

TECHNICAL FEATURE OF APPLICATION OF SPO TECHNOLOGY IN INDUSTRIAL IMPLEMENTATION UNDER DECOMMISSIONING PROJECT OF FAST REACTORS

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Since 2002, research reactor BR-10 (RR BR-10) moved into a decommissioning status. The main scientific and technical challenge for decommissioning project was to determine the most safety technology for conditioning radioactive waste (RW) of alkaline liquid-metal coolants (LMC). As a decision has been the technology of solid-phase oxidation (SPO) of alkaline metal by slag from copper smelting industry [1].

At the initial stage of development of SPO technology were experimentally designation parameters and technical modes of conditioning and establish the course of chemical interaction of alkaline metal with oxides which are present in the slag. But the use of the obtained results in decommissioning project of RR BR-10 was required to conduct a large-scale verification of SPO technology. As a result have been developed two alternative ways of mixing the components. One of them involves the discharge of hot slag into the molten alkaline metal ("upper dumping"), the second - injection of molten alkaline metal under the layer of slag ("bottom feed").

To test the mixing methods was carried out a large-scale verification of one-time conditioning for 50 liters of alkaline metal at the experimental rigs, layout of which are shown in Figure 1.

Figure 1. Mixing schemes of SPO technology.

Thus, the large-scale verification was shown that the "bottom feed" has a number of advantages in terms of safety process control, efficiency and reliability of the design, quality of final product which are suitable for long term storage [2].

As a result, the "bottom feed" was designation for the implementation of decommissioning project of RR BR-10. Technical solutions that were worked out at the experimental rigs were introduced in the principle of operation of the Testing Ground under the decommissioning project of RR BR-10. A separate part of the Testing Ground is a unit Magma which is intended one-time conditioning for 60 liters of RW of alkaline LMC. Works which are concerned with industrial application of SPO technology will begin on unit Magma in 2016. Recently, the technical conditions are developed for the implementation SPO technology in relation to energy power reactors and reactors-prototypes. The result of development shows that the increase one-time conditioning is necessary to upgrade some components and equipment for more safety and effectively.

REFERENCES

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Primary author: Mr BUTOV, Kirill (Rosatom, Russian Federation)

Co-authors: Mr KONONYUK, Mikhail (Rosatom, Russian Federation); Mr SMYKOV, Vladimir (Rosatom, Russian Federation)

Presenter: Mr BUTOV, Kirill (Rosatom, Russian Federation)

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