EDITORIAL

HPJ SPECIAL ISSUE INTRODUCTION

Eduardo B. Farfán*

* Savannah River National Laboratory, Aiken, SC 29808, USA

For reprints and correspondence contact: Eduardo B. Farfán, Ph.D. Environmental Science and Biotechnology Environmental Analysis Section Savannah River National Laboratory Savannah River Nuclear Solutions, LLC 773-42A, Room 236 Aiken, SC 29808 E-mail: Eduardo.Farfan@srnl.doe.gov Phone: (803) 725-2257, Fax: (803) 725-7673

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INTRODUCTION

Eduardo B. Farfán*

* Savannah River National Laboratory, Aiken, SC 29808, USA

Radioecology is the study of the fate and transport and potential effects of radionuclides and associated contaminants in the environment. In short, it is the science that describes the fundamental connection between environmental health and human health risks. As such, radioecology can and has provided the credible, consistent and defensible basis for the successful and cost-effective environmental cleanup and closure of nuclear production and waste sites. In addition, radioecology also provides the technical basis for making timely and reliable decisions on cleanup in the aftermath of nuclear incidents such as Chernobyl and Fukushima.

The 1986 Chernobyl Nuclear Power Plant (ChNPP) accident resulted in catastrophic health, social, and economic consequences in many countries, predominantly, Ukraine, Belarus, and Russia. The extent of radioactive contamination, levels and forms of contamination, and diversity of the ecosystems affected by the accident did not have any precedent and provided unique opportunities for environmental scientists around the world. Following the natural course of their development, populations of species and their communities found themselves in conditions of chronic radiation exposure that exceeded the natural background by factors of hundreds and thousands. Anything similar would have been extremely difficult if not impossible to recreate in a scientific laboratory. Consequently, since the first few years after the accident, many teams of scientists have visited the Chernobyl Exclusion Zone (ChEZ). The knowledge gained by studying the consequences of this accident has tremendous importance.

The concept of an international research and technical center to address the problems involving nuclear and radiological accidents became a reality with the establishment of the International Chernobyl Center (ICC). In May 1995, the US and Ukraine signed a Protocol of Intent on establishment of the ICC, and the government of Ukraine appealed to the international scientific community to support ICC and join its activities (Chernobyl Center 2006). In December 1995, a memorandum of understanding (MOU) on the ChNPP closure was signed by the government of Ukraine, all of the G7 governments, and the European Commission. The ICC foundation was considered critical to ensure the safe decommissioning of the ChNPP reactor units and improvement of the safety of the Chernobyl Containment Shelter. On the 10th anniversary of the Chernobyl accident (26 April 1996), Mr. Viktor Yushchenko, the President of Ukraine, issued a decree to establish the Chernobyl Center for Nuclear Safety, Radioactive Waste and Radioecology (Chernobyl Center). On the same day, a MOU involving the US participation in Chernobyl Center activities was signed by the US and Ukraine (Chernobyl Center 2006).

In July 1998, the US and Ukraine signed an agreement to establish the International Radioecology Laboratory (IRL) as part of the Chernobyl Center. The creation of IRL was a logical

continuation of previous programs to conduct scientific research in radioecology and provide Ukraine and the rest of the world with the necessary infrastructure and scientific basis to conduct research in radioecology, radiobiology, dosimetry, and environmental protection in the ChEZ (Chernobyl Center 2006).

A recent collaborative effort with IRL has been implemented through a project titled “Long-term impacts from radiation/contamination within the Chernobyl Exclusion Zone” (Farfán et al. 2008; Gerdes et al. 2009; Marra et al. 2010). This collaboration had the following objectives:

- Assess the long-term impacts to the environment from radiation exposure within the ChEZ;
- Provide information on remediation guidelines and ecological risk assessment within radioactively contaminated territories based on the results of long-term field monitoring, analytical measurements, and numerical modeling of soils and groundwater radioactive contamination; and
- Recommend the development and testing of effective cleanup technologies to reduce environmental and health risks.

Based on this work, a large amount of data are now available for publication, some of which are presented in this Special Issue of the Health Physics Journal.

FUTURE ACTIVITES - NATIONAL CENTER FOR RADIOECOLOGY

Given the fundamental importance of radioecology to the success of the Department of Energy – Office of Environmental Management (DOE-EM) cleanup mission, and given the fact that educational opportunities in radioecology have diminished to the point that there are no longer any graduate levels programs left in the US, SRNL took the lead role to establish the National Center for Radioecology (NCoRE), which couples national laboratory radioecology capabilities with the best international and academic scientific capabilities in this field. In addition to SRNL as the lead, key partner organizations of NCoRE include IRL, Clemson University, Colorado State University, Duke University, Institut de Radioprotection et de Sûreté Nucléaire (IRSN, France), Oregon State University, University of Georgia’s Savannah River Ecology Laboratory, and University of South Carolina. In addition, three more organizations are currently being invited to be part of NCoRE: 1) Polesye State Radiation Ecological Reserve Ministry for Emergency Situations of the Republic of Belarus Department of Mitigation of the Consequences of the Catastrophe at the Chernobyl Nuclear Power Plant (Belarusian counterpart of IRL), 2) Institute for Nuclear Research - National Academia of Sciences of Ukraine, and 3) Russian Institute of Agricultural Radiology and Agroecology - Russian Academia of Agricultural Sciences.

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