Contribution ID: **405** Type: **ORAL**

BN-800 core with MOX fuel

Tuesday, 27 June 2017 14:10 (20 minutes)

One of the main objectives for BN-800 development is to master the closed nuclear fuel cycle technologies using the mixed uranium-plutonium (MOX) fuel. The initial loading of BN-800 with the hybrid core mainly made of the uranium oxide fuel includes the limited quantity (16%) of MOX fuel subassemblies fabricated at experimental production facilities of Mayak Production Association and JSC SSC RIAR.
The core will be completely fueled with the MOX fuel fabricated at the Mining and Chemical Combine by step-by-step replacement (three refuelings) of fuel subassemblies in the hybrid core with MOX fuel subassemblies.
To flatten power distribution, the core uses three types of fuel subassemblies with the different plutonium content in the fuel. A technique to adjust plutonium enrichment in fuel depending on the fuel isotope composition makes it possible to fabricate plutonium-based MOX fuel with a wide range of isotope compositions and retain core operation parameters within the design limits.
To reduce the sodium void reactivity effect, the fuel subassembly design has an upper sodium cavity and absorbing shield made of natural boron carbide.
In the BN-800 core, the ChS-68 steel is used for fuel rod claddings the same as for standard fuel rods in BN-600. Fuel rods with such cladding continue to operate up to the damaging dose of ⊠ 90 dpa, which as applied to BN-800 corresponds to the average burnup of 66 MW day/kg for the fuel unloaded.
Prospects to increase BN-800 fuel burnup are connected with a transition to the more radiation-resistant steel EK-164 for fuel rod cladding and later on, to ferritic-martensitic steels and oxide-dispersion-strengthened ferritic steels.

Country/Int. Organization

Russia/JSC “Afrikantov OKBM”

Primary author: Mr KUZNETSOV, Artem (JSC “Afrikantov OKBM”)

Presenter: Mr KUZNETSOV, Artem (JSC “Afrikantov OKBM”)

Session Classification: 1.4 CORE AND DESIGN FEATURES - 1

Track Classification: Track 1. Innovative Fast Reactor Designs