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RESEARCH REACTOR BR-10 - TESTING GROUND FOR CONDITIONING OF RADIOACTIVE WASTE OF ALKALINE LIQUID-METAL COOLANTS UNDER DECOMMISSIONING PROJECT

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In 2002 after successful work over a period 46 years the research reactor BR-10 (RR BR-10) was shut down and transfer into decommissioning status. The total amounts of alkaline coolant radioactive waste are approximately 18 m3 with the total activity in excess of 37 TBq (1000Ci). These are: sodium - 9 m3, including sodium from 16 cold traps oxides; alloy NaKHg - 4,5 m3 with a ratio 44% - 48,5% - 7,5% and 4,5 m3 with a ratio 95% - 5% - 0,02%.

Later, treatment technologies with radioactive waste of alkaline liquid metal coolant and with polluted equipment were developed as a result of decision of scientific-technical challenges.

Currently in the rector building introduce in operation the testing ground for transferring into safety stable condition radioactive waste of alkaline liquid metal coolant from RR BR-10. Decommissioning project includes units which founded on the developed treatment technologies. Namely: Magma for solid-phase conditioning the total volume of alkaline coolant radioactive waste; Getter for purification alloy NaK from mercury admixtures; Luisa-RW for neutralization nondrainable residual radioactive waste of alkaline coolant. These technologies have experimental and estimated justification for industrial application under decommissioning project of RR BR-10.

For conditioning the total volume of discharge alkaline liquid metal coolant in safety condition was created unit Magma. The principle of operation of the unit is based on the solid-phase oxidation technology by slag from the copper-smelting industry [1-3].

Other main challenge at the RR BR-10 is treatment with radioactive waste of alloy NaK which impure of mercury admixtures. For solution of this problem was created unit Getter, the principle of which is based on the technology of purification alloy NaK from mercury with a hot magnesium getter [2-3].

For removal nondrainable residual radioactive waste of alkaline liquid metal coolant from inside surface of individual equipment was created unit Luisa-RW. The principle of operation of the unit based on the technology of neutralization nondrainable residues by nitrous oxide with subsequent grouting of obtained salt phase directly in the volume of equipment. A priority unit Luisa-RW is handling with cold traps oxides [2-3].

Currently, at the testing ground is produced complex tests of equipment and adjustment of technological conditions. The operation of the testing ground, which is scheduled to begin in 2016, is assumed:

 unit Magma conditioning of sodium from 1 and 2 circuits (approximately 6 m3); conditioning of sodium from cold traps oxides (approximately 3 m3); conditioning of cleared alloy NaK from mercury (approximately 9 m3);

 unit Getter - purification alloy NaKHg from mercury (approximately 9 m3);

 unit Luisa-RW - neutralization nondrainable residual in 16 spent cold traps oxides and other individual equipment.

Country or International Organization

Russian Federation

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