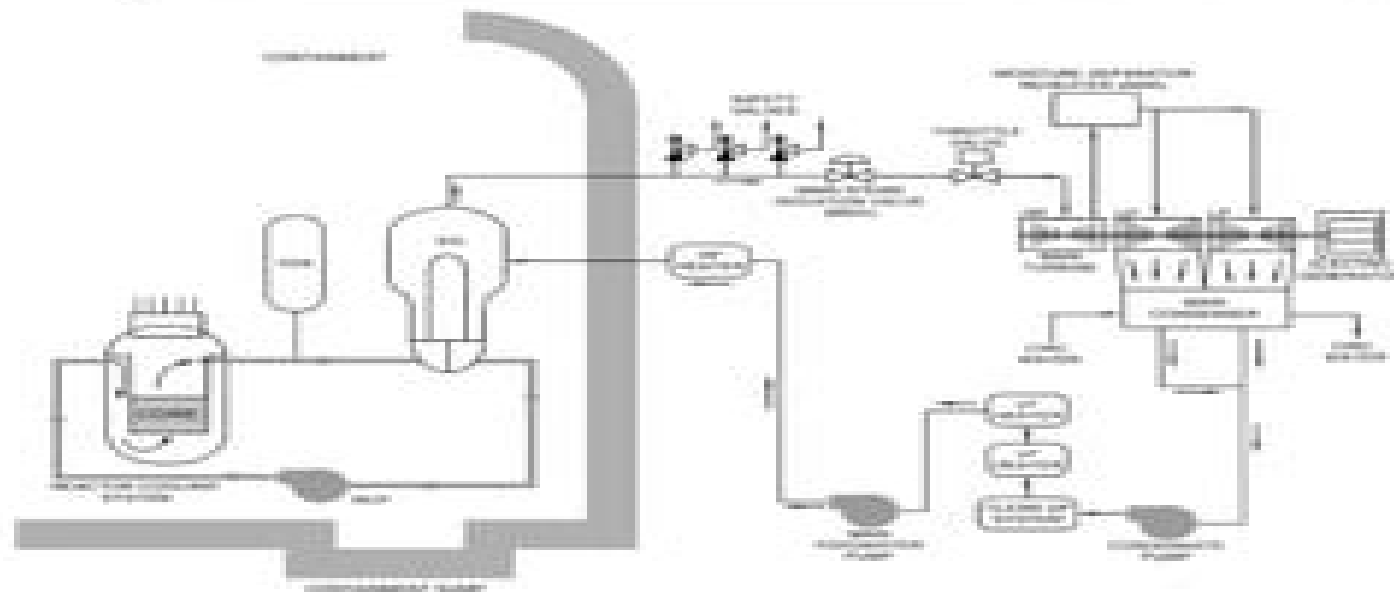




The major secondary systems of a pressurized water reactor are the main steam system and the condensate/feedwater system. Since the primary and secondary systems are physically separated from each other (by the steam generator tubes), the secondary system will contain little or no radioactive material.

The main steam system starts at the outlet of the steam generator. The steam is routed to the high pressure main turbine. After passing through the high pressure turbine, the steam is piped to the moisture separator/reheaters (MSRs). In the MSRs, the steam is dried with moisture separators and reheated using other steam as a heat source. From the MSRs, the steam goes to the low pressure turbines. After passing through the low pressure turbines, the steam goes to the main condenser, which is operated at a vacuum to allow for the greatest removal of energy by the low pressure turbines. The steam is condensed into water by the flow of circulating water through the condenser tubes.

At this point, the condensate/feedwater system starts. The condensed steam collects in the hotwell area of the main condenser. The condensate pumps take a suction on the hotwell to increase the pressure of the water. The condensate then passes through a cleanup system to remove any impurities in the water. This is necessary because the steam generator acts as a concentrator. If the impurities are not removed, they will be left in the steam generator after the steam forming process, and this could reduce the heat transfer capability of the steam generator and/or damage the steam generator tubes. The condensate then passes through some low pressure feedwater heaters. The temperature of the condensate is increased in the heaters by using steam from the low pressure turbine (extraction steam). The condensate flow then enters the suction of the main feedwater pumps, which increases the pressure of the water high enough to enter the steam generator. The feedwater now passes through a set of high pressure feedwater heaters, which are heated by extraction steam from the high pressure turbine (heating the feedwater helps to increase the efficiency of the plant). The flow rate of the feedwater is controlled as it enters the steam generators.

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Nuclear Fuel Cycle Science and Engineering Ian Crossland, 2012-09-21 The nuclear fuel cycle is characterised by the wide range of scientific disciplines and technologies it employs The development of ever more integrated processes across the many stages of the nuclear fuel cycle therefore confronts plant manufacturers and operators with formidable challenges Nuclear fuel cycle science and engineering describes both the key features of the complete nuclear fuel cycle and the wealth of recent research in this important field Part one provides an introduction to the nuclear fuel cycle Radiological protection security and public acceptance of nuclear technology are considered along with the economics of nuclear power Part two goes on to explore materials mining enrichment fuel element design and fabrication for the uranium and thorium nuclear fuel cycle The impact of nuclear reactor design and operation on fuel element irradiation is the focus of part three including water and gas cooled reactors along with CANDU and Generation IV designs Finally part four reviews spent nuclear fuel and radioactive waste management With its distinguished editor and international team of expert contributors Nuclear fuel cycle science and engineering provides an important review for all those involved in the design fabrication use and disposal of nuclear fuels as well as regulatory bodies and researchers in this field Provides a comprehensive and holistic review of the complete nuclear fuel cycle Reviews the issues presented by the nuclear fuel cycle including radiological protection and security public acceptance and economic analysis Discusses issues at the front end of the fuel cycle including uranium and thorium mining enrichment and fuel design and fabrication

Handbook of Small Modular Nuclear Reactors Daniel T. Ingersoll, Mario D. Carelli, 2020-10-22 Handbook of Small Modular Nuclear Reactors Second Edition is a fully updated comprehensive reference on Small Modular Reactors SMRs which reflects the latest research and technological advances in the field from the last five years Editors Daniel T Ingersoll and Mario D Carelli along with their team of expert contributors combine their wealth of collective experience to update this comprehensive handbook that provides the reader with all required knowledge on SMRs expanding on the rapidly growing interest and development of SMRs around the globe This book begins with an introduction to SMRs for power generation an overview of international developments and an analysis of Integral Pressurized Water Reactors as a popular class of SMRs The second part of the book is dedicated to SMR technologies including physics components I C human system interfaces and safety aspects Part three discusses the implementation of SMRs covering economic factors construction methods hybrid energy systems and licensing considerations The fourth part of the book provides an in depth analysis of SMR R D and deployment of SMRs within eight countries including the United States Republic of Korea Russia China Argentina and Japan This edition includes brand new content on the United Kingdom and Canada where interests in SMRs have increased considerably since the first edition was published The final part of the book adds a new analysis of the global SMR market and concludes with a perspective on SMR benefits to developing economies This authoritative and practical handbook benefits engineers designers operators and

regulators working in nuclear energy as well as academics and graduate students researching nuclear reactor technologies Presents the latest research on SMR technologies and global developments Includes new case study chapters on the United Kingdom and Canada and a chapter on global SMR markets Discusses new technologies such as floating SMRs and molten salt SMRs *The Case for Pandora* James M. Essig, Steve McCarter, 2017-01-12 This book is about building craft for space travel space travel not in the far distant future but in the immediate future There is no question that we have the technology to build and power a large craft capable of traversing the galaxy and for now this book will focus on achieving the goal of intragalactic travel We will describe various methods of power generation and propulsion delineate the materials and technology for construction discuss the building of the spacecraft from the outside in and show what is required to sustain life on the craft for extended periods of time While we will go into some detail on each of these pointing out advantages and disadvantages to components and methods this is not nor is it intended to be a highly technical book to be used by specialists Rather it is intended to inform the general readership about what is possible and perhaps what is not in building and operating spacecraft for long distance and long duration travel with current and available means **Fundamentals of Nuclear Engineering** Brent J. Lewis, E. Nihan Onder, Andrew A. Prudil, 2017-03-31 Fundamental of Nuclear Engineering is derived from over 25 years of teaching undergraduate and graduate courses on nuclear engineering The material has been extensively class tested and provides the most comprehensive textbook and reference on the fundamentals of nuclear engineering It includes a broad range of important areas in the nuclear engineering field nuclear and atomic theory nuclear reactor physics design control dynamics safety and thermal hydraulics nuclear fuel engineering and health physics radiation protection It also includes the latest information that is missing in traditional texts such as space radiation The aim of the book is to provide a source for upper level undergraduate and graduate students studying nuclear engineering

Handbook on Thermal Hydraulics in Water-Cooled Nuclear Reactors Francesco D'Auria, Yassin A. Hassan, 2024-07-29 Handbook on Thermal Hydraulics of Water Cooled Nuclear Reactors Volume 3 Procedures and Applications includes all new chapters which delve deeper into the topic adding context and practical examples to help readers apply learnings to their own setting Topics covered include experimental thermal hydraulics and instrumentation numerics scaling and containment in thermal hydraulics as well as a title dedicated to good practices in verification and validation This book will be a valuable reference for graduate and undergraduate students of nuclear or thermal engineering as well as researchers in nuclear thermal hydraulics and reactor technology engineers working in simulation and modeling of nuclear reactors and more In addition nuclear operators code developers and safety engineers will also benefit from the practical guidance provided Presents a comprehensive analysis on the connection between nuclear power and thermal hydraulics Includes end of chapter questions quizzes and exercises to confirm understanding and provides solutions in an appendix Covers applicable nuclear reactor safety considerations and design technology throughout *Nuclear Power Plant*

Design and Seismic Safety Considerations , *Summary of NRC LWR Safety Research Programs on Fuel Behavior, Metallurgy/materials and Operational Safety* Gary Lee Bennett,1979 *Radiation Protection at Light Water Reactors* Robert Prince,2012-03-28 This book is aimed at Health Physicists wishing to gain a better understanding of the principles and practices associated with a light water reactor LWR radiation protection program The role of key program elements is presented in sufficient detail to assist practicing radiation protection professionals in improving and strengthening their current program Details related to daily operation and discipline areas vital to maintaining an effective LWR radiation protection program are presented Programmatic areas and functions important in preventing responding to and minimizing radiological incidents and the importance of performing effective incident evaluations and investigations are described Elements that are integral in ensuring continuous program improvements are emphasized throughout the text **The Future of Energy Use** Philip O'Keefe,Geoff O'Brien,Nicola Pearsall,2010 First Published in 2010 Routledge is an imprint of Taylor Francis an informa company *IAPSM's Textbook of Community Medicine* AM Kadri,2019-06-30

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