CBRN Protection: Managing the Threat of Chemical, Biological, Radioactive and Nuclear Weapons

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DESCRIPTION

Originating in the armed forces of the early 20th century, weapons based on chemical, biological or nuclear agents have become an everpresent threat that has not vanished after the end of the cold war. Since the technology to produce these agents is nowadays available to many countries and organizations, including those with terrorist aims, civil authorities across the world need to prepare against incidents involving these agents and train their personnel accordingly.

As an introductory text on NBC CBRN weapons and agents, this book leads the reader from the scientific basics to the current threats and strategies to prepare against them. After an introductory part on the history of NBC CBRN weapons and their international control, the three classes of nuclear/radiological, biological, and chemical weapons are introduced, focusing on agents and delivery vehicles. Current methods for the rapid detection of NBC CBRN agents are introduced, and the principles of physical protection of humans and structures are explained.

The final parts addresses more general issues of risk management, preparedness and response management, as the set of tools that authorities and civil services will be needed in a future CBRN scenario as well as the likely future scenarios that authorities and civil services will be faced with in the coming years.
ABOUT THE AUTHOR

Andre Richardt has obtained his academic degrees from University Cologne in 1991 (Dipl. Degree in Genetics), Albert-Ludwigs-University, Freiburg (Dr. rer. nat Degree in Microbiology) in 1997 and Helmut-Schmidt-University, Hamburg (Dr. habil Degree in Biotechnology) in 2006. Currently, he is head of Biological and Chemical Decontamination business area at the Bundeswehr Research Institute for Protective Technologies and NBC Protection in Munster, Germany. Most of his career he has been working for the German Armed Forces in the field of CBRN-protection. From 2004 to 2005 he worked at dstl, PortonDown, Great Britain. In the special field catalytic decontamination of biological and chemical warfare agents he has been working for over ten years in national and international working-groups. His current research interests include investigations of non-thermal inactivation of biological and chemical agents as well as the control of the efficiency of a decontamination process. Currently, he is also a lecturer at the Helmut-Schmidt-University, Hamburg and he tutors young officers in the field of CBRN-protection. He is a member in several working groups dealing with fundamental technical and scientific aspects of CBRN protection.

Dr. Birgit Hülseweh studied Biology at the Heinrich-Heine-University of Düsseldorf, Germany with a focus on Microbiology, Molecularbiology and Organic Chemistry. There she received her Diploma in 1990 and did her doctoral thesis (PhD) at the Institute of Microbiology.

From 1994 to 1998 she was as a post-doc at the Max-Planck Institute for Molecular Physiology in Dortmund, Germany and for another 4 year period she worked as a scientific assistant at the University of Essen-Duisburg, Germany. From 2001 to 2002 she was the head of the scientific laboratory of Alpha Technology GmbH in Cologne, Germany, a biotech company, which dealt with the spotting, production and electrical read-out of microarrays for microbial diagnostics. In 2003 she joined as a senior scientist the department of Virology at the Bundeswehr Research Institute for Protective Technologies and NBC Protection in Munster, Germany. Her research focuses on innovative technologies for the identification of microorganisms and her scientific interests include all aspects of real-time-PCR methods, array applications as well as innovative applications of nanotechnology. Dr. Hülseweh has extensive experience in Molecular and Cellular Biology as well as in Immunology and Biochemistry. She is the author of diverse peer reviewed scientific publications and tutors several PhD-students. She has been working as scientific advisor in national and international working-groups and takes care for several international scientific co-operations.

Bernd Niemeyer studied Chemical Engineering and obtained his German Diploma degree (Dipl.-Ing.) at the University Erlangen-Nuremberg, Germany in 1986. His following PhD work focused in the field of bio engineering at the same University. He obtained his PhD-degree in 1990. As Post-doc he visited the Department of Scientific and Industrial Research (DSIR) in Lower Hutt
(New Zealand) for one year and researched into separation technologies for health and chemical engineering topics. After his comeback he worked for the Deutsche Aerospace AG (later named DaimlerChrysler Aerospace AG) and the company Thermoselect Suedwest GmbH. He designed, constructed and commissioned new waste treatment plants for ammunition disposal (newly invented process) as well as for municipal waste processing.

Since 1996 he leads the Chair of "Process Engineering with focus on Separation Technology" at the Helmut-Schmidt-University / University of the Federal Armed Forces Hamburg in combination with the Research Group "Molecular Recognition and Separation" at the Helmholtz-Zentrum Geesthacht, Centre for Material Science and Coastal Research.

His research interests are applicable for CBRN-safety (analyses and decontamination of biological warfare agents as well as protection, detection and decontamination of chemical warfare agents), environmental engineering (waste as well as off-gas treatment, like odorous removal), biotechnology (enzyme catalysis and separation of valuables) as well as chemical processing (process design and separation of substances from reaction mixtures). The main methods applied are mainly adsorptive separation technologies, oxidative processes, and development of analytical and sensor systems.

Frank Sabath received the Dipl.-Ing. Degree in electrical engineering from the University of Paderborn, Paderborn, Germany, in 1993, and the Dr.-Ing. degree from the Leibniz University of Hannover, Hannover, Germany, in 1998.

From 1993 to 1998, he was with the C-Lab, a Joint Research and Development Institute of the University of Paderborn and the Siemens Nixdorf Informationssysteme AG, Paderborn, Germany, where his responsibilities included research activities on numerical field calculation and the radiation analysis of printed circuit boards. Since 1998, he has been with the Federal Office of Defense Technology and Procurement (BWB). Currently, he is head of the division on Balanced Nuclear Protection Measures and Nuclear Hardening, Electro-Magnetic Effects, Fire Protection of the Bundeswehr Research Institute for Protective Technologies and NBC-Protection (WIS), Munster, Germany. He is the author or coauthor of more than 110 papers published in international journals and conference proceedings. His research interests include investigations of electromagnetic field theory, High-Power Electromagnetics, investigations of short pulse interaction on electronics, and impulse radiation.

Dr. Sabath served as Ultra Wide Band (UWB) co-chairman of the EUROEM 2004, Magdeburg, Germany as well of the EUROEM 2008, Lausanne, Switzerland. He has been the Editor-in-chief for several Ultra-Wideband, Short-Pulse electromagnetics books. Currently he is an Associate Editor of the IEEE Transactions on EMC, member of the board of directors of the IEEE EMC Society and chair of the IEEE Germany Section EMC Society Chapter. Due to his outstanding service the EMC Society presented him the Laurence G. Cumming Award in 2009 and the Honored Member Award in 2012. He is a Member of the IEEE Electromagnetic Compatibility (EMC), Antennas and Propagation (AP), Microwaves Theory and Techniques (MTT) societies, and a member of URSI Commission E.