

1.8.29. COMBINED DIAGNOSTICS OF THE TECHNICAL STATE OF MOVABLE REFLECTOR (MR) OF RESEARCH REACTOR IBR-2

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Paper proposes combined approach to evaluation of the technical state of movable reflector (MR) of the research reactor IBR-2 in the process of its operation on the basis of two methods. Main method uses analysis of vibration-acoustic signals. Modern approaches to solution of vibration diagnostics tasks are disclosed. These approaches bear on the combination of free oscillations calculation results, identification methods and modern algorithms of technical state diagnostics. As an additional method for determination of current state, as well as the moment of initiation and development of degradation processes, neural-activation method of the analysis of radioactive impurities in oil is described. IBR-2 is a powerful source of neutrons and is intended for design purposes. MR is located near reactor and parameters of its structural elements, including quality of oil circulating in the lubrication system, vary constantly in the process of reactor operation. Induced radioactivity accumulates in oil. Small particles of material formed during parts friction are entrained by oil from movable reflector. Therefore, oil radioactivity value at the output of individual units is proportional to the number of such particles and wear rate of rubbing parts. Every chemical element provides its own specific gamma-radiation. Measurement of gamma-spectra of radioactive impurities appeared in oil makes it possible to identify the worn-out material and to control the wear rate. Results of vibration-acoustic diagnostics and neural-activation method of oil analysis are presented.