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**TYPES OF CHEMICAL COMPOUNDS IN THE
ASSESSMENT OF RADIATION AND HYGIENIC
HAZARDS WHEN WORKING WITH IRRADIATED
NITRIDE FUEL**

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At the moment, in the world nuclear power industry there are proposals for the transition from oxide to other types of fuel, which can be much more cost-effective and used in the technology of closing the nuclear fuel cycle based on fast reactors. One of such fuels is uranium-plutonium nitrides. During the fission of uranium and plutonium nuclei in fast neutron reactors, a large number of isotopes of chemical elements and various chemical compounds with these isotopes are formed. These elements and compounds have different chemical properties.

The purpose of this report is to consider various types of chemical compounds of fission products formed in irradiated nitride fuel in fast reactors and to assess the radiation-hygienic hazard of work with irradiated nitride fuel.

The report examined the types of chemical compounds formed both directly in the fuel matrix during the operation of reactors, and their possible transitions into other chemical compounds and forms during the processing of irradiated nuclear fuel.

As a result, the report contains the main types and forms of chemical compounds of fission products present in irradiated nitride fuel, such as lanthanide nitrides and intermetallic compounds, the physicochemical and radiotoxicological properties of which have not been studied in detail, which can lead to an incorrect assessment of the contribution to the internal dose of workers during ensuring radiation monitoring or emergency situations. This stands means the loss or complete absence of control over radiation safety during the reprocessing of nitride fuel is possible. It is necessary to holding a computational and analytical assessment of the real radio-hygienic hazard and the significance of these compounds, in internal exposure and experimental confirmation of the presence of these compounds in the air of the working area of enterprises processing irradiated nitride fuel.

Country/Int. organization

Russian Federation

Author: Mr KOMAROV, Artem (Burnasyan Federal Medical Biophysical Center of Federal Medical Biological Agency)

Presenter: Mr KOMAROV, Artem (Burnasyan Federal Medical Biophysical Center of Federal Medical Biological Agency)

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