

## 2. NEUTRON SOURCES

### THE IBR-2 PULSED REACTOR

1. In January-February, 2010, after completion of the adjustment work on the sodium cooling system of the reactor, the heating of the sodium circuits and filling of the I<sup>st</sup> and II<sup>nd</sup> cooling loops with sodium were performed successfully and the circulation of sodium was started in a standby mode. The purification of the coolant with the help of cold traps, calibration tests of the level gauges of the expansion tanks and vessel of the reactor, calibration of the flowmeters were carried out.
2. After installation of actuating mechanisms (AM) of the Safety Control System (SCS) A3-1, A3-2, KO-1, KO-2, PP and AP at regular places, the adjustment of the system controlling the movements of the actuating devices was performed. The emergency protection system of the reactor was tested in the forced operation mode (actuated by a stepper motor and an accelerating spring) and in the mode when its operation was triggered only by a spring. The obtained results are positive and meet the design requirements. Movement ranges of all actuating devices were determined – the setting of the up and down limit switches; the stability of their operation was checked. No faults in the operation of AM were revealed. The SCS AM were tested for electromagnetic compatibility, i.e. for the effects of various disturbances (radio interferences, electrostatic discharges, magnetic fields, etc.). The results of these tests are positive.
3. Installation, adjustment and tests of the Automatic Safety Control System (ASCS-12R). The equipment for ASCS-12R was delivered from SNIIP-SYSTEMATOM in April, 2010 with a delay of 15 months. The installation of the equipment took 3 months and was followed by the adjustment and tests of the complex. In November the ASCS-12R complex was presented to the Working Commission for carrying out the physical start-up of the reactor.
4. The spent IBR-2 fuel assemblies were removed from the main storage facility to an additional one. The main fuel assembly storage is ready for the physical start-up.
5. A start-up neutron source was loaded into the reactor core.
6. All technological systems of the reactor passed complex tests before the physical start-up.
7. A large amount of work on the preparation of the commissioning documentation for the physical start-up was carried out. The reactor successfully passed the inspection by the Working Commission for readiness for physical start-up.

**The modernized IBR-2 reactor physical start up was commenced according to the plan.**

### IREN FACILITY

In accordance with the decision of the JINR Directorate to realize the IREN project in several stages, the construction of the electron accelerator and the nonmultiplying neutron-producing target complex has been completed. Since the beginning of 2009 the carrying out of experimental investigations on newly constructed source has been started. IREN operated around 800 hours for experiment in 2010. Neutron yield raised up to  $10^{11}$  n/s at 100 ns pulse width.

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