

Foreword

Nuclear power currently contributes some 23% of the electricity needs of the UK. Much of the power generated by nuclear fission is based on gas cooled reactor technology developed some fifty years ago. The first Magnox stations were commissioned in the 1960s whilst the first Advanced Gas Cooled Reactors came into service in 1976. Although the remaining Magnox reactors are scheduled to close over the next few years through to 2012 both they, and the fourteen AGRs in service, are essential to the power generation needs of the country.

The gas cooled reactors use graphite as a moderator in the form of layers of interlocked graphite bricks that provide channels for gas flow past fuel elements and for insertion of control rods to enable the reactor to be shut down when required. Graphite undergoes complex changes when exposed over long periods to the effects of irradiation and oxidation in the core of the reactor. It is essential that the ageing and deterioration of any complex and safety critical plant is managed effectively. The management of the effects of ageing of graphite in gas cooled reactor cores provides a significant challenge both to the industry and to the associated research community. This book provides an opportunity to review the latest developments in understanding of the behaviour of graphite as a material, as components in a reactor and in its behaviour in the complete reactor core. As well as presenting the current position with respect to ageing behaviour it is hoped that the papers presented will help to identify gaps in understanding which need to be filled to assist the management of the ageing behaviour of graphite and continued safe operation of the reactors concerned.

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