

Preface

Crosslinked polyethylene (XLPE) has become the globally preferred insulation for underground power cables, for both distribution and transmission system applications. This insulation system provides cost efficiency in operation and procurement as well as reduced environmental impact and maintenance requirements when compared to older impregnated paper systems.

The purpose of this book is to outline some of the most common global practices that can help electric utilities obtain a cost-effective cable with a reliable service life. The history of XLPE power cables is well documented and the most important lessons are documented here. The objectives of the book are to:

- a) Communicate an understanding of what this history teaches us, and
- b) Suggest how to wisely apply what it has taught us.

We hope that we have achieved this goal within the pages of this book.

When medium voltage (MV) XLPE-insulated cables were first installed in the late 1960's, cable manufacturers and electric utilities expected them to perform reliably for 20 or even 30 years. History has shown that the service life of some of these early cables was far shorter than expected. At that time, cable engineers and material scientists were not aware that moisture, voltage stress and imperfections within the cable structure would combine to cause water trees. These micro-cavities degraded the insulation so severely that many cables failed after only 10 to 15 years in service.

The consequences of this lack of understanding were profound. It has been estimated that for every dollar that utilities spent installing the cable, they had to spend at least 10 dollars to replace it. Resources that could have been used to build new infrastructure were diverted to replace cables that were less than 20 years old. This had an impact on operating costs that electric utilities are still dealing with today.

