

SYSTEM 80+

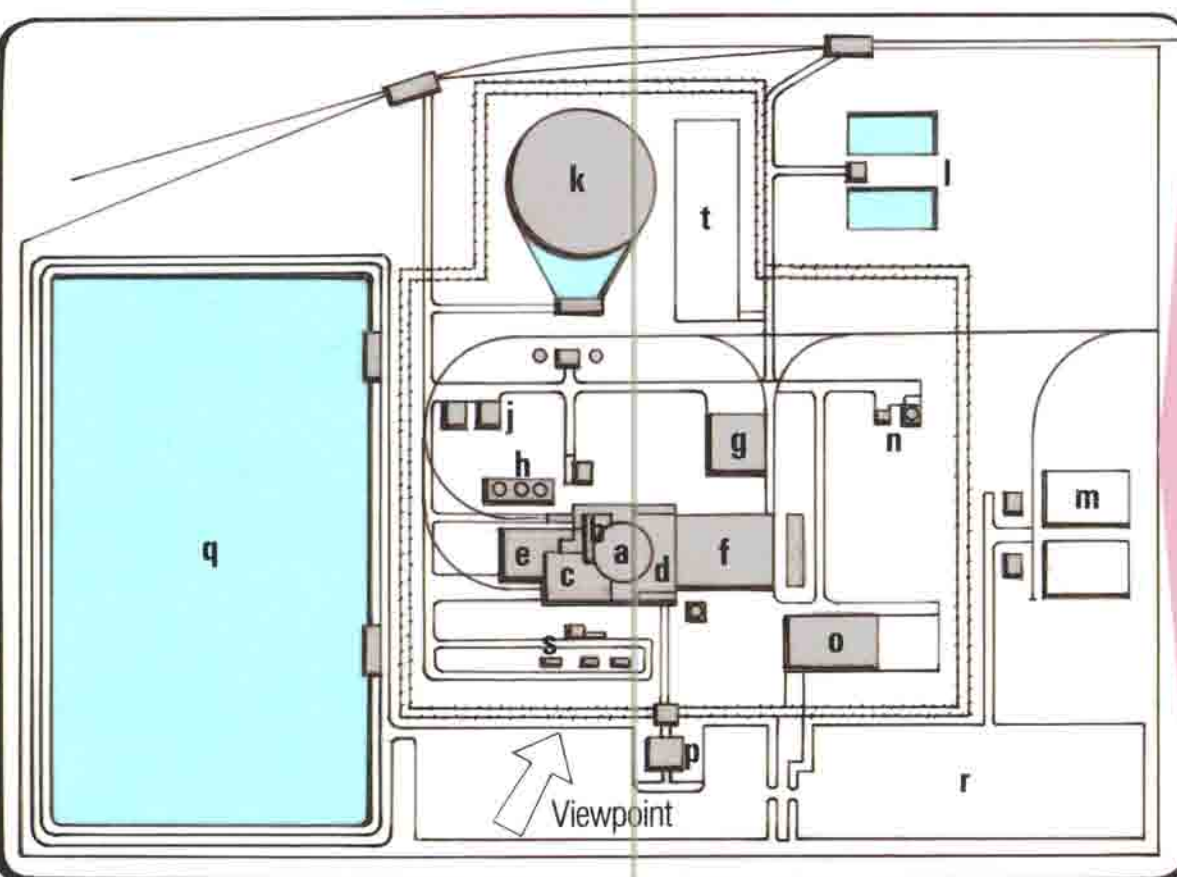
STANDARD DESIGN

ABB nuclear engineering
ASEA BROWN BOVERI INTERNATIONAL

This drawing was produced by the magazine Nuclear Engineering International, in collaboration with ABB CE. It was published in the November 1992 issue.

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 Quadrant House, The Quadrant, Sutton, Surrey, SM2 5AS, UK.

John Way



- Site plan key**
- a Reactor building
 - b Fuel pool area
 - c Maintenance and outage area
 - d Control area
 - e Radwaste building
 - f Turbine building
 - g Service building
 - h Storage tanks
 - i Pump and heat exchanger structures
 - k Cooling tower
 - l Sewage treatment
 - m Switchyard
 - n Alternate AC source gas turbine
 - o Warehouse
 - p Administration
 - q Pond
 - r Parking
 - s Bulk gas storage
 - t Spent fuel storage

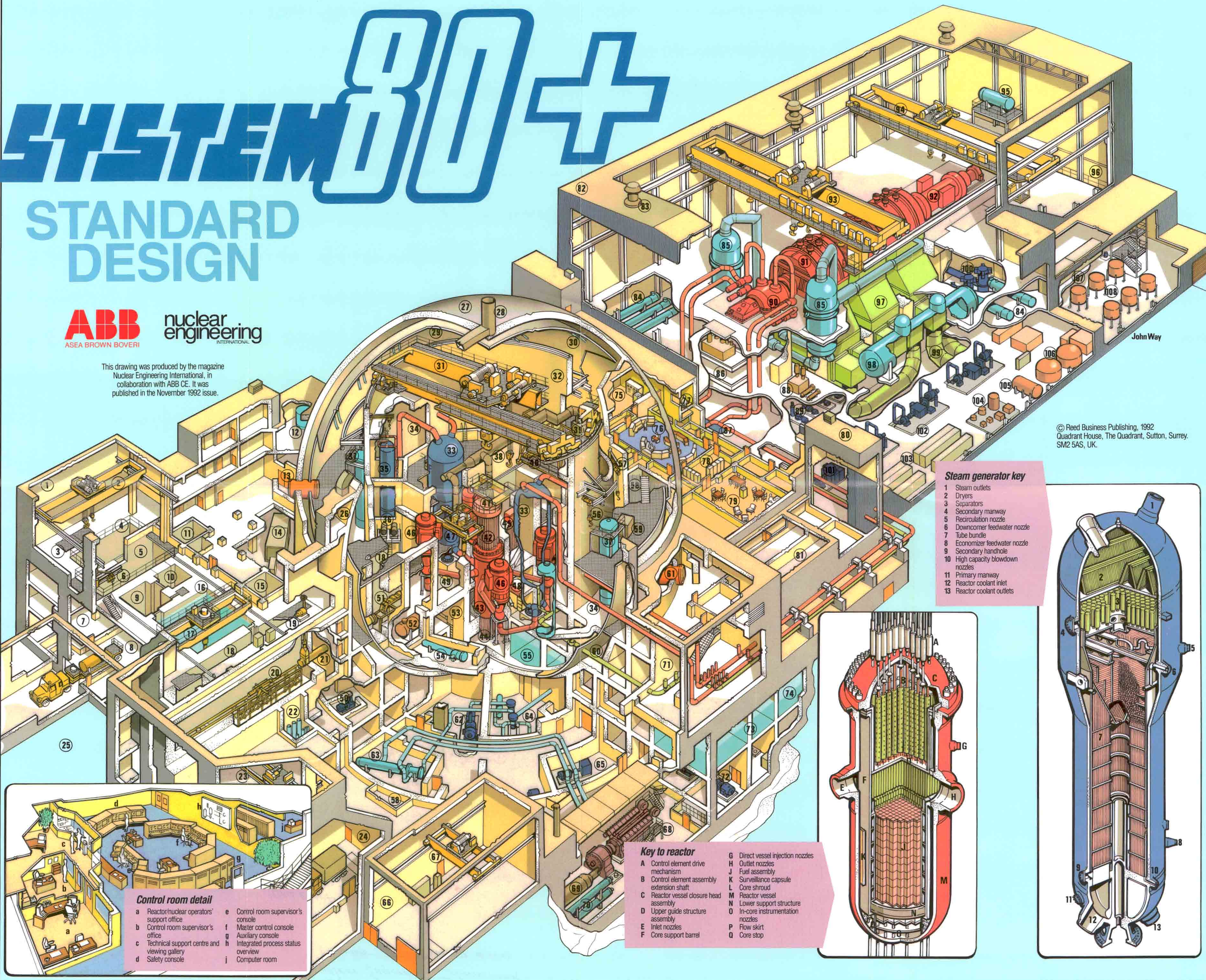
Technical data

TYPE Pressurised water reactor; fuel – slightly enriched UO ₂ Zircaloy-4 clad, chemical shim; 1382 MWe Standardized System 80+™	Thickness of SS cladding Design pressure Design temperature Material Weight (incl. vessel head)	0.13in (3.3mm) 2500lb/in ² (176kg/cm ²) 650°F (343°C) SA-506 1 120 000lb (508 000kg)
CONSTRUCTION SCHEDULE First structural concrete to fuel load Startup tests	TURBINE Type	Tandem-compound, 1hp 3hp turbine 1800 rev/min.
CAPACITY Gross generation Net electrical output Overall station net efficiency	Speed Boiler steam at turbine inlet: Pressure Temperature	969lb/in ² (68.1kg/cm ²) 539°F (282°C)
REACTOR CORE Reactor output Core length Core diameter Number of fuel assemblies	CONDENSER Type	Three shell, three pass, divided water boxes 8.438 x 10 ⁶ ft ² h (2.531 x 10 ⁶ W) 1 070 600ft ² (99 500m ²)
FUEL Fuel material Total quantity of UO ₂ Number of pins per assembly Pellet diameter Clad material Clad thickness Enrichment levels (initial core)	Design Heat transfer Design pressure: Shell Water box	2.29/2.88/3.59inHg (77.4/97.3/121mb) 251lb/in ² (1.76kg/cm ²)
CONTROL Number of control element assemblies Absorber material	GENERATOR Design Speed Flating Terminal voltage Power factor Frequency	Hydrogen inner cooled 1800 rev/min 1573 kVA 24kV 0.9 60 Hz
DRIVE TYPE Drive type Number of fingers per assembly	MAIN TRANSFORMER Rated power High voltage rating Low voltage	760 MVA 230 kV 22.8 kV
THERMAL DATA Steam flow Steam pressure Steam temperatures: Saturated steam operation Feed water temperature	CONTAINMENT Type	Spherical steel containment vessel, reinforced concrete shield building
REACTOR PRESSURE VESSEL Inside diameter Overall height Average wall thickness	Diameter: Shield building Containment vessel Concrete wall thickness Foundation slab thickness Design pressure Design temperature Free volume	216ft (66m) 200ft (61m) 3ft (0.9m) 10ft (3m) 53.0lb/in ² (3.73kg/cm ²) 290°F (143°C) 3.34 x 10 ⁶ ft ³ (95 x 10 ³ m ³)

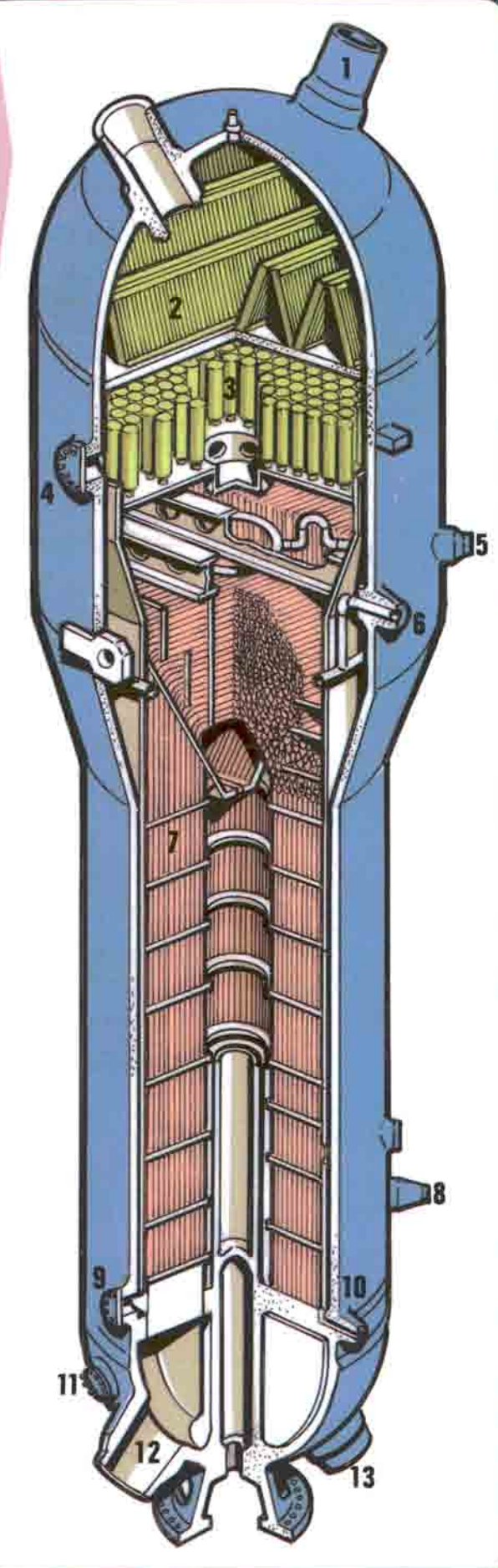
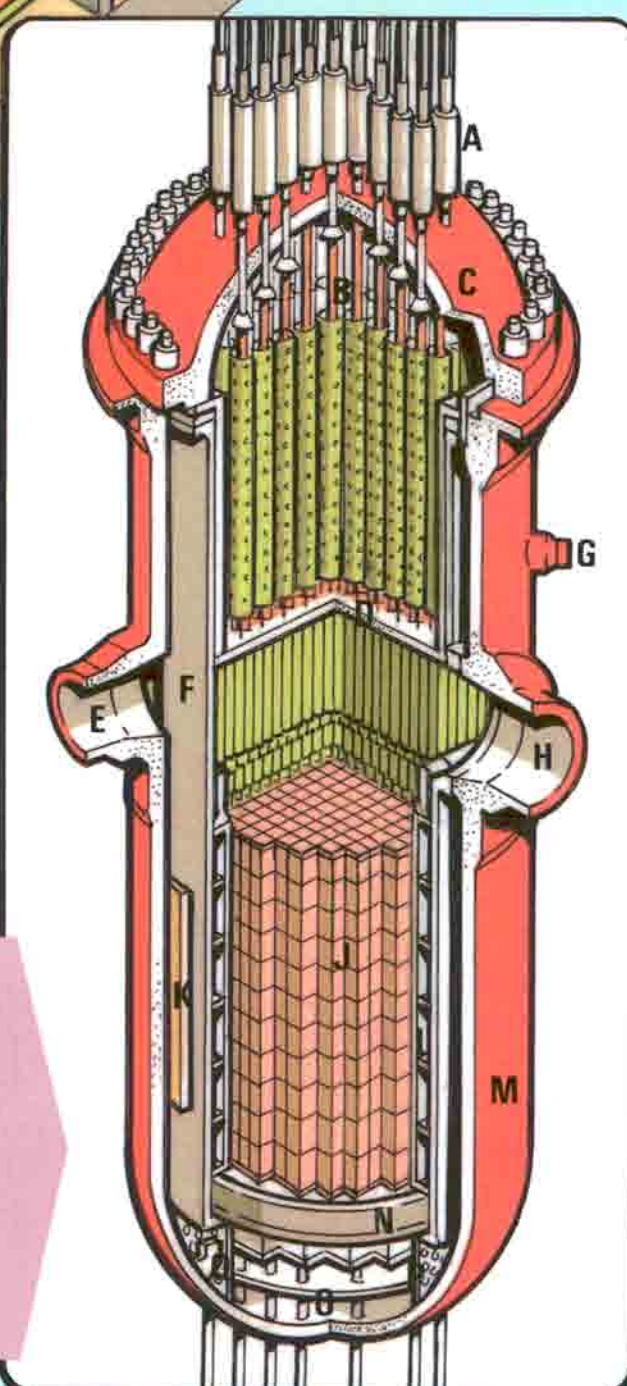
All data above refer to one reactor-turbine unit

Key to power station cutaway

1 Fuel building	31 Polar crane	56 Monorail crane	82 Turbine building
2 Fuel building overhead crane	32 Crane wall	57 Jib crane	83 Roof ventilation fans
3 New fuel storage	33 Steam generators	58 Cable shaft	84 Feedwater heaters
4 New fuel inspection station	34 Main steam lines	59 Containment cooling ventilation unit	85 Moisture separator reheaters
5 New fuel unloading area	35 Pressuriser	60 Feedwater line	86 Lubricating oil storage tank, pumps, and coolers
6 Jib crane	36 Pressuriser vent fans	61 Personnel access	87 Main steam header
7 Fuel pool storage	37 Safety injection tanks	62 Safety injection pump room	88 Control fluid unit and coolers
8 Truck bay	38 Control element drive mechanism cooling ducts	63 Containment spray heat exchangers	89 Condenser air removal
9 Cask laydown	39 Control element drive mechanism cooling units	64 Containment spray pumps	90 High pressure turbine
10 Cask washdown	40 Control element assembly change platform	65 Emergency feedwater pumps	91 Low pressure turbines
11 Equipment access shaft	41 Head area cable tray system	66 Hot machine shop	92 Generator
12 Component cooling water surge tank	42 Control element drive mechanism	67 Overhead bridge crane	93 Main turbine building crane
13 Personnel access	43 Reactor vessel	68 Emergency diesel generators	94 Auxiliary crane
14 Annulus exhaust	44 In-core instrumentation tubes	69 Diesel exhaust silencer	95 Turbine building cooling water surge tank
15 HVAC chase	45 Seal table	70 Water and lubricating oil coolers	96 Hoist area
16 Spent fuel pool	46 Reactor coolant pumps	71 Main steam valve house	97 Condensers
17 Spent fuel pool bridge crane	47 Fuel handling bridge	72 Component cooling water pumps	98 Deaerator
18 Refuelling canal	48 Reactor coolant piping (hot leg)	73 Emergency feedwater storage tanks	99 Circulating water outlet pumps
19 Winch assembly	49 Reactor coolant piping (cold leg)	74 Normal chilled water	100 Condensate pumps
20 Fuel transfer system (spent fuel side)	50 Fuel pool cooling pumps	75 Computer room	101 Start-up feedwater pump
21 Fuel transfer tube	51 Fuel transfer system upender	76 Control room	102 Motor-driven feed and booster pumps
22 Pipe chase	52 Reactor drain tank	77 Viewing gallery	103 Feedwater pump controllers
23 Truck bay overhead crane	53 Hold-up volume	78 Shift assembly room	104 Ammonia break equipment area
24 Truck bay	54 Laydown heat exchanger	79 Break room	105 Ammonia storage tank
25 Radwaste facility	55 In-containment refuelling water storage tank	80 Elevator and stairs	106 Waste storage tank
26 Station vent room		81 Personnel decontamination	107 Switchgear
27 Reactor building shield wall			108 Condensate polishers
28 Vent stack			
29 Steel containment			
30 Containment spray lines			



- Steam generator key**
- 1 Steam outlets
 - 2 Dryers
 - 3 Separators
 - 4 Secondary manway
 - 5 Recirculation nozzle
 - 6 Downcomer feedwater nozzle
 - 7 Tube bundle
 - 8 Economizer feedwater nozzle
 - 9 Secondary handhole
 - 10 High capacity blowdown nozzles
 - 11 Primary manway
 - 12 Reactor coolant inlet
 - 13 Reactor coolant outlets



- Key to reactor**
- | | |
|--|-----------------------------------|
| A Control element drive mechanism | G Direct vessel injection nozzles |
| B Control element assembly extension shaft | H Outlet nozzles |
| C Reactor vessel closure head assembly | J Fuel assembly |
| D Upper guide structure | K Surveillance capsule |
| E Inlet nozzles | L Core shroud |
| F Core support barrel | M Reactor vessel |
| | N Lower support structure |
| | O In-core instrumentation nozzles |
| | P Flow skirt |
| | Q Core stop |

- Control room detail**
- | | |
|--|--------------------------------------|
| a Reactor/nuclear operators' support office | e Control room supervisor's console |
| b Control room supervisor's office | f Master control console |
| c Technical support centre and viewing gallery | g Auxiliary console |
| d Safety console | h Integrated process status overview |
| | i Computer room |