**Sector 4a. Radiological-Nuclear Threats**

*(Number at the end of the presentation title is the abstract number in the printed abstract book)*

1. **Mr. Nick Mann,** Emergency Response & Readiness, National and Homeland Security - Defense Systems, Idaho National Laboratory, USA - "Radiological contamination: historical uses and novel isotope development for emergency response training and testing" (20)
2. **Dr. Marija Surić Mihić,** Ministry of the Interior, Civil Protection Directorate, Radiological and Nuclear Safety Sector, Zagreb, Croatia - "Radiological protection education and training in Croatia" (19)
3. **Dr. Stela Popovic MD,** Ministry of the Interior, Civil Protection Directorate, Civil Protection Operations Centre, Unit for Radiological and Nuclear Emergency, Zagreb, Croatia – "Illicit trafficking attempt at Croatian border crossing" (25)
4. **COL. Lien Senchak MD,** AFRRI US, Armed Forces Radiobiology Research Institute Uniformed Services University of the Health Sciences - "Testing Technologies for Personnel Dry Decontamination of Radiological Contaminant in Extreme Cold Environments to Increase Human Survivability" (13)
5. **Steven Buntman**, Program Manager, International Operations, Office of Nuclear Incident Policy and Cooperation, Department of Energy, National Nuclear Security Administration, USA - "US DOE's Office of Counterterrorism and Counterproliferation (CTCP)" (61)

**Sector 4b. Radiological-Nuclear Threats**

1. **Dr. Giacomo Mangiagalli,** CAEN SpA, Spectroscopy Division, Italy - "Fast detection of Nuclear threats and weapon grade material with realtime identification of Gamma and (n,alpha) radiological emission in realistic scenarios" (33)
2. **Dr. Ivica Prlić,** Institute for Medical Research and Occupational Health, Croatia - "A citizen monitoring network - a pilot project proposal and subject for discussion" (17)
3. **Dr. Natalia Klos,** Coordinator of the Black Sea Women in Nuclear Network - "Civil Society and Volunteer Organizations' Response to Nuclear Accidents in Ukraine" (9)
4. **Dr. Sabol Jozef,** Police Academy, Czech Republic - "Communication of CBRN risk to the public with special emphasis on radiation exposure and radioactive contamination" (46)
5. **Mr. John Giles,** Idaho National Laboratory, 2525 N. Fremont Ave., Idaho Falls, ID, USA – "Consequence Management Training in a "Live" Radiological Environment" (69)

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**20. Radiological Contamination: Historical Uses and Novel Isotope Development for Emergency Response Training and Testing**

**Nick Mann***[1], Z. Heiden[2], C. Hines[2], S. Buntman[3]

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**Abstract**

The use of radioactive materials in training has a rich historical background dating back to the development of nuclear weapons during World War II. The potential dangers of radioactive materials (sealed and unsealed) necessitate that first responders are adequately trained in the event of a nuclear incident or radiological accident. The dispersion of actual radioactive materials for training is problematic due to their radiotoxicity. Radioactive materials exist in a wide variety of chemical forms with varying physical properties that prohibit their use other than as industrial sealed sources. The successful adoption of useful surrogate radioactive materials for training depends on several characteristics. Surrogate materials must decay to stable or short-lived daughter isotopes that decay to stable, non-toxic isotopes. The target matrices must be relatively inexpensive yet have a high enough purity as to minimize the production of deleterious radioactive isotopes that are considered environmentally and biologically persistent. To be useful as a training resource, surrogate radioactive materials should mimic radioactive particle and photon emission properties of known industrial radioisotopes that mesh well with first responder detection equipment. Idaho National Laboratory (INL) has been training U.S. first responders since 2009. Bromine-82, K-42 (Potassium Bromide) and Cu-64 have been successfully adopted as radioactive surrogates for outdoor large area contamination training. INL is currently evaluating additional isotopes for use in a national **indoor testbed.**

**Keywords**: Isotopes; Responders; Training

**Biography – Nick Mann**

Mr. Nick Mann – Idaho National Laboratory
Mr. Mann began his career at the Idaho National Laboratory (INL) in 1997 as a separations researcher. He has over 25 years of technical experience in the areas of chemical separations, solid-liquid separations and Radioactive Dispersal Device (RDD) research. He is credited with the development of live RDD dispersals for training and testing at the INL. Mr. Mann currently serves as a RDD SME and instructor for the Emergency Response and Readiness program. Mr. Mann has authored or co-authored over 19 peer reviewed journal publications and conference proceedings. Authored 10 INL external reports and awarded 13 U.S. patents.

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## 19. Radiological protection education and training in Croatia

**Marija Surić Mihić***, Zdravka Tečić and Antonia Bilić
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**Abstract**

As of 2014, the radiological protection education for radiation workers and radiation protection officers (RPOs) has been performed via e-learning system only. A practical training on implementation of radiation protection measures is not provided. The education, training and retraining for radiation protection experts (RPEs) is not available in Croatia as a formal systematic education so RPEs build their competences graduating PhD courses in medical physics, attending available courses provided by the EU/EURATOM, IAEA or professional/scientific associations. In order to improve the radiological and nuclear safety in the country the Ministry of the interior, Civil protection directorate, as a regulatory body in radiological and nuclear safety, within the framework of the IAEA Technical cooperation programme, participates in projects aimed to strengthen national capacities in radiological protection and safety. In 2019, a curriculum for education and training of RPEs and RPOs was prepared in cooperation with the IAEA experts. In 2022, a national project proposal for establishing a national strategy for education and training in radiological protection, nuclear safety and nuclear security was submitted to IAEA for Technical cooperation Programme Cycle 2024-2025. The current situation, needs and planned measures to improve the Radiation protection education and training in Croatia would be presented and discussed.

**Biography – Dr. Marija Surić Mihić, PhD**

Marija Surić Mihić was born in Zagreb. After completing her elementary and secondary education in Zadar, she studied experimental medical physics at the Faculty of Science, University of Zagreb where she received her BSc degree in experimental physics and earned her PhD degree in medical physics. From 2001 to 2005, she worked as a junior researcher at the School of medicine, University of Zagreb, and from 2005 to 2021 as a scientist at the Institute for Medical Research and Occupational Health in Zagreb. In 2021, she earned the title of senior research associate in the field of public health and healthcare. Her major scientific interests were issues of human exposure to ionizing radiation in all aspects: occupational exposure during work with radiation sources, patient exposure in radiodiagnostic procedures as well as exposure of the population and biota from radionuclides in the environment. In 2018 she gained status of radiation protection expert.

Since 2021, she has worked as a head of the Radiological safety department in the Civil protection directorate of the Ministry of the interior. She is an author or co-author of 88 scientific and professional publications in scientific journals and proceedings of scientific and professional conferences, and she mentored graduate theses and doctoral dissertations. As a member of the organizing or scientific committee, she participated in the organization of three national and two international congresses, where she was the editor of a book of abstracts of an international congress. She is an active member of several Croatian professional societies.

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## 25. Illicit Trafficking Attempt at Croatian Border Crossing

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**Abstract**

Illicit trafficking of radioactive materials is a potential threat to the security of states and their international security. The loss or unauthorized possession of nuclear material or nuclear waste can lead to serious economic and environmental consequences. In the hands of terrorists or other criminals, radioactive sources could be used for malicious purposes. In EU neighboring former-Soviet Union countries, nuclear and radioactive materials have continued to appear on the black market since the early 1990s. As part of the effort to prevent smuggling of nuclear and radioactive materials, the US Department of Energy National Nuclear Security Administration through Second Line of Defense Program donated to the Croatian Customs Administration several Radiation Portal Monitors (RPMs) which were deployed on four Croatian border crossings. On 12 September 2016, when trying to leave the Croatian territory, a vehicle with foreign license plates caused RPMs to trigger an alarm procedure at the border crossing Karasovici. Since Croatia is a tourist country where tourism revenues represent a significant portion of the state budget, the possibility that radioactive material was detected caused a great deal of attention of the professionals and the media. The driver was sentenced to one year in prison, suspended for four years. This case is an example of successful cooperation and coordination of all response participants. The scenario at the Karasovici border crossing was used as the basis for the preparation of the National Preparedness and Response Plan of the Republic of Croatia.

**Keywords**: Illicit Trafficking; Response; Coordination

**Biography – Stela Popović**

Ms. Stela Popović is currently the Head of Unite for Radiological and Nuclear Emergency, in Civil Protection Directorate Ministry of the Interior in the Republic of Croatia. Her education and vocational background are as a medical doctor with a long national and international experience in public health activities, including surveillance over use and transport of radioactive material, emergency preparedness and response, inspection and international cooperation. As an external expert, she has contributed extensively to the IAEA publications, training courses and Missions.

## 13. Testing Technologies for Personnel Dry Decontamination of Radiological Contaminant in Extreme Cold Environments to Increase Human Survivability

**COL. Lien Senchak MD**

*AFRRI US, Armed Forces Radiobiology Research Institute Uniformed Services University of the Health Sciences, USA*

## Abstract

**Summary**:
An incident where radiological agents are released into the air is a serious threat and hazard for military forces and civilians in the operational environment. The events can range from an industrial accident or accidental release of radiological particulate into the environment from an intentional terrorist attack or adversary use of a nuclear or radiological weapon. Casualties may present with conventional traumatic injuries, burns and/or radiological contamination on skin and clothing. Decontamination should be performed immediately if there are no life-threatening injuries. Standard decontamination procedures use a water-based solution which poses logistical challenges of transportation of water tanks, equipment and a water source readily available. However, in extreme cold weather environments snow and ice create additional logistical challenges as well as risk of lowering core body temperatures causing casualties to experience cold shock or hypothermia. Various dry technologies such as a wipe, spray or vacuum have been developed to expand the operational temperatures that can be used to safely and adequately decontaminate casualties in extreme cold weather, especially when water-based systems are not a viable option for use in humans due to the high risk of hypothermia. Our objective was to test the various dry technologies for efficacy and ease of use in removing dusty radiological contaminate in extreme cold temperatures.

**Methods-Results**:
Our purpose was to collect independent performance data of dry decontamination technologies in a range of low temperatures as an alternative to water-based systems. We performed the experiments using dead pig skin as simulant to human flesh and an adherent non-radioactive simulant to represent radiological fallout. A key performance data point was adequate reduction of contaminant on the pig skin (1 x 1”and 3 x 7” samples) and time to complete decontamination within a set time frame. This time limit for self-decontamination of ambulatory casualties is 3 minutes and non-ambulatory casualties is 9 minutes. The technologies were tested at 3 prescribed temperatures of (65F, 35F and 5F) using the radiological simulant at concentrations of (10g/m2, 5 g/m2, and 2 g/m2) and measuring residual contaminate by utilizing several detection sensors (laser particle, microscope, X-ray fluorescence, and high-speed camera analysis). The technologies tested included an alcohol-based wipe, carbon embedded fiber wipe, spray, and HEPA vacuum. Initial testing showed that there is no significant impact of temperature on the efficacy of the technologies. Temperature only drives the decision to use dry decontamination instead of water-based systems when the temperature is below 35 degrees F. The results utilizing 60 data points showed the most effective technology was the carbon embedded fiber wipe and the HEPA vacuum, with efficacy of 82% and 79% respectively. The less effective technologies include the spray which showed no significant change between the samples and alcohol-based wipe with efficacy of 61%.

**Conclusions**:
The carbon embedded fiber wipe showed no significant difference in efficacy when compared to the HEPA vacuum. The performance of the two technologies is identical in the full range of temperatures and concentrations. The technology proved robust with changing temperatures and demonstrated consistent performance and efficacy. Final phase of testing involving large scale operations in the field performed in Alaska. Points of measure included rate of processing contaminated casualties in both an ambulatory and non-ambulatory setting, ease of training and use, durability, and waste management.

**Biography - COL. Lien Senchak MD**

COL Lien Senchak is a Medical Doctor specializing in Diagnostic Radiology. She graduated with a medical degree from the State University of New York at Buffalo in 2004. She subsequently completed her residency in 2009 at Tripler Army Medical Center in Honolulu, HI. Her tours included serving as Officer in Chief at Joint Readiness Training Center Fort Polk, LA in 2010 followed by head of the ultrasound department at Joint Base San Antonio in Texas in 2011. During which time she deployed to Afghanistan and served as Officer in Chief of Diagnostic Radiology at a Role 3 Combat Support Hospital at Camp Dwyer in Helmand Province Afghanistan in 2012. She completed a fellowship in Musculoskeletal Imaging at the American Institute of Radiologic Pathology at Washington Hospital Center in 2013 followed by serving as Department Head of Musculoskeletal Radiology at Walter Reed National Military Medical Center from 2013-2019. She then served as the department head of Military Medical Operations at the Armed Forces Radiobiology Research Institute (AFRRI) for 4 years before transitioning to her current role as Director of the Office of Strategic Operations at AFRRI in Bethesda, MD. The primary functions of her office include developing relationships, establishing a connection in order exchange scientific knowledge to prepare global partners and allies to better respond to a nuclear radiological threat.

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## 61. US DOE's Office of Counterterrorism and Counterproliferation (CTCP)

**Mr. Steven Buntman**

*International Operations, Office of Nuclear Incident Policy and Cooperation, Department of Energy, National Nuclear Security Administration, USA*

### Abstract

The presentation discusses the U.S. Department of Energy's Office of Counterterrorism and Counterproliferation (CTCP), which falls under DOE's National Nuclear Security Administration (NNSA). The CTCP is integral to the U.S. Government's layered defense against nuclear terrorism and nuclear proliferation and for response support to nuclear security and nuclear safety incidents. CTCP is responsible for countering nuclear terrorism and nuclear proliferation and responding to nuclear incidents and accidents domestically and overseas. To meet this mission requirement, CTCP manages the Nuclear Emergency Support Team (NEST) that leverages the Department's scientists and technical experts to contend with nuclear and radiological incidents and accidents of any size or category. Additionally, CTCP missions include both national security and public health and safety disciplines.

The principal intention of the presentation is to outline the CTCP's Office of Nuclear Incident Policy and Cooperation (NA-81) capabilities for international assistance programs and training opportunities based on DOE's domestic expertise. International support activities take the form of Policy & Partnership agreements, Preparedness & Operations, and Exercises & Interdiction Training. A possible model of regional organization to share is CTCP'S mission requirements and capabilities for the preparedness and response to potential or actual release of radiological or nuclear material into the environment. The model will include the NEST structure for consequence management based on the Radiological Assistance Program (RAP) and the Federal Radiological Monitoring and Assessment Center (FRAMC). The presentation will outline the CTCP support capabilities for rapid deployment in emergencies and concepts for a coordinated operational response structure with other Federal, State, local, Tribal, and territorial (FSLTT) governments. Additionally, the presentation will outline potential training and exercise opportunities that utilize CTCP/NEST capabilities and lessons learned and best practices provided by international partners and organizations.

**Biography – Steven Buntman**

Mr. Buntman is Program Manager, International Operations, Office of Nuclear Incident Policy and Cooperation, Department of Energy, National Nuclear Security Administration, USA.

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## 33. Fast Detection of Nuclear Threats and Weapon Grade Material with realtime identification of Gamma and (n,alpha) Radiological Emission in realistic scenarios

**Giacomo Mangiagalli*** [1] , M. Morichi[1] , F. Pepe[1] , P. Garosi[1] , I. Bonesso[2] , L. Stevanato[2]
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**Abstract**

Nuclear Emergencies and Nuclear Security actions require abilities to quickly understand the specific scenario and rapidly execute a complete assessment of the radiological risk. A near real-time understanding of the situation together with the ability to implement immediate operations is essential to mitigate the infrastructures, operators and population risks. The current dramatic situation obliges us to consider scenarios where the ability to detect and alarm in seconds and identify within one minute a nuclear threat by identifying Special Nuclear Material with a high level of efficiency is highly required.

For this reason, CAEN developed and patented an innovative algorithm capable of identifying, in only 1 minute, through the neutron measurement, Special Nuclear Material even when it's shielded, moderated or masked. Thanks to the extensive experience acquired by CAEN in Nuclear Safeguards and advanced digital electronics we realized a novel isotope identifier that can be effectively deployed to enhance operations.
Its validation is proven by the NATO stock number availability.

The identification capability exceeds any standard currently available. To give an idea, to perform the same measurement with current technique a set of three systems (more than 300.000€ cost), more than one hour of measurement and analysis performed by highly experienced nuclear physicists are needed. In this article we present the results of an extensive test conducted for more than 4 years in the main international laboratories (IAEA, ENEA, INFN) with real Reactor Grade Plutonium sources. The tests were performed in compliance with international standards and by simulating real use case scenarios of contaminations, smuggling and nuclear threats.

**Keywords**: Nuclear Threats; Dirty bomb; Special Nuclear Material; Radiological Counterterrorism Device

**Biography - Giacomo, Mangiagalli**

Giacomo Mangiagalli is a technical salesperson with a master's degree in physics obtained at the University of Milano Bicocca and 5 years of experience in civil nuclear industry and CRBNe security.
He Joined CAEN in 2017 as a junior scientist and he started laboratory measurement for characterization and calibration of equipment used to detect ionizing radiations with a focus on neutron measurements.
In 2018 he was in charge of the product development of a Special Nuclear Material portable identifier called SNIPER-GN, a backpack radiation device with a novel algorithm capable of identifying the SNM by means of the only neutron detection. He followed the development of the prototype and the measurement campaign in recognized international laboratories in IAEA, Ispra JRC and ENEA sites to validate the instrument. In 2019 he became the product manager of SNIPER-GN delivering the first prototype and starting the production phase. He is now responsible of the security product line and Sales Specialist for the Italian, French and German market.
Currently he is head of marketing for the CAEN SyS division.

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## 17. Naturally Occurring Radioactive Materials - NORM waste in security of gas & oil industry

**Ivica Prlić**, L. Pavelić, S. Kobešćak_

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**Abstract**

Republic of Croatia is the latest and one of the smaller members of the European Union in which the oil & gas were explored and gained since 1855. The first tar site in Croatia was mentioned 1391. Today, the national oil & gas company exploits some 54 oil & natural gas fields mostly in the geological region of Pannonian basin and from the northern Adriatic Seabed (gas). Recently, Croatia started new investment cycles based on national energetic strategy and general plan and program of oil & gas exploration at land and sea. European Union environmental and radiation protection and oil & gas production Directives and new regulatory framework regarding NORM (production of residues) from oil & gas industry are implemented into research and production protocols. There is a need to investigate NORM originating from oil & gas production and to link the production sites once again with geological underground in order to establish the well documented map of sites where residues are to be expected as by-product of the production. This paper deals with the obvious technological need to work out the proper but cheap technology which can assure that NORM residues originating from Oil & Gas industry are reused and NOT stored as NORM LL RadWaste. Present geopolitical situation caused by the Russian invasion of Ukraine rises the need of energy sources security of EU MS. This means that oil & gas are of enormous importance for the EU as a whole and production is to be encouraged. The NORM LL RadWaste will be produced while performing maintenance of the wells which, if not properly regulated, can contribute to a disturbance of environmental, mostly rural, sites with residues burden.

The radiological risk estimation and shielding calculation simulation are to be performed in order to gain the possible construction which can be used as added value protecting environment from additional NORM LL RadWaste by using this byproduct to fight the new global climate change incidents, like flooding, fires, or else. In addition, the metrological relevance of crowd-sourced dose rate data originating from residues in scale and sludge inside tubing pipes, collected by professional at GPS mapped production sites is to be investigated. The pilot results will be presented.

**Keywords**: NORM residue, LL RadWaste, building material, reuse,

Emerging Domains of RP assignation - Research and Development (protection of people and environment)

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## 9. Civil Society and Volunteer Organizations' Response to Nuclear Accidents in Ukraine

**Natalia Klos**

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**Abstract**

Over the past 100 years, Ukraine has been almost the only country with a developed industry and one of the leading countries in the world, ranking 7th in terms of electricity production by nuclear power plants. The conventional war unleashed by the Russian Federation has brought new threats. Russia attacked and occupied Zaporizhzhia NPP. The principles of nuclear and radiation safety and physical protection were violated. The facility is being operated with violations, including with an insufficient number of personnel. Ukraine and international observers have recorded the presence of a significant amount of military equipment and explosives on the territory of the facility. The area around the facility has been confirmed to be mined. Ukrainian intelligence notes that critical facilities at the nuclear power plant and the cooling pond are mined. In this vein, the explosion of the Novo-Kakhovka HPP by Russian troops has increased the risks of safe operation of the NPP and raised the risk of ZNPP explosion. There are many prerequisites that confirm the development of such a scenario, based on the previous experience of observing Russia's actions. For example, Rosatom personnel were withdrawn from Enerhodar, the satellite city of ZNPP, and the personnel who had suspended their contracts with the Russians. In the information space of the Russian Federation, the main media channels spread information that the Ukrainian authorities are preparing a terrorist attack on the ZNPP. This is a common, proven tactic of Russia when they want to shift the blame for some actions to the Ukrainian side. About a month before, the Russian population begins to prepare to find the guilty party. These and other events, together with intelligence from the Ukrainian side, led to active preparations by the Ukrainian authorities for a possible nuclear accident. The only consolation is that at least 5 units are in cold shutdown, and the consequences of a nuclear explosion

will not be as catastrophic as in the case of the Chernobyl accident. At the same time, without access to the facility, it is difficult to predict what exactly might happen. The explosion, including of the dry spent fuel storage facility, will also not bring anything good. The authorities have announced training exercises in the region to eliminate the consequences of the accident, and the media are disseminating information about a possible terrorist attack and recommendations to the public on how to behave in the event of a radioactive accident. Also, in the event of a ZNPP explosion, a 50-km exclusion zone and mandatory resettlement have been announced. This zone includes, for example, the town of Zaporizhzhia and other smaller towns, which is somewhere around a little over a million people, not including the military. The cities of Dnipro, Kryvyi Rih, and Melitopol are also affected, which is up to another three million people. With so many people in need of assistance, self-organization of the population and volunteer movements are gaining significant importance, playing a significant role in meeting the needs of people at this time. The existence of a highly motivated self-organization of the population is not taken into account in the existing response systems. Volunteer organizations have been actively created since 2014, and since 2022 they have expanded and become a significant driving force in assisting the state in responding to and eliminating the consequences of emergencies. The nuclear sphere is specific and requires knowledge of how to deal with them. Ukraine already has the experience of the Chornobyl disaster, so the reaction of an average citizen is tied to past experience and causes a lot of fear, belief in myths and retold stories. It's not so much radiation that kills, but the fear of it and the panic it causes. In my presentation, I will talk about the experience of conducting training and awareness courses for volunteer organizations on how to behave in the event of a radiological accident and how to cooperate with the authorities. Explaining to the public why these other events are taking place, and how to behave and what to expect. Against the backdrop of hostilities and constant rocket attacks from Russia, this is many times more difficult. At the same time, the Ukrainian population is quite resilient to all kinds of emergencies and is ready to help each other at the highest organizational level.

**Biography – Natalia Klos**

Natalia Klos is a Coordinator of the Black Sea Women in Nuclear Network. She is a nuclear security expert with 19 years of experience in the field of physical protection, including at the IAEA, the State Nuclear Regulatory Inspectorate of Ukraine, the Ministry of Energy of Ukraine and the Ministry of Internal Affairs of Ukraine. Nataliia holds a Master's degree in Nuclear Security and Public Administration, and fellowship program at the James Martin Center for Nonproliferation Studies, Monterey, California, USA, Co-Chair of the Initiative Sharing Initiative on Assistance to Ukraine in Radiation and Nuclear Security within the Global Partnership Against Spread of Weapon and Material of Mass Destruction in 2017-2022. Permanent Representative of Ukraine on the Global Partnership meetings in 2015-2022. Chairwoman of Working Group No. III Promoting the Development of Nuclear Security in IAEA International Nuclear Security Education Network (INSEN). IAEA IPPAS mission, nuclear security culture expert. Founder of the Nuclear Security master's degree program in NTUU "Igor Sikorsky Kyiv Polytechnic Institute" in 2019. IAEA expert on security culture. Research area: SMR, security culture, countering insider threats, cybersecurity and illicit trafficking of radioactive materials.

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## 46. Communication of CBRN risk to the public with special emphasis on radiation exposure and radioactive contamination

**Jozef Sabol**

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**Abstract**

In order to prevent severe effects and consequences of the use of CBRN weapons and minimize their impact on the health of affected persons, it is vital to prepare members of the public for such emergencies. Therefore, it is essential to inform the population about basic CBRN effects using simple and well-understandable language so that all persons can perceive the potential impact of individual agents of the CBRN family. People who are familiar with potential CBRN

risk and understand the basic principles of protection against such dangerous substances usually cooperate with professional rescue teams more effectively than persons who are not aware of such threats. This is why it is very important to communicate CBRN risk to the public in order to prepare the population for the potential future use of CBRN agents for terrorist attacks. Special attention should be paid to the possible radiological or nuclear assaults, which usually result in high radiation exposure. Any appropriate countermeasures may substantially reduce the impact of such attacks. The more the public is aware of the radiological danger, the better and more efficiently they can be protected against radiation exposure and thus minimize consequences and health hazards associated with such dangerous situations.

**Keywords**: Communication; CBRN; risk; public; radiation exposure; radioactive contamination

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## 69. Consequence Management Training in a "Live" Radiological Environment

**John Giles***[1], D. Walker[1], D. Egbert[1]

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**Abstract**

Effective consequence management after an event involving the release of radioactive material results from safe mitigation of the radiological hazards to both responders and the public. Effective consequence management will lead to a higher level of public trust. Proper mitigation of the radiological hazards for the responders and public is achieved through several key objectives including accurate predictive plume and ground deposition modeling, rapid and complete ground deposition characterization to include 1-meter dose rates.

These objectives are met through the deployment of competent field data collection and processing teams. Competency in field teams is achieved through routine training. Excellence in field teams is achieved through routine training in realistic training environments, including the use of short-lived radioactive materials.

Idaho National Laboratory maintains a unique training environment where field teams can train in "live" radiological environments where short-lived radioactive materials have been dispersed to simulate different types of events including transportation accidents or the spread of radioactive contamination from the activation of a radiological dispersal device.

The process of the consequence management training evolution, including field data collection reports is described.

**Keywords:** Consequence management; radiological contamination; characterization

**Biography – John Giles**
**(Photo will be added)**

John Giles is recognized nationally and internationally throughout the NA-84 Emergency Response community as a subject-matter expert (SME) in radiation detection and measurement, radiological dispersal device materials and health physics applications related to emergency response. Mr. Giles is a member of the U.S. Department of Energy (DOE) Region 6 Radiological Assistance Program (RAP) Team and serves as a Team Scientist and Health Physics Support. Serving in a lead role for multiple projects within the INL Defense Systems directorate, Mr. Giles has extensive experience in coordination and execution of training and testing exercises at on- and off-INL locations. Mr. Giles is also a lead instructor for the Radiological Dispersal Device Materials Training Program at INL.

In this position, John provides instruction to personnel from various groups within the United States government, as well as international response assets. Courses of instruction include basic radiation physics, health effects of ionizing radiation, radiation detection and instrumentation, radiological dispersal device materials, and x-ray radiography. Mr. Giles has both a bachelor's of science and master's degree in physics and health physics from Idaho State University.