

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

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Abstract: *The aim of this study is to identify the fuel channel components and the reference plans based on which is made the installation into calandria of CANDU 6 nuclear reactor. The CANDU 6 is a 740 MW pressure tube reactor designed by Atomic Energy of Canada Limited (AECL) to provide safe and reliable nuclear power. It is an evolution of the previous CANDU reactor, and it is designed to be licensable internationally by ensuring its compliance with the latest Canadian nuclear regulations and the fundamental safety principles of the International Atomic Energy Agency (IAEA) Safety Standards. The CANDU reactor design is based on the experience derived from preceding CANDU reactors and virtually every design feature of the latest CANDU reactor is identical to, or it is an evolutionary improvement of, an earlier proven design. The design of the CANDU fuel channel is accordingly the result of continuing intensive engineering development of its major components. The reactor assembly of the CANDU 6 nuclear reactor consists of the horizontal, cylindrical, low-pressure calandria and the end-shield assembly. This enclosed assembly contains the heavy water moderator, the 380 fuel channels assemblies and the reactivity mechanisms. The fuel channels are one of the major distinguishing features of a CANDU reactor and their reliability is crucial to the performance of the reactor. Each fuel channel consists of four major components: the pressure tube, the calandria tube, the annulus spacers and the end fittings. Fuel bundles are enclosed in the fuel channels that pass through the calandria and the end-shield assembly. The fuel channel is designed to ensure a radiation exposure protection of workers and public, during the reactor operation. The fuel channels are assembled and installed into the calandria vessel at the reactor site following installation of the calandria.*

Key words: *Candu reactor, Zirconium alloy, plane reference, calandria tube, fuel channel, pressure tube, fuel bundle, end fitting, annulus spacer*

1. General Introduction

The nuclear reactors are designed and manufactured with respect of the specific requirements of codes and standards for the manufacture of components, equipment and systems required for the construction and operation of CANDU nuclear power plant.

The requirements for CANDU reactor design must comply with the codes of Canada

Standards Association (CSA), Atomic Energy Control Board (AECB) of Canada and International Energy Agency (IAEA) which specify the specific and regulatory requirements.

The reactor assembly consists a hollow cylindrical structure called the calandria assembly, fuel channels and control mechanisms of reactivity.