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OPTIMIZATION OF BUILT-IN PRIMARY SODIUM PURIFICATION SYSTEM FOR ADVANCED BN REACTOR PLANT

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While developing an advanced BN reactor plant the tasks were put to reduce a reactor plant cost with obligate meeting of safety requirements and reliability increase of reactor plant equipment and systems.
A purification system with cold traps (CT) placed in the reactor vessel (built-in purification system) was applied in the large BN reactor plant for primary sodium purification.
The developed CTs were equipped with unchangeable electromagnetic devices (a pump and a pump-throttle) to provide flowrate through the CT.
While developing an advanced BN, the primary sodium purification system was optimized - the cold trap design was optimized.
The electromagnetic pump and the electromagnetic pump-throttle were excluded from the cold trap design.
Sodium supply was arranged from the pressure chamber of the reactor.
To control sodium flowrate, the cold trap was equipped with changeable mechanical regulating devices with built-in flowmeters, and a changeable throttling device.
In addition, a CT cooling circuit was optimized within the framework of optimization. Eccentric collectors were used for cooling agent inlet and outlet; it permitted to increase CT impurity capacity by ~ 1.75 times and to increase purification system efficiency by ~ 1.5 times.
The performed optimization permitted to increase CT reliability and repairability, reduce quantity of CTs for replacement over the reactor plant service life by two times approximately; this made a positive effect on decrease of reactor plant construction cost and costs of CT replacement and disposal of spent CT.

Country/Int. organization

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