

## Foreword

The 12<sup>th</sup> International Conference on Radiation Shielding (ICRS-12) and the 17<sup>th</sup> Topical Meeting of the Radiation Protection and Shielding Division of the American Nuclear Society (RPSD-2012), organized by the Atomic Energy Society of Japan (AESJ) with 19 co-organizers including The Radiation Protection and Shielding Division of American Nuclear Society (ANS), Radiation Safety Information Computational Center of Oak Ridge National Laboratory and Organization for Economic Cooperation and Development (OECD) Nuclear Energy Agency, was successfully held at Nara Prefectural New Public Hall in Nara, from September 2<sup>nd</sup> to 7<sup>th</sup>, 2012 with totally 389 participants from 32 countries and regions. ICRS is a series of conferences which started after the first conference at Cambridge United Kingdom of Great Britain and Northern Ireland in 1958 and follows conferences held in Studsvik Sweden (1961), Harwell UK (1967), Paris France (1972), Knoxville United State of America (1977), Tokyo Japan (1983), Bournemouth UK (1988), Arlington USA (1994), Tsukuba Japan (1999), Funchal, Madeira Portugal (2004) and Callaway Garden, Atlanta USA (2008).

ICRS-12 and RPSD-2012 explores the scientific, technological and engineering issues associated with particle and ionizing radiation shielding in its broadest context, including nuclear energy systems, accelerator facilities, space and other radiation environments. It is one of the premier international radiation shielding events, regularly drawing hundreds of the world's top scientists and engineers.

The conference opened in the morning of September 3. Welcome speeches were given by Prof. Nolan Hertel, Georgia Tech. and the chair of ANS Radiation Protection and Shielding Division, and Prof. Takashi Nakamura, Tohoku Univ. and the general chair of international steering committee and domestic steering committee of ICRS-12.

Plenary sessions were held on September 3, 4 and 6 to give a talk on hot topics on severe accident in Fukushima-Daiichi Nuclear Power Plant Stations. In the first day, the outline of severe accident in Fukushima-Daiichi NPPS and leaning about nuclear safety was reviewed by Prof. Akio Yamamoto, Nagoya Univ., and atmospheric dispersion of radioactive materials discharged from Fukushima-Daiichi nuclear power station was reviewed by Prof. Hiromi Yamazawa, Nagoya Univ. A talk in the second day was devoted to address the distributions and migrations of radionuclides in the environment released from the Fukushima Accident by Dr. Kimiaki Saito, Japan Atomic Energy Agency (JAEA). In the final plenary session, Dr. Hiroshi Nakashima read Dr. Shun-ichi Tanaka's speech, ex-deputy of atomic energy commission in Japan, about issues on radiation shielding, protection and environmental restoration. In this way, systematic presentations from state of accident sequences, dispersion mechanism of radioactive materials, pollution status in environment to program of environmental restoration, much audience were interested in these items.

In the special session on severe accident in Fukushima-Daiichi Nuclear Power Plant Stations, there were 20 oral and over 60 poster presentations on estimation of gamma-ray from the contaminated soil surface in environment by shielding calculation code, dose measurement inside houses in Fukushima prefecture, shielding designs for contaminated soil, and dose estimation around the pressure vessels inside the reactor buildings. In the other session, measurements and analyses for dose inside the reactor buildings was also presented. Estimated dose summed up the dose contribution from the contaminated floor, wall and ceiling, and the radiation source of hot

spots was underestimated than measured dose. Before the preparation works for extraction of fuel debris from container vessels, detailed dose mapping, understanding of dominant hot spots and decontamination inside reactor buildings are needed.

There were 27 oral and about 100 poster presentations on Monte Carlo calculation methods and these applications. Monte Carlo methods are dominant shielding calculation techniques and these are used in a wide-spread field.

In the shielding calculations for Radio-Isotope gamma-ray, convenience methods by using of the shielding calculation constants such as gamma-ray buildup factors are frequently used even now. Japanese group are evaluating the new gamma-ray buildup factors to take the place of ANSI/ANS standard data, and new standard dataset is published from AESJ standards committee.

This volume of the journal, Progress in Nuclear Science and Technology (PNST), is published as selected papers of ICRS-12 and RPSD-2012. Not all the papers presented at the conference are included in this volume. This volume includes only papers that are desired to be published in PNST by authors and meet the acceptance criteria of the journal through the extensive peer reviews. We hope this volume will provide readers with valuable information, inspiration and enthusiasm for research and practice in the radiation shielding calculation and dose measurement fields.

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Technical Program Committee of ICRS-12 and RPSD-2012

Chair : Hideo Hirayama (AESJ, KEK)

and

International Steering Committee of ICRS-12 and RPSD-2012

General Chair : Takashi Nakamura (AESJ, Tohoku Univ.)