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DOUGLAS

Natural Circulation in Water Cooled Nuclear Power Plants IAEA

Nuclear Energy Since the mid-1980s there has been much

discussion of the advantages of passive safety systems in advanced nuclear power plants (NPPs). It has been recognized that the application of passive safety systems can contribute to simplification and potentially improve economics of new NPP designs. However, this implies careful design and analysis methods to assure that these systems perform their intended functions. This publication draws on the studies of an IAEA coordinated research project on the topic and reports the findings of the latest research activities. It describes passive safety systems in a wide range of advanced water-cooled nuclear power plant designs, defines the thermal hydraulic phenomena associated with natural circulation phenomena and cross-links these phenomena with the passive safety systems.

The measure of man

Frontiers Media SA

Enthusiasts look forward to a time when tiny machines reassemble matter and process information but is their vision realistic? 'Soft Machines' explains why the nanoworld is so different to the macro-world that we are all familar with and shows how it has more in common with biology than conventional

engineering. *Safety Aspects of Nuclear Power Plants in Human Induced External Events* John Wiley & Sons Using the most current data and statistics available, this Outlook provides projections up to 2050 to consider growth scenarios and potential implications on the future use of nuclear energy. Innovation in Nuclear Energy Technology John Wiley & Sons Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database. Human Factors in Transportation , Communication, Health, and the Workplace Springer This publication is one in a series of reports on the assessment and management of ageing of major nuclear power plant (NPP) components. Current practices for assessment of safety margins (fitness for service) and inspection, monitoring and mitigation of ageing related degradation of selected concrete structures related to NPPs are documented. Implications for and differences in new reactor designs are discussed.

This information is intended to help all involved directly and indirectly in ensuring the safe operation of NPPs, and also to provide a common technical basis for dialogue between plant operators and regulators when dealing with age related licensing issues.

Passive Safety Systems and Natural Circulation in Water Cooled Nuclear Power Plants

Springer Science & Business Media

This publication provides guidance on project management from the preparatory phase to plant turnover to commissioning of nuclear power plants. The guidelines and experiences described will enable project managers to obtain better performance in nuclear power plant construction.

Guide to Nuclear Power Cost Evaluation: Equipment costs

Springer

Describes the state of knowledge of natural circulation in water cooled nuclear power plants and passive system reliability. The publication presents information on phenomena, models, predictive tools and experiments that currently support design and analysis of natural circulation systems, and highlights areas where additional research is

needed.
Human Factors
National Academy Press
The March 11, 2011, Great East Japan Earthquake and tsunami sparked a humanitarian disaster in northeastern Japan. They were responsible for more than 15,900 deaths and 2,600 missing persons as well as physical infrastructure damages exceeding $200 billion. The earthquake and tsunami also initiated a severe nuclear accident at the Fukushima Daiichi Nuclear Power Station. Three of the six reactors at the plant sustained severe core damage and released hydrogen and radioactive materials. Explosion of the released hydrogen damaged three reactor buildings and impeded onsite emergency response efforts. The accident prompted widespread evacuations of local populations, large economic losses, and the eventual shutdown of all nuclear power plants in Japan. "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants" is a study of the Fukushima Daiichi accident. This report examines the causes of the crisis, the performance of safety systems at the plant, and the

responses of its operators following the earthquake and tsunami. The report then considers the lessons that can be learned and their implications for U.S. safety and storage of spent nuclear fuel and high-level waste, commercial nuclear reactor safety and security regulations, and design improvements. "Lessons Learned" makes recommendations to improve plant systems, resources, and operator training to enable effective ad hoc responses to severe accidents. This report's recommendations to incorporate modern risk concepts into safety regulations and improve the nuclear safety culture will help the industry prepare for events that could challenge the design of plant structures and lead to a loss of critical safety functions. In providing a broad-scope, high-level examination of the accident, "Lessons Learned" is meant to complement earlier evaluations by industry and regulators. This in-depth review will be an essential resource for the nuclear power industry, policy makers, and anyone interested in the state of U.S. preparedness and response in the face of crisis situations.

Advances in Human

Error, Reliability, Resilience, and Performance
IAEA Tecdoc Series No. 1785
This publication presents technology developers and users with common considerations, approaches and measures for enhancing the defence in depth and operability of water cooled small modular reactor (SMR) design concepts to cope with extreme natural hazards. Indicative requirements to prevent an accident such as the Fukushima Daiichi accident from recurring are also provided for States planning to adopt water cooled SMR designs and technologies. This publication was produced within the framework of the IAEA Action Plan on effectively utilizing research and development.

Human Factors Engineering in the Design of Nuclear Power Plants: IAEA Safety Standards Series No. Ssg-51
Springer
As energy demand increases in line with the expansion of the world's leading economies and the growth of developing economies, a key challenge remains of how to provide the energy levels required while protecting our environment and conserving natural resources. Nuclear

energy is a complex and controversial technology but also has the potential to provide considerable benefits. This publication explores a range of issues involved in the use of nuclear energy, including safety aspects, whether its use is economically competitive, its role in meeting greenhouse gas reduction targets, how to manage the radioactive waste it generates, whether its use increase the risk of proliferation of nuclear weapons, security of resources, and its potential role in the future. **Human Factors: Theory and Practice** The Health Foundation Innovation has been a driving force in the successful deployment of nuclear energy and remains essential today for its sustainable future. This report provides an overview of the state of the art in nuclear innovation systems, including their driving forces, main actors, institutional and legal frameworks, and infrastructure for knowledge and programme management. It also offers policy recommendations based on country reports and case studies supplied by participating member countries. Reliability, Safety and Hazard Assessment

for Risk-Based Technologies Springer Nature This volume presents selected papers from the International Conference on Reliability, Safety, and Hazard. It presents the latest developments in reliability engineering and probabilistic safety assessment, and brings together contributions from a diverse international community and covers all aspects of safety, reliability, and hazard assessment across a host of interdisciplinary applications. This book will be of interest to researchers in both academia and the industry. **Carbon-free and Nuclear-free** IAEA In a world confronting global climate change, political turmoil among oil exporting nations, nuclear weapons proliferation, nuclear plant safety and waste disposal issues, the United States must assume a leadership role in moving to a zero-CO2-emissions energy economy. At the same time America needs to take the lead in reducing the world's reliance on nuclear power. This breakthrough joint study by the Institute for Energy and Environmental Research and the Nuclear Policy Research Institute shows how our energy needs can be met by alternative sources, as

wind, solar, hydrogen, biomass, microalgae, geothermal and wave power are all part of the solution. Must reading for everyone concerned with energy politics and the planet's future, Carbon-Free is already making headlines.

Project Management in Nuclear Power Plant Construction

Oxford University Press

This open access book discusses the eroding economics of nuclear power for electricity generation as well as technical, legal, and political acceptance issues. The use of nuclear power for electricity generation is still a heavily disputed issue. Aside from technical risks, safety issues, and the unsolved problem of nuclear waste disposal, the economic performance is currently a major barrier. In recent years, the costs have skyrocketed especially in the European countries and North America. At the same time, the costs of alternatives such as photovoltaics and wind power have significantly decreased. Contents History and Current Status of the World Nuclear Industry The Dramatic Decrease of the Economics of Nuclear Power Nuclear Policy in the EU The Legacy of Csernobyl and Fukushima Nuclear Waste

and Decommissioning of Nuclear Power Plants Alternatives: Heading Towards Sustainable Electricity Systems Target Groups Researchers and students in the fields of political, economic and technical sciences Energy (policy) experts, nuclear energy experts and practitioners, economists, engineers, consultants, civil society organizations The Editors Prof. Dr. Reinhard Haas is University Professor of energy economics at the Institute of Energy Systems and Electric Drives at Technische Universität Wien, Austria. PD Dr. Lutz Mez is Associate Professor at the Department for Political and Social Sciences of Freie Universität Berlin, Germany. PD Dr. Amela Ajanovic is a senior researcher and lecturer at the Institute of Energy Systems and Electrical Drives at Technische Universität Wien, Austria.--

Nuclear Energy Outlook 2008

National Academies Press

This publication provides detailed guidelines for the safety assessment of nuclear power structures against mechanical impact, explosion and fire caused by human induced external events. It covers the

characterization of loading, the assessment of structural integrity using both simplified methods and more elaborated methodologies, and the assessment of induced vibration. The acceptance criteria provided in the publication are for different failure modes: overall stability, overall bending and shear, local failure modes and induced vibrations. The process of analysing fire consequences is also included.

Nuclear Power Reactor Safety

ISA

This book provides a training course for I and C maintenance engineers in power, process, chemical, and other industries. It summarizes all the scattered literature in this field. The book compiles 30 years of knowledge gained by the author and his staff in testing the I and C systems of nuclear power plants around the world. It focuses on process temperature and pressure sensors and the verification of these sensors' calibration and response time.

Evidence

Cambridge University Press

This book brings together studies broadly dealing with human error from different disciplines and perspectives. They concern human performance; human

variability and reliability analysis; medical, driver and pilot error, as well as automation error; reports on root cause analyses; and the cognitive modeling of human error. In addition, they highlight cutting-edge applications in safety management, defense, security, transportation , process controls, and medicine, as well as more traditional fields of application. Based on the AHFE 2017 International Conference on Human Error, Reliability, Resilience, and Performance, held on July 17–21, 2017 in Los Angeles, California, USA, the book includes experimental papers, original reviews, and reports on case studies, as well as meta-analyses, technical guidelines, best practice and methodologica l papers. It offers a timely reference guide for researchers and practitioners dealing with human error in a diverse range of fields. “p> *Scientific and Technical Aerospace Reports* OECD Publishing This book focuses on nuclear engineering education in the post-Fukushima era. It was edited by the organizers of the summer school held in August 2011 in University of California, Berkeley, as part of a collaborative program

between the University of Tokyo and UC Berkeley. Motivated by the particular relevance and importance of social-scientific approaches to various crucial aspects of nuclear technology, special emphasis was placed on integrating nuclear science and engineering with social science. The book consists of the lectures given in 2011 summer school and additional chapters that cover developments in the past three years since the accident. It provides an arena for discussions to find and create a renewed platform for engineering practices, and thus nuclear engineering education, which are essential in the post-Fukushima era for nurturing nuclear engineers who need to be both technically competent and trusted in society.

Approaches for Assessing the Economic Competitiveness of Small and Medium Sized Reactors

OECD Publishing

Electricity, supplied reliably and affordably, is foundational to the U.S. economy and is utterly indispensable to modern society. However, emissions resulting from many forms of electricity generation create environmental risks that could have significant negative economic, security, and

human health consequences . Large-scale installation of cleaner power generation has been generally hampered because greener technologies are more expensive than the technologies that currently produce most of our power. Rather than trade affordability and reliability for low emissions, is there a way to balance all three? The Power of Change: Innovation for Development and Deployment of Increasingly Clean Energy Technologies considers how to speed up innovations that would dramatically improve the performance and lower the cost of currently available technologies while also developing new advanced cleaner energy technologies. According to this report, there is an opportunity for the United States to continue to lead in the pursuit of increasingly clean, more efficient electricity through innovation in advanced technologies. The Power of Change: Innovation for Development and Deployment of Increasingly Clean Energy Technologies makes the case that America's advantagesâ€ "world-class universities and national laboratories, a vibrant private sector, and innovative states, cities, and regions that are free to experiment

with a variety of public policy approachesâ€"position the United States to create and lead a new clean energy revolution. This study focuses on five paths to accelerate the market adoption of increasing clean energy and efficiency technologies: (1) expanding the portfolio of cleaner energy technology options; (2) leveraging the advantages of energy efficiency; (3) facilitating the development of increasing clean technologies, including renewables, nuclear, and cleaner fossil; (4) improving the existing technologies, systems, and infrastructure; and (5) leveling the playing field for cleaner energy technologies. The Power of Change: Innovation for Development and Deployment of Increasingly Clean Energy Technologies is a call for leadership to transform the United States energy sector in order to both mitigate the risks of greenhouse gas and other pollutants and to spur future economic growth. This study's focus on science, technology, and economic policy makes it a valuable resource to guide support that produces innovation to meet energy challenges now and for the future. *Human Factors. The Journal of the Human Factors Society of America* RDR Books
In this book,

compelling case studies show how past crises have reshaped regulation, and how policy-makers can learn from crises in the future.