

# RESEARCHES FOR THE DEVELOPMENT OF A DEVICE FOR THE DECOMMISSIONING OF THE HORIZONTAL FUEL CHANNELS IN THE CANDU 6 NUCLEAR REACTOR. FUEL CHANNEL DECOMMISSIONING

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**Abstract:** *Based on the knowledge referring to assembly the fuel channel into calandria of CANDU 6 nuclear reactor, the purpose of this study is to achieve possible method for decommissioning of the horizontal fuel channels of calandria vessel. As long as nuclear power plants are reaching their end of lifecycle, the decommissioning of these installations has become one of the 21<sup>st</sup> century's great challenges. Every project may be managed differently, depending on the country, development policies, financial considerations, and the availability of qualified engineers or specialized companies to handle such projects. The main objective of decommissioning is to place a facility into such a condition that there is no unacceptable risk from the decommissioned facility to public health and safety of the environment. The overall decommissioning strategy is to deliver a timely, cost-effective program while maintaining high standards of safety, security and environmental radiation protection. If facilities are not decommissioned, they could degrade and potentially present an environmental radiological hazard in the future. Simply abandoning or leaving a facility after ceasing operations is not considered to be an acceptable alternative to decommissioning. The decommissioning activities performed are administrative and technical, and include the preparation, endorsement and approval of documents, obtaining permits and authorizations, providing financial resources, decontamination, dismantling, demolition, controlled removal of equipments, components, conventional or hazardous waste demonstrating the fulfillment of the radiological conditional or unconditional release of the facility and the ground included in the decommissioning project. Nuclear decommissioning consists in a planning phase and the implementation of all procedures and operations. The decommissioning of fuel channels represents one of the last operation which is performed in the nuclear power decommissioning and it is the most important operation in the nuclear reactor dismantling. The radiological safety analyses should be made by certified experts for protection assessment to radiation exposure of workers in time of fuel channel dismantling. The dismantling of fuel channels represents the final phase of nuclear facility decommissioning and refers to the technical operations taken to extract the components from inside of the nuclear reactor channel. It is a complex process and requires activities such as disassembly decommissioning device, locking/unlocking the channel closure and the shield plug, pressure tube cutting, extracting of each component from the channel, as well as radioactive waste management. The dismantling operation stages of the fuel channel components should be repeated for each of all 380 channels of the reactor, starting from the front of calandria side and continuing with the rear side. The final aim of decommissioning is to recover the geographic site to its original condition.*

**Keywords:** *Candu reactor, calandria tube, fuel channel, pressure tube, fuel bundle, end fitting, annulus spacer*