Gundremmingen KRB-A

Technical description

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1. Short description of a Boiling Water Reactor (BWR)

The Nuclear Reactor KRB-A located at Gundremmingen is of Boiling Water Reactor type (BWR) (Fig. 1).

The BWR reactor typically allows *bulk boiling of the water in the reactor*.

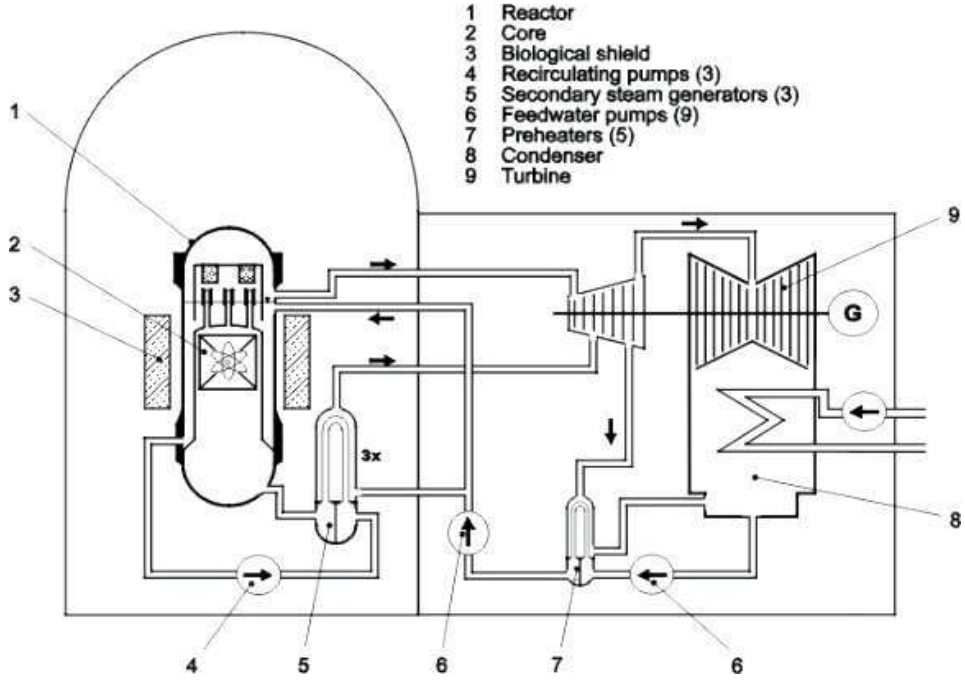

Figure 1. Nuclear Boiling Water Reactor

1: Reactor	4: Recirculating pumps (3)	7: Preheaters (5)
2: Core	5: Secondary steam generators (3)	8: Condenser
3: Biological shield	6: Feedwater pumps (9)	9: Turbine

The BWR reactor typically allows bulk boiling of the water in the reactor.

The operating temperature of the reactor is approximately 570 °F producing steam at a pressure of about 1000 pounds per square inch (bar).

The water is circulated through the Reactor Core picking up heat as the water moves past the fuel assemblies. The water eventually is heated enough to convert to steam. Steam separators in the upper part of the reactor remove water from the steam.

The steam is directly sent to the turbine, which allows to convert the gas expansion in mechanical energy by rotating the turbine driving shaft. The rotor of the generator, coupled to the shaft, transforms the mechanical power into electrical power.

The steam, after passing through the turbines, then condenses in the Condenser, which is at a vacuum and is cooled by ocean, sea, lake, or river water. The condensed steam then is pumped to Low Pressure Feedwater Heaters (shown but not identified).

The water then passes to the Feedwater Pumps which in turn, pump the water to the reactor and start the cycle all over again.

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2. KRB-A features and technical data

Reactor type:	Boiling Water Reactor with additional secondary steam generation.
Thermal power:	801 MW_{th}.
Electric power:	237 MWe net.
Electrical production:	16000 GWh.
Average availability:	75 %.

One feature of KRB-A is the existence of a secondary steam system.

Indeed, besides the primary steam (1000 Mg/h), there was a secondary steam system (360 Mg/h) available for load regulation of the reactor. Each of the three recirculation loops was equipped with a big recirculation pump and a steam generator.

The situation before starting the reported work (EC contract) is shown on Fig. 2.

The turbine hall is empty and is now used as a work shop. A big band saw and a high pressure compactor is located there.

On the pre-heater floor the mechanical segmenting area was installed to prepare the dismantled components for decontamination. The decontamination bathes are located on the floor of the feedwater pumps.

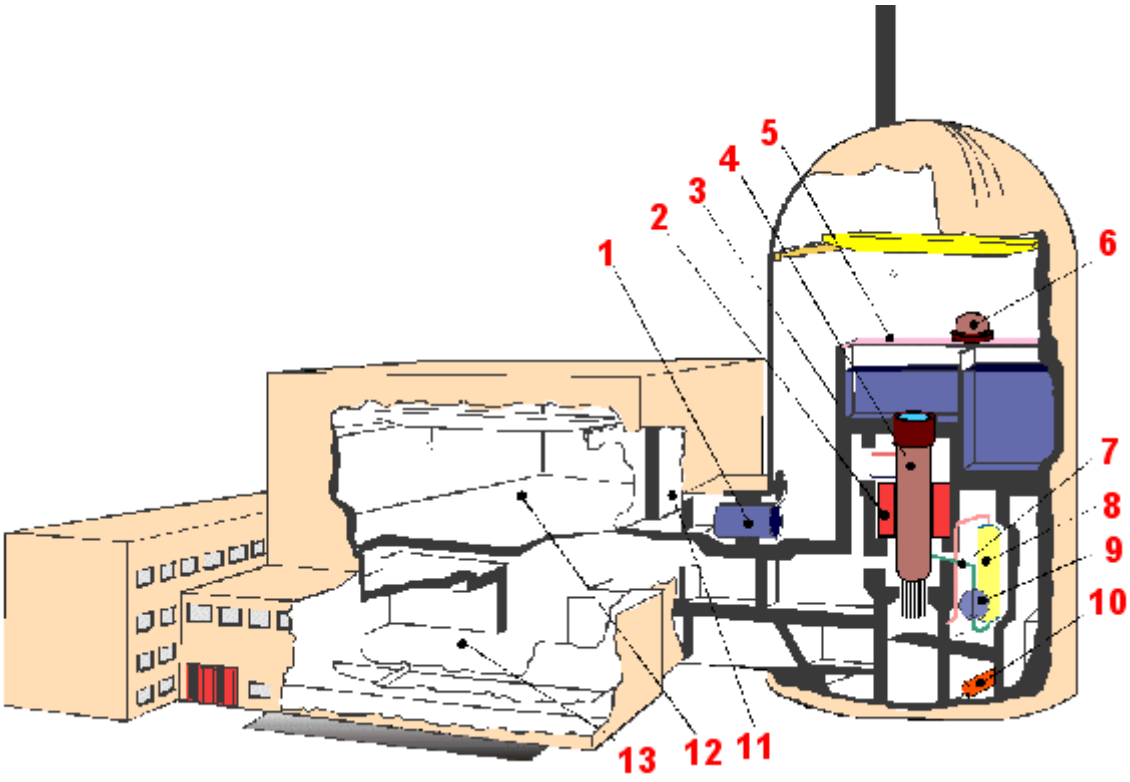

Figure 2. KRB-A before starting the EC-contract FI2D-0005

1: Material lock
2: Biological Shield
3: Clean-up cooler (behind RPV)
4: Reactor Pressure Vessel
5: Reactor floor + 31 m
6: RPV cover
7: Recirculating loops (3)
8: Secondary steam generators (3)
9: Recirculating pumps (3)
10: Shutdown cooler
11: Former preheater floor
12: Former turbine hall
13: Former feedwater pumps floor

Both mechanical and thermal cutting techniques were used depending on the special cutting tasks and in order to gain experience and compare different strategies for the dismantling of contaminated components:

- Ice-sawing technique;
- Modified plasma torch technique for thick-walled pipes and pies fittings in limited space;
- Conventional mechanical cutting techniques.