The world's reactors No. 68

SNUPPS

Standardized Nuclear Unit Power Plant System

Owner-operator: Kansas City Power & Light Co. *Kansas Gas and Electric Co.	Northern States Power Co.	Rochester Gas and Electric Corp.	Union Electric Co.
Station name: Wolf Creek Unit 1	Tyrone Energy	Sterling Unit 1	Callaway Units 1 & 2
Location: Burlington, Kan.	Durand, Wisc.	Sterling, N.Y.	Fulton, Mo.
Commercial operation: April 1982	April 1985	April 1984	1 – October 1981 2 – April 1983
Constructor: Daniel International			Daniel International
Site architect-engineer: Sargent & Lundy	Commonwealth Associates, Inc.	Bechtel Associates Professional Corp.	Sverdrup & Parcel and Associates, Inc.

*Operator

All other data same for each.

Contracts

Lead architect-engineer	Bechtel Power Corp.
Project management	Nuclear Projects Inc.
Nuclear steam supply system	Westinghouse Electric Corp.
Turbine generator	General Electric Company.

Power

Net electrical output	1150 MW(e) nominal
Gross electrical output	1188 MW(e)
Gross thermal output	3425 MW(th)

Reactor core

Fuel material	Cylindrical UO_2 pellets
Core diameter (equivalent)	3.4m (133.9 in)
Pellet diameter	8.2 mm (0.323 in)
Pin diameter	9.5 mm (0.374 in)
Clad thickness	0.543 mm (0.021 in)
Clad material	Zircaloy 4
Linear fuel rating	44.6 kW/m
Feed enrichment	2.1, 2.6, 3.1%
Fuel discharge burn-up (average)	24 000 MWd/t

Reactivity control

Control rods: Number – Full length	53
Part length	8
Neutron absorber	Ag-In-Cd
Cladding material	S.S. Type 304
Fuel	Burnable poison rods
Moderator	Chemical shim

Primary coolant system

Type	Forced circulation
Operating pressure	158 kg/cm² (2250 psia)
Reactor inlet temperature	278°C (532°F)
Reactor outlet temperature	311°C (592°F)
Coolant pumps: Number	4
Type	Mixed flow
Total reactor flow	63.2×10^3 te/h (139×10^6 lb/h)

Reactor pressure vessel

Inside diameter	4.39 m (173 in)
Inside height	12.9 m (508 in)
Wall thickness (core region)	215 mm (8.46 in)
Material	SA 533
Design pressure	174.7kg/cm²g (2485 psig)
Design temperature	343.3°C (650°F)

Containment

Type	Prestressed concrete – Steel lined
Pressure suppression	Containment spray system
Emergency cooling	Containment spray system. Containment fan cooler system. Emergency core cooling system
Design pressure	4.22 kg/cm²g (60 psig)
Inside diameter	42.67 m (1680 in)
Inside height	62.94 m (2478 in)

Steam generators

Type	Vertical U-tube
Number	4
Tube material	Inconel
Thermal rating	853 MW(th)

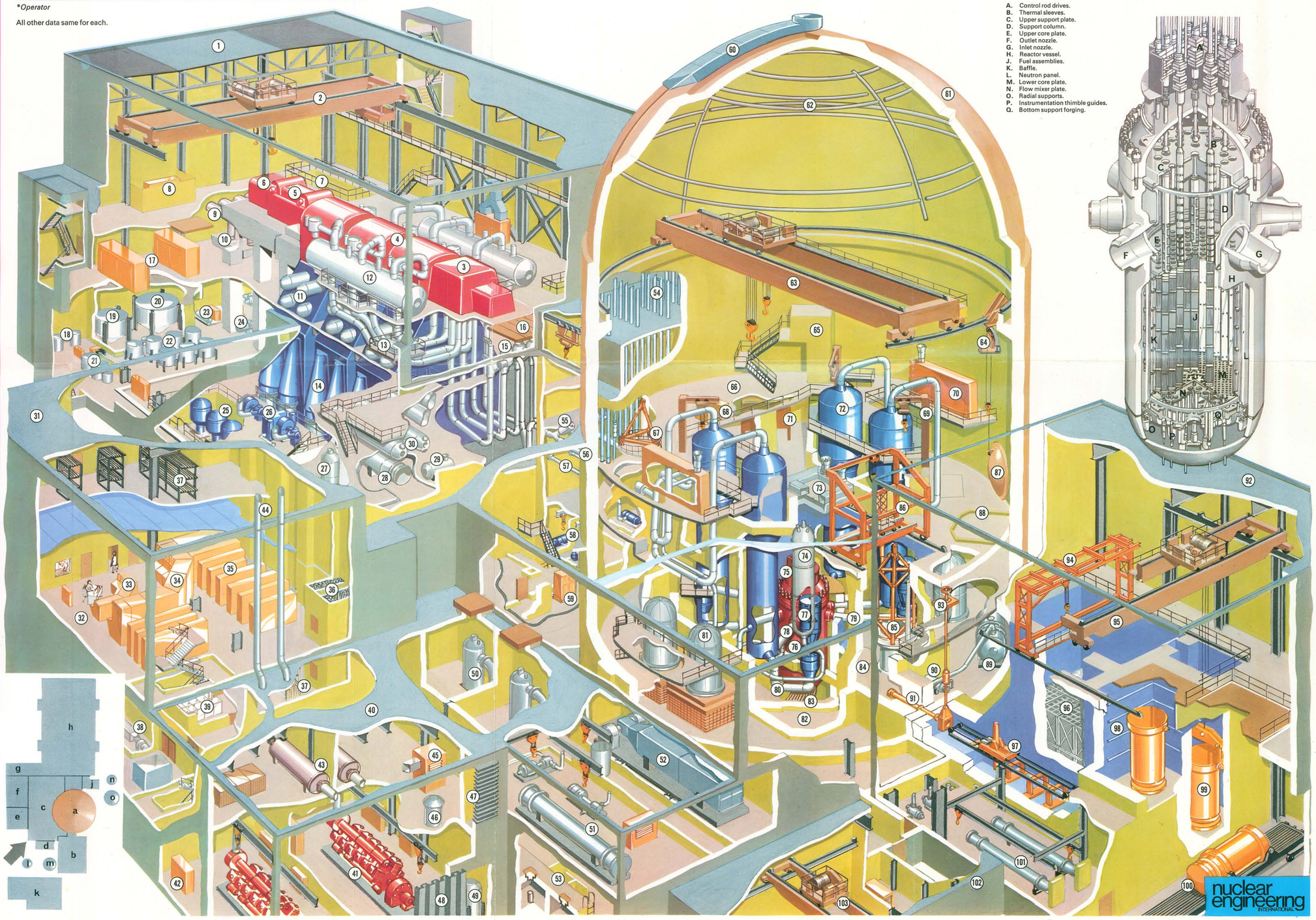
Turbine-generator sets

Type	Tandem compound 6-flow
Speed	1800 rev/min
Rating	1188 MW(e)
Generator cooling: Stator	Water
Rotor	Hydrogen
TSV pressure	68.55 kg/cm²a (975 psia)
TSV temperature	282.2°C (540°F)

NUCLEAR ENGINEERING INTERNATIONAL NOVEMBER 1975

Nuclear Engineering International,
Dorset House, Stamford Street,
London SE1 9LU, England.

1. Turbine building.
2. Turbine building crane.
3. High pressure turbine.
4. Low pressure turbines.
5. Generator.
6. Exciter.
7. Equipment opening.
8. Generator relay cabinet.
9. Isophase bus.
10. Isophase bus cooling unit.
11. Low pressure heaters.
12. Moisture separator reheater.
13. Reheat drain tanks.
14. Condensers.
15. Stop and control valves.
16. Access hatch to control valves.
17. 480 volt load centers.
18. Regeneration chemical tanks.
19. High TDS tank.
20. Low TDS tank.
21. Resin tanks.
22. Condensate polishing tanks.
23. Central chillers.
24. Closed cooling water heat exchangers.
25. Condensate pumps.
26. Steam generator feed pumps.
27. Steam generator blowdown flash tank.
28. Reboiler.
29. Deaerator.
30. High pressure heaters.
31. Control building.
32. Control room.
33. Operator's console.
34. Main control boards.
35. Equipment cabinets.
36. Electrical chase.
37. Cable spreading room.
38. Control room pressurization filter units.
39. Battery room.
40. Diesel generator building.
41. Diesel generators.
42. Control cabinet.
43. Exhaust silencers.
44. Exhaust stacks.
45. Vent fans.
46. Air intake filters.
47. Air intake louver.
48. Removable missile shield.
49. Fuel oil day tank.
50. RHR heat exchangers.
51. Component cooling heat exchanger.
52. Auxiliary building exhaust filter adsorber.
53. Reactor coolant and seal water filters.
54. Steam vent stacks.
55. Main steam isolation valves.
56. Main steam feed pipes.
57. Main feedwater pipes.
58. Auxiliary feedwater pumps.
59. Pressurizer deadweight test stand.
60. Unit vent.
61. Reactor building.
62. Containment spray headers.
63. Reactor building polar crane.
64. Equipment access hatch lifting gear.
65. Elevator machinery room.
66. Laydown area.
67. Reactor vessel internals lifting rig.
68. Control and data acquisition equipment.
69. Jib crane.
70. Containment atmospheric control filter adsorber.
71. Containment cooler.
72. Steam generators.
73. Control rod drive mechanism cooling fans.
74. Pressurizer.
75. Control rod drive mechanism.
76. Reactor.
77. Reactor coolant pumps.
78. Steam generator – reactor primary loop.
79. Reactor – pump primary loop.
80. Pump – steam generator primary loop.
81. Accumulator tanks.
82. Pressurizer enclosure.
83. Incore instrumentation.
84. Lower internals storage stand.
85. Upper internals storage stand with internals lifting rig.
86. Manipulator crane.
87. Equipment hatch.
88. Reactor cavity seal ring storage area and reactorvessel head storage and decontamination area.
89. Pressurizer relief tank.
90. Reactor coolant drain tank.
91. Fuel transfer tube.
92. Fuel building.
93. Fuel transfer tube valve control.
94. Spent fuel pool bridge crane.
95. Fuel building cask handling crane.
96. Spent fuel pool.
97. Fuel transfer carriage.
98. Cask washdown pit.
99. Cask loading pool.
100. Cask railcar.
101. Fuel pool cooling heat exchangers.
102. Hot machine shop.
103. Hot machine shop crane.



a. Reactor building.
b. Fuel building.
c. Auxiliary building.
d. Hot machine shop.
e. Diesel generator building.
f. Control building.
g. Communications corridor.
h. Turbine building.
j. Auxiliary boiler room.
k. Radwaste building.
l. Reactor makeup water storage tank.
m. Refuelling water storage tank.
n. Demineralized water tank.
o. Condensate storage tank.

A. Control rod drives.
B. Thermal sleeves.
C. Upper support plate.
D. Support column.
E. Upper core plate.
F. Outlet nozzle.
G. Inlet nozzle.
H. Reactor vessel.
J. Fuel assemblies.
K. Baffle.
L. Neutron panel.
M. Lower core plate.
N. Flow mixer plate.
O. Radial supports.
P. Instrumentation thimble guides.
Q. Bottom support forging.

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