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Seminarium Zakładu Energetyki Jądrowej i Analiz Środowiska (UZ3) Departament Badań Układów Złożonych (DUZ)

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11:30

dr Karol Kowal

Reliability and Availability Analysis of the HTTR Electrical Facility

Abstract:

Driven by the desire to expand the industrial applications of high temperature gas-cooled reactors (HTGR) the Japan Atomic Energy Agency (JAEA) is intensively conducting research and development activities on the new commercial design of Gas Turbine High Temperature Reactor for Cogeneration (GTHTR300C). In order to confirm operation and safety performance of such a system for electricity and hydrogen cogeneration, the pre-licensing design of the test plant has been recently proposed that is based on the existing JAEA's technology – High Temperature Engineering Test Reactor (HTTR). Many efforts have been undertaken by JAEA to prove the safety features of the reactor including tests and simulations. The aspects of reliability and availability have not been discussed so far. However, the long-term profitability of commercial installations is strongly driven by the ability to maintain the continuous operation of the plant systems, nuclear and non-nuclear, avoiding unplanned outages. This work was focused on the reliability and availability studies of the HTTR Electrical Facility on which all active systems rely upon. Reliability Block Diagrams were developed for two configurations of the system design, the standard JAEA configuration and the modified one. Afterward, the availability simulations were performed covering the whole lifetime of the facility, foreseen for as long as 20 years. Significant benefits of the system modification have been noted and will be discussed during the presentation.

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