LIMITED EDITION

Space Nuclear Safety

edited by Albert C. Marshall with F. Eric Haskin, & Veniamin Usov

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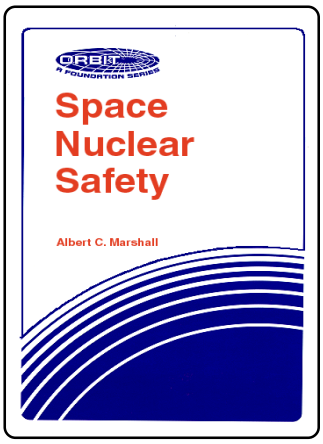

The first, and presently, the only book written on the topic of space nuclear safety, is a comprehensive textbook intended for professors and students.The principal authors and contributors are recognized leaders in their field of expertise. The book is also a convenient reference book for nuclear engineers, aerospace safety specialists, project managers, and government staff. Although *Space Nuclear Safety* is oriented toward nuclear engineers and aerospace safety professionals, the material should be accessible to engineers, scientists, graduate students and upper division undergraduate students without nuclear engineering or aerospace backgrounds.

Space Nuclear Safety covers both radioisotope power sources and space reactor systems. The chapters address safety principles and safety analysis methods and include discussions of safety issues and scenarios, protection and mitigation methods, and safety testing. Topics include radiation protection and shielding, propellant fires and explosions, orbital mechanics, atmospheric reentry, impact and analysis, reactor criticality safety, reactor transient analysis, risk/reliability analysis, and consequence analysis. Student exercises are provided that can be solved using a handheld calculator. Although the book focuses on relatively simple safety analysis methods, each chapter provides a brief discussion of computer analysis methods used in space nuclear safety programs.

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About the Editors

Albert C. Marshall was employed as a Nuclear Engineer and Distinguished Member of Technical Staff at Sandia National Laboratories between 1976 and 2005. During this period he worked in the areas of reactor physics, space nuclear power, space nuclear safety, reactor testing, terrestrial reactor safety, depleted uranium dispersal and health effects, assessment of terrorist threats, thermionic physics, and several other areas. After his retirement from Sandia Laboratories in 2005, he served as a consultant for Sandia Laboratories and the Department of Energy on space nuclear safety and U.N. nuclear safety principle guidance. He was a representative for the U.S. Department of Energy at a U.N. meeting on space nuclear safety in 2006. Mr. Marshall received his BS in Physics and MS in Nuclear Engineering from Pennsylvania State University.

F. Eric Haskin is a registered professional engineer and a self-employed consultant to both private companies and national laboratories. He has been involved in modeling and analyzing the safety of both terrestrial and space nuclear power sources since 1970. He developed and teaches a course entitled "Perspectives on Reactor Safety" for the U.S. Nuclear Regulatory Commission. Mr. Haskin has managed a number of major research projects including an assessment of public risks associated with a proposed orbital mission of the Topaz space reactor, safety analysis and testing of a space nuclear reactor for the Strategic Defense Initiative, initial development of the NRC's MELCOR and MACCS computer codes, and development of methods and computer codes used to characterize uncertainties in the NRC's NUREG-1150 risk assessments.

Veniamin A. Usov is the Deputy Director for Space Nuclear Power, High-temperature Power Systems Department, Institute of Nuclear Reactors, RRC (Kurchatov Institute). He was a member of the research team that built the world's first Romashka high-temperature nuclear reactor with thermoelectric energy conversion using silicon-germanium semiconductor elements. He took part in the U.S./Russia/U.K./France International Program on the evaluation of the TOPAZ II space system experimental units in an electrically heated facility in Albuquerque, New Mexico. From 1991 through 1997 he was Director General of Intertek U.S./Russian Joint Venture for managing the TOPAZ II tests, development of higher power space system designs (Space-R) using TOPAZ II technology and development of a design of flight tests of the upgraded TOPAZ II system for the proposed NEPSTP mission.

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