STATE OF THE TECHNOLOGIES DEVELOPMENT PROGRAM OF THE FUSION FUEL CYCLE OF FFHS IN THE RUSSIAN FEDERATION [[1]](#footnote-1)\*)

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Within the framework of the federal project "Development of technologies for controlled fusion and innovative plasma technologies" of the complex program "Development of equipment, technologies and research in the field of atomic energy use in the Russian Federation for the period up to 2024" (DTTS) it is planned to carry out applied research and development at the National Research Center "Kurchatov Institute". The tasks of the current period include substantiation of fuel cycle and hybrid blanket technologies choice, as well as technical design of the FNS-K fusion neutron source and hybrid reactor plant (GRU) for testing technologies, materials and components of hybrid systems [1].

The fusion-fission hybrid systems (FFHS) development program proposed by NRC Kurchatov Institute provides for the creation of a mock-up for testing technologies and their mutual integration. Timely provision of specialized stands and qualified personnel will make it possible to effectively implement the project for the construction of a GRU with a thermal capacity of up to 500 MW.

As a result of work under the DTTS program of the State Corporation Rosatom and the R&D plans of the NRC Kurchatov Institute until 2024, a physical model (stand) of the tritium-deuterium fuel cycle (FC) should be designed, developed and put into operation for research aimed at determining or clarifying operational parameters, productivity, amount of tritium and other parameters of FC systems using the projects DEMO-FNS [2] and FNS-ST [3] as the basis for the design of FNS-K and GRU. It is planned to justify the safety of technological systems and train personnel for the operation of these systems in the FFHS with a tritium reserve at the facility site from 0.1 to 2.0 kg. At later stages, technical projects of the FC systems [4-6] for FNS-K and GRU should be developed, mock-ups were made and their joint operation was carried out, in accordance with the research program, including research and selection of the optimal technology for tritium reproduction and extraction in a blanket, improvement and optimization of individual fuel cycle technologies, justification of the radiation safety of the facility.

This report is devoted to a description of the roadmap's all stages and intermediate results of the work being carried out.

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