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ADAPTABLE CHEMICAL AND BIOLOGICAL PROTECTIVE CLOTHING: A NOVEL LAYERED SYSTEM

Cornelis P Bogerd*, Saskia de Kant & Emiel A den Hartog

TNO CBRN Protection, Lange Kleiweg 137, 2288 GJ Rijswijk, the Netherlands

*niels.bogerd@tno.nl

Many relevant standards state that CBRN protective clothing should provide protection for 24 h. This guideline has been present since the Cold War which ended several decades ago, despite changing CBRN threats and advancements in (clothing) technology. Furthermore, a disadvantage of the 24 h norm is that the protective requirements to the clothing materials needs to be high. Since there is still an inverse relationship between protection and user effectiveness and comfort , the present CBRN clothing systems are likely suboptimal for performance-periods much shorter than the 24 h norm. In addition, threats are changing and will likely include much shorter periods of exposure for a soldier and/or first responder. Finally, also the expected tasks or activities are different from what was envisioned during the Cold War. This provides a strong basis for investigating novel solutions in CBRN protective clothing which let go of the 24 h norm and focus on increasing user effectiveness and comfort with lower levels of protection. In this presentation we will present a novel concept of CBRN protection based on a layered system. In this concept each layer provides a certain protection level, aimed at increasing effectiveness and comfort , corresponding to lower level threats and/or shorter exposure durations. Unique to this concept is that it facilitates the regulation of protection, by wearing selected layers only. Wearing one layer provides a minimum protection, e.g., for 4 h at classic threat levels(but maximum user effectiveness and comfort), wearing all layers provides maximum protection at the expense of user effectiveness and comfort. This presentation will be accompanied by empirical results giving the first insight into the applicability of this novel concept. These results will encompass experimental results on protection, from Whole System Tests (also known as MIST tests) and evaluations and

perception of the thermal physiological burden to the wearer. These results will provide insight in the ranges and conditions of use for such novel concepts as well as their limitations, in addition it will support risk management strategies for military personnel in CBRN risk environments.This study was executed as part of the CBRN Protection research program, funded by the Netherlands Ministry of Defence.