System of primary circuit coolant purification KBE

System of primary circuit coolant purification provides fulfilling of the primary circuit WCR requirements.

Functions of the KBE system are as follows:

- to clean the primary circuit coolant from dissolved impurities in cation and anion forms;
- to clean the coolant from radioactive suspended corrosion products;
- to control ammonia-potassium WCR.

The need to provide the coolant quality parameters maintenance and reduction of ionizing radiation dose capacity from the primary circuit equipment is of primary importance. It is ensured by traditional methods of mechanic filtration and ionic exchange.

The maintenance of the primary circuit WCR normal values is provided by purification of coolant on the KBE filters with constant consumption 30 t/h. Maximum coolant consumption is defined on the basis of the need for coolant purification at the boric regulation. In this case the consumption through KBE system is 60 t/h.

In accordance to it there are two independent filters groups , that are parallel connected. Each of filters groups includes MB, entrainment filter, pipelines, armature. MB-filters have mixed bed: cation exchanger and anion exchanger in the ratio 1:1. The entrainment filter are placed after ion exchanger in each group. The system is connected with the system of make-up and boric regulation KBA. The principal scheme is demonstrated in the picture below.
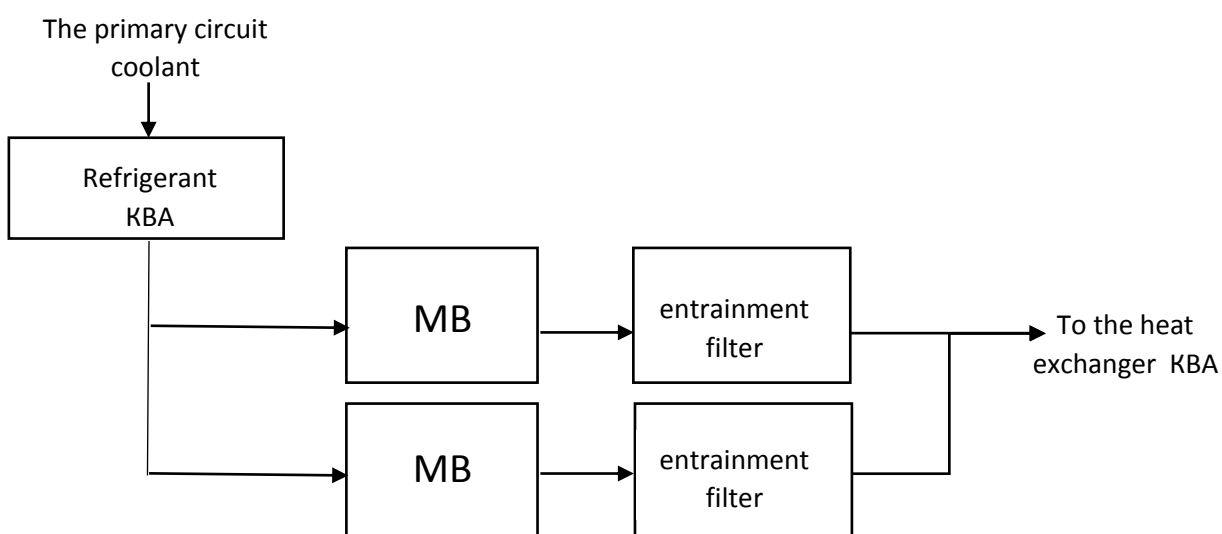
Scheme 1. The principal technological scheme of KBA system
(MB – mixed bed; KBA – system of make-up and boric regulation)

The equipment of KBE system is placed in the impermeable part of the reactor compartment. Technical service and repair of equipment are carried out in PPR period.

The system works in the following regimes:

- constant purification of the primary circuit coolant (one set of filters is working);
- boric regulation (two sets of filters are working).

Control of purification efficiency and filtration materials states are secured with automatic chemical control (KUB). Substitution of ion exchange material is carried out at depletion of one exchange volume.