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## EXPERIENCE OF COMMISSIONING OF BN-800 CORE DIAGNOSTIC SYSTEM (SDRU)

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Diagnostic system of the core of the reactor facility BN-800 (SDRU) of Unit 4 of Beloyarsk NPP is an automated system as part of automatic process control system (APCS), designed for complex control of processes taking place in the reactor in normal operating conditions and violations of normal operation, detection at an early stage of violations of normal operation and damage to the reactor core (the deformation of the core elements, sodium boiling in the fuel assembly, the melting of fuel rods in the fuel assembly, a violation of the core cooling and other anomalies).

SDRU includes an abnormal reactivity detection system (SOAR), neutron noise diagnostic system (SNSHD), core temperature control system (STKAZ), complex analysis system (SCA).

When entering SDRU into operation at different power levels, measurement channels (MC) as a part of SDRU performance is confirmed (temperature MC, neutron chambers current and current fluctuations MC, reactivity MC), the definition of neutron-physical characteristics of the reactor is carried out, and also the basic system algorithms efficiency is investigated:

- ☒ abnormal reactivity control based on continuous determination of reactivity effects due to changes in the parameters of the reactor, the fuel burn-up, moving the control rods, etc.;
- ☒ sodium current temperature values control over the heads of the fuel assembly, the inlet and outlet of the reactor core, temperature fluctuations and power distribution loops for heat exchange;
- ☒ current fluctuations neutron ionization chambers control;
- ☒ a comprehensive analysis of the diagnostic information and the formation of the early signs of normal operation violations and damage to the reactor core on the basis of the testimony of SDRU systems and operational information from higher-level process control systems (ARMS, TLS-U).

Currently SDRU system is in trial operation and in-service functions on the Unit 4 of Beloyarsk NPP, the possibility of expanding the functions of the system for the calculation of neutron-physical characteristics of the core of the reactor BN-800 is based on the software and hardware SDRU.

### Country/Int. Organization

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