design pressure

Design temperature TURBINES

Number Tandem compound, 1 HP and 3 LP cylinders 1800 rev/min 900 psi (63·3 kg/cm²) Turbine stop valve pressure Turbine stop valve temperature 565°F (296°C)

CONTAINMENT BUILDINGS Number

Prestressed concrete Type 116 ft (35·4m) Inside diameter 208-5ft (63-5m) Inside height 45 in (114 cm) Wall thickness 58 psig (4·1 kg/cm²) Design pressure

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headers 6. Polar crane 7. Ventilation duct 8. Access to polar crane 9. Elevator machinery room

Key to drawing

4. Reactor building

stressing tendons
5. Reactor building spray

Reactor hall 11. Removable shielding

concrete Reactor building No. 1
 Reactor building No. 2
 Reactor building No. 3 12. Steam generators Pressurizer 14. Reactor coolant pumps Reactor vessel

> 16. Main steam pipes 17. Feedwater pipe 18. Reactor-steam generator pipes 19. Core flooding pipes

Pump—reactor return

21. Auxiliary feedwater spray header

> 22. Feedwater spray header 23. Steam generator—pump 31. Main steam pipes return pipes 24. Main fuel handling

25. Auxiliary fuel handling bridge 26. Equipment hatch lifting

27. Reactor head storage

28. Equipment hatch

stand

36. Cask wash-down area 37. Fuel transfer mechanism 38. Fuel transfer tubes reactor No. 2

29. Core flooding tanks

30. Lower tendon access

Fuel transfer tubes— reactor No. 1

support structures 32. Fuel handling building 33. Cask handling crane

34. Auxiliary fuel handling 35. Fuel pool

40. Fuel cask 41. Auxiliary cooling package 42. Cask and transporter

43. Fuel storage area 44. Hot machine shop 45. Control rod drive test

46. Borated water storage tank 47. Control room 48. Electrical equipment room 58. Reactor building purge

49. Reactor building vent 50. Elevator shaft

51. Purge exhaust fan unit 52. Purge exhaust filters

53. Reactor building purge exhaust ducts 54. Reactor building cooling 62. Concentrated boric acid unit fans

55. Reactor building cooling unit motors 56. Reactor building coolers 57. Reactor building purge

water tank 66. Waste gas tanks 67. L.P. boric acid tanks

68. Spent resin tank inlet system ducts 59. Cable and duct shafts

60. Radioactive gas monitoring equipment 61. Reactor coolant bleed

hold-up tanks storage tank 63. Personnel airlocks

64. Decay heat coolers 65. Recirculating cooling

69. Seal return coolers 70. Let down filters 71. Tendon gallery access 72. Heaters 73. Main steam pipe—

78. H.P. unit-turbine No. 2

79. L.P. units turbine No. 2

80. Generator No. 2

reactor No. 1 74. Upper surge tanks 75. Turbine building

88. Condensate storage 76. Heater bay tanks 77. Heater bay crane

81. Turbine building crane Key to site plan 82. Turbine building auxiliary crane

83. Pump aisle crane 84. Turbine—reactor No. 1 85. Feedwater turbines 86. Condensers 87. Condensate cooler

Warehouse

a. Reactor No. 1 b. Reactor No. 2

c. Reactor No. 3

d. Turbine No. 1 Turbine No. 2 f. Turbine No. 3 Fuel oil store

Transformer yard

Electrical shop

Supply room

m. Machine shop n. Administration Water intake

Key to reactor A. Control rod drive actuators

nozzles

H. Fuel assembly Thermal shield K. Flow baffle Support skirt M. In-core instrumentation

B. Internals vent valve C. Control rod guide tubes D. Upper plenum Core support shield Outlet nozzle G. Inlet nozzle

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