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USAEC - AECL COOPERATIVE PROGRAM

MONTHLY PROGRESS REPORT

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Compiled by:

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Technical Information Service

This document is furnished pursuant to the memorandum of understanding of June 7, 1960, between the U. S. and Canadian Governments establishing a Cooperative Program on the development of heavy water moderated power reactors.

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Aiken, South Carolina 29801

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CONTENTS

SECTION I

PHYSICS EXPERIMENTS FOR CANDU LATTICES

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INTRODUCTION

Experiments are underway in the PDP to measure $1/\eta\ d\eta/dT$ and the effects of asymmetric control rod placement in simple lattices of natural uranium fuel rods in D_2O.

SUMMARY

The $1/\eta\ d\eta/dT$ experiments are slightly ahead of schedule for a June 30 completion. The measurements on the 5.05-inch lattice have been completed.

DISCUSSION

The first lattice of the $d\eta/dT$ program was brought to criticality in the PDP on May 29, 1967. The fuel rods for this lattice consist of 1-inch diameter natural uranium slugs loaded into copper cladding tubes of ~0.034-inch wall thickness. The following series of experiments has been completed for a 5.05-inch square lattice:

- buckling measurements at 20°C
- period measurements at 20°C
- gold pin irradiations at 20°C
- buckling measurements at 60°C
- period measurements at 60°C

The period measurements were made to determine M^2, the neutron migration area. The gold pin irradiations were made to determine the neutron extrapolation distances at the reactor boundaries. Preliminary material buckling values are 252 μB at 20°C, and 227 μB at 60°C.

A similar series of experiments is planned for a 7.0-inch triangular lattice pitch. A tentative startup date for this lattice is June 12, 1967.

SECTION II

AECL IN-CORE FLUX MONITORS

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An irradiation test of in-core flux monitors was made in one of the Savannah River Plant reactors to determine the life characteristics of a selection of flux detectors and of the mineral insulation used in their construction. Self-powered flux detectors are relatively new; therefore, confidence in their use hinges to a great extent on proven performance at large integrated exposures. The chief points of interest are 1) integrity of the conductors and sheath during life, 2) life of insulation, and 3) sensitivity.

Irradiation testing of the AECL neutron detector rod described in DPST-66-83-5 has been completed. A separate report is being written on the irradiation test.

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