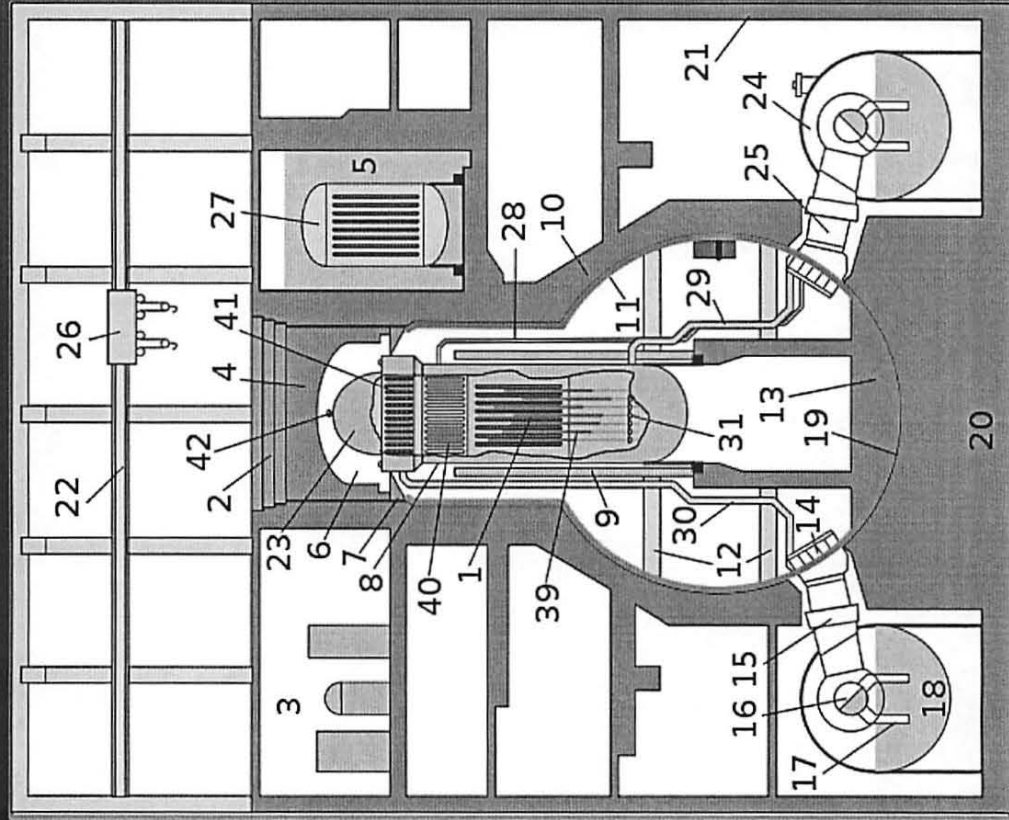


Briefing to Texas A&M University nuclear engineering students in the wake of Fukushima-Daiichi NPP accidents



- | | | | |
|----|------------------------------------|----|---|
| 1 | Core with fuel rods | 22 | Refueling platform |
| 2 | Concrete shield plug | 23 | Refueling Bulkhead |
| 3 | Equipment pool | 24 | Pressure suppression chamber (runs in a torus around the reactor) |
| 4 | Drywell head | 25 | Vent (81 inch diameter) |
| 5 | Fuel storage pool; spent fuel area | 26 | Crane |
| 6 | Refuelling cavity | 27 | Used Fuel |
| 7 | Drywell flange | 28 | Coolant pipe |
| 8 | Reactor pressure vessel | 29 | Cold water pipe (from generator) |
| 9 | Biological shield | 30 | Steam pipe (to generator) |
| 10 | Secondary concrete shield wall | 31 | Control rod drives |
| 11 | Free standing steel drywell | 39 | Control rods |
| 12 | Radial beam | 40 | Steam separators (water normally goes to this level) |
| 13 | Concrete embedment | 41 | Steam dryer |
| 14 | Jet deflector | 42 | Vent and head spray |
| 15 | Expansion bellows | | |
| 16 | Vent header | | |
| 17 | Downcomer pipe | | |
| 18 | Water (wetwell) | | |
| 19 | Embedded shell region | | |
| 20 | Basement | | |
| 21 | Reactor building | | |

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Core Damage Frequency (CDF)

Typical Nuclear Power Plant	CDF per reactor year
Boiling Water Reactor Design Type 3 (BWR/3)	4.5×10^{-6} *
BWR/4	1×10^{-5}
BWR/6	1×10^{-6}
Advanced BWR (ABWR)	2×10^{-7} (operating in Japan)
Economic Simplified BWR (ESBWR)	1×10^{-8} (NRC approval stage)
AP1000 (Westinghouse Advanced PWR)	5.09×10^{-7}
European Pressurized Reactor (EPR)	4×10^{-7}

A 2003 European Commission study remarked that “CDF of 5×10^{-5} /ry are a common result” or in other words, one core damage incident in 20,000 reactor years. A 2008 EPRI study estimated core damage frequency for the United States nuclear industry is estimated at once in 50,000 reactor years, or 2×10^{-5} . Assuming there are 500 reactors in use in the world, the above numbers mean that, statistically, one core damage incident would be expected to occur somewhere in the world every 40 or 100 years, respectively.