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Nota di contenuto	Nuclear Electric Power: Safety, Operation, and Control Aspects; Contents; Preface; Glossary; Principal Nomenclature; 1. Energy Sources, Grid Compatibility, Economics, and the Environment; 1.1 Background; 1.2 Geothermal Energy; 1.3 Hydroelectricity; 1.4 Solar Energy; 1.5 Tidal Energy; 1.6 Wind Energy; 1.7 Fossil-Fired Power Generation; 1.8 Nuclear Generation and Reactor Choice; 1.9 A Prologue; 2. Adequacy of Linear Models and Nuclear Reactor Dynamics; 2.1 Linear Models, Stability, and Nyquist Theorems; 2.2 Mathematical Descriptions of a Neutron Population; 2.3 A Point Model of Reactor Kinetics 2.4 Temperature and Other Operational Feedback Effects 2.5 Reactor Control, its Stable Period and Re-equilibrium; 3. Some Power Station and Grid Control Problems; 3.1 Steam Drum Water-Level Control; 3.2 Flow Stability in Parallel Boiling Channels; 3.3 Grid Power Systems and Frequency Control; 3.4 Grid Disconnection for a Nuclear Station with Functioning "Scram"; 4. Some Aspects of Nuclear Accidents and Their Mitigation; 4.1 Reactor Accident Classification by Probabilities; 4.2

Hazards from an Atmospheric Release of Fission Products; 4.3 Mathematical Risk, Event Trees, and Human Attitudes 4.4 The Farmer-Beattie Siting Criterion 4.5 Examples of Potential Severe Accidents in Fast Reactors and PWR's with their Consequences; 5. Molten Fuel Coolant Interactions: Analyses and Experiments; 5.1 A History and a Mixing Analysis; 5.2 Coarse Mixtures and Contact Modes in Severe Nuclear Accidents; 5.3 Some Physics of a Vapor Film and its Interface; 5.4 Heat Transfer from Contiguous Melt; 5.5 Mass Transfer at a Liquid-Vapor Interface and the Condensation Coefficient; 5.6 Kinetics, Heat Diffusion, a Triggering Simulation, and Reactor Safety 5.7 Melt Fragmentation, Heat Transfer, Debris Sizes, and MFCI Yield 5.8 Features of the Bubex Code and an MFTF Simulation; 6. Primary Containment Integrity and Impact Studies; 6.1 Primary Containment Integrity; 6.2 The Pi-Theorem, Scale Models, and Replicas; 6.3 Experimental Impact Facilities; 6.4 Computational Techniques and an Aircraft Impact; 7. Natural Circulation, Passive Safety Systems, and Debris-Bed Cooling; 7.1 Natural Convection in Nuclear Plants; 7.2 Passive Safety Systems for Water Reactors; 7.3 Core Debris-Bed Cooling in Water Reactors; 7.4 An Epilogue; References; Index

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Sommario/riassunto

Assesses the engineering of renewable sources for commercial power generation and discusses the safety, operation, and control aspects of nuclear electric power From an expert who advised the European Commission and UK government in the aftermath of Three Mile Island and Chernobyl comes a book that contains experienced engineering assessments of the options for replacing the existing, aged, fossil-fired power stations with renewable, gas-fired, or nuclear plants. From geothermal, solar, and wind to tidal and hydro generation, Nuclear Electric Power: Safety, Operation

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