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E. I. du Pont de Nemours and Co.
Savannah River Laboratory
Aiken, South Carolina

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CONTENTS

SECTION I

HYDRIDE ORIENTATION AND MECHANICAL PROPERTIES OF THIN-WALLED ZIRCALOY TUBING

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INTRODUCTION

Studies of factors that influence the orientation of zirconium hydride platelets in thin-walled Zircaloy tubing are being conducted at the Savannah River Laboratory. These studies will define the relationship of fabrication techniques and associated Zircaloy structures to susceptibility of tubing to preferred hydride orientations. The work will also assess the effects of various aspects of hydride morphology, orientation, platelet size, and cluster size on the mechanical behavior of tubing.

SUMMARY

Preparations are complete for the special fabrication test of Zircaloy tubing at a major fabricator. The order for the work will be placed in the near future. The fabricator was selected on the basis of past performance and ability to meet delivery schedules. The capability of the fabricator to produce tubing sizes of interest was prerequisite and was decided by contacts including site visits to review equipment and technical resources, and to discuss details and purposes of the test.

The fabrication test will provide information on the following questions:

1. Can the final step in the fabrication sequence overcome a poor prior history? What are the limits of the final step and of the prior history?

2. What are the approximate capabilities of the different processes, drawing, tubing reducing, and swaging, as related to control of hydride orientation?

3. What is the effect of increasing or decreasing the number of fabrication steps along the same fabrication route?

4. What is the effect of annealing temperature?

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