

Colonel Henry Neumann, Head of CBRN Defence Capabilities Development for NBC Defence of the Joint Service Support Command, Germany, tells *CBRN World* about the elimination of fourth-stage – or clearance – decontamination

# Generation gap

**CW: Last November saw the release of the "Subconcept for NBC Defence in the Bundeswehr", which plotted the future course of the German military in terms of NBC. What direction did this plot for the future of decontamination in the German Federal armed forces?**

HN: Before we look into the future we need to take a retrospective; the threat posed by the use of CBRN weapons and devices is not new. CBRN – or NBC – was a determinant characteristic of the Cold War. At that time we assumed the use of NBC weapons would be essentially against military targets in support of operational objectives, and our defensive capabilities were primarily focused on conducting NBC reconnaissance and decontamination. The latter was driven by the fact that, in terms of soldiers and weapons, the Warsaw Pact forces heavily outnumbered Nato forces. The ratio of three to one forced the various national Nato NBC Defence Corps to conduct decontamination of their own forces in order to restore operational readiness and bring them back into the fight. This ratio meant that every fighting unit was essential for operations and also for our survival; this survival aspect is also perhaps the reason why we took a more risk-orientated approach to thorough decontamination – in regards to residual contamination – instead of implementing effective measures to control decontamination outcomes.

The situation has changed dramatically. While the Cold War has ended, there is still a serious threat posed by the uncontrolled proliferation of CBRN agents and the according delivery systems. In addition, we are increasingly being confronted with global terrorist groups seeking unconventional strategies and tactics, which include using CBRN, and linked to this are dramatic changes in the types and character of our missions. In Germany we have come to the realisation

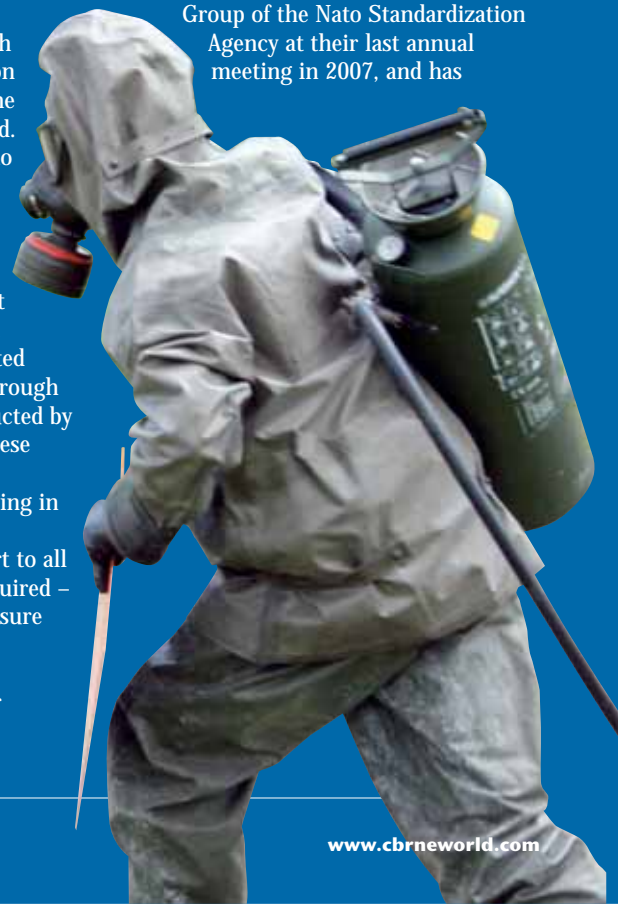
that warfighting is less probable than military operations such as Afghanistan (ISAF) or Kosovo (KFOR). These peace-support operations are conducted under the legal framework of peace-time, implying that safety and security regulations for our personnel are still applicable, even if the operation is abroad. For that reason we have had to change our perspective with regards to risk management – we cannot afford to neglect residual contamination any longer.

Decontamination in the German armed forces encompasses three different decontamination levels in regards to capability and proficiency. At the "basic" level, all personnel must be trained to conduct immediate decontamination as part of self and buddy aid. So Bundeswehr personnel are equipped and trained to conduct immediate decontamination procedures on themselves and others so they can survive and maintain combat readiness. At the "enhanced" level, operators of platforms and weapons systems – drivers, gunners, etc – have to be able to conduct operational decontamination measures, meaning they must be capable of decontaminating materiel and weapons systems without third-party support in such a way that the hazard concentration can be significantly reduced and the spread of contamination minimised. The purpose of these measures is to sustain operations in a CBRN environment until such a time as thorough decontamination can take place without endangering the overall aim of the operation. At the "qualified" level, contaminated personnel, materiel, and, to a limited extent, infrastructure undergo thorough decontamination and this is conducted by specialist CBRN defence forces. These must be able to apply thorough decontamination measures, including in mass-contamination situations, to provide rapid and extensive support to all parts of the joint force and – if required – other organisations, in order to ensure unrestricted use of contaminated materiel. The aim of thorough decontamination is to eliminate or

neutralise contamination entirely or at least to the extent that the operation can continue without IPE and in compliance with statutory requirements.

An important part of thorough decontamination is the capability to conduct a decontamination check on personnel and materiel by using suitable equipment and sensors. This needs to be done to ensure the absence of any contamination hazard deriving from the decontaminated equipment. This capability requirement is new and the equipment and sensors need to be developed.

During the development of our new CBRN defence concept, we had a long discussion about the relationship between thorough and clearance decontamination. The longer we discussed the issue the clearer it became to us that, if we define thorough decontamination to be in compliance with statutory requirements, we assume that all legal aspects are covered including those which we have to apply when sending our equipment and materiel back home. This understanding is fully in line with what was agreed by the CBRN Defence Operational Working Group of the Nato Standardization Agency at their last annual meeting in 2007, and has



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**PROENGIN Inc**

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# Generation gap



The new German doctrine calls for the eradication of fourth stage decontamination ©CBRN World

decontamination results for specific contamination. Ten years ago we thought we could develop the "one size fits all" solution; we now think differently about this approach. We think about qualified decon with specially trained personnel that have to choose the right procedure for the contamination. You will have to adjust the procedures to the contamination, and that is the new approach. What happened in the above mentioned slide is what we cannot accept any longer: a procedure we call "thorough" decon and then afterward we find out there is a risk of rest of residual contamination.

**CW: The flaw is that most detectors work off vapour or liquid. If the agent has gone sub-surface – into the paintwork – then until it off-gasses you will think it is clean, which might be hours later. Without detectors that can do sub-surface you can't ratify thorough decon...**

HN: OK, but if we are not sure then we will have to assess the situation based on information, which we know beforehand: we know the contaminant and the surface of the vehicle. That is why we need qualified personnel; they know how to deal with these things and if there might be a chance there is some "hidden" contamination they will check it. As we are not in the position at the moment to fulfil the requirement and our scientists and technical guys can only provide us with decontamination procedures to do the 95 per cent solution, I have told them to go ahead and do the research and development to achieve the 100 per cent thorough decontamination capability requirement.

**CW: Couldn't we see technology provide the fourth layer; you do thorough decon and then use something like a peelable coating – so if there is any doubt you just peel it off and then you are sure. Is this a stage after thorough?**

HN: There are other technologies, such as nanotechnology; if you cover the surface with nano colours – creating a very smooth surface – this will prevent contamination staying on the surface so the decon success is better. But what about civilian cars or equipment that you buy in theatre? For the military you can prepare, but for others it is not possible. So our concept is that we say thorough decon means 100 per cent decon; 100 per cent in line with legal requirement, and you cannot hand over kit to your employees that might cause them harm.

subsequently been written in the new AJP 3.8.1, Volume 1 currently being developed. From a German perspective, clearance decontamination is nothing more or nothing less than thorough decontamination requiring special considerations. These special considerations in most cases involve national legislation issues, which makes clearance decontamination essentially a national responsibility best to be conducted after Transfer of Authority.

**CW: So as long as your thorough decon meets statutory requirements there is no need for a fourth stage? The repatriation, or fourth-stage decon, can be eliminated?**

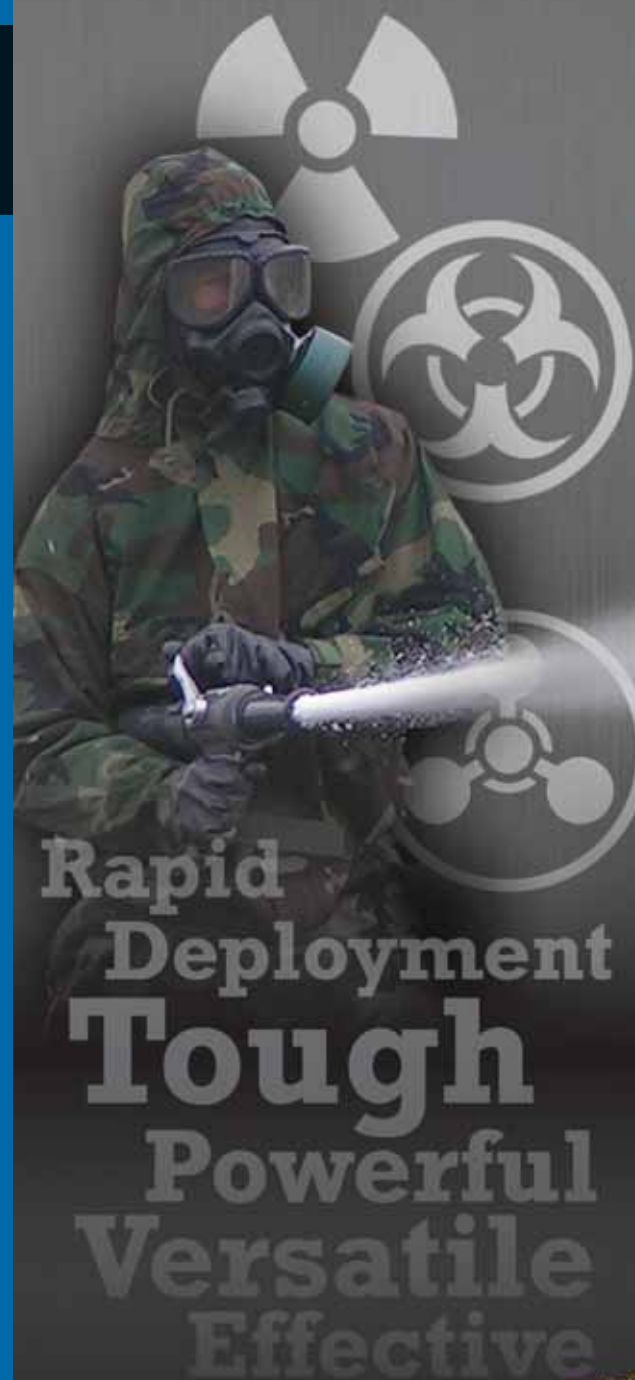
HN: Up to now we thought about fourth-stage, as the technical guys told us that if we decontaminate it is only possible to achieve 95 per cent success. If we accept the 5 per cent risk, this is not in line with European occupational health and safety law – if you have an employee and you deliver him the tools for business, whatever you give him must be safe. When we declare we will decontaminate equipment and then it is not safe, we are not in line with European and national law – so in thorough decon there cannot be any risk. Decontamination means you can handle it without protection and it must be in line with the law and regulation. The fourth stage – clearance – was developed to do cleaning of equipment before it was repatriated; it has nothing to do with decontamination, as the equipment is no longer contaminated.

**CW: So because it has been through thorough decon it is, *ipso facto*, not contaminated?**

HN: That is the new idea behind our thinking. Thorough means 100 per cent. There was a big discussion within the CBRN community, as some countries insisted on four levels [being involved]. Taking this into consideration Germany proposed during a NATO Standardisation Agency Doctrine and Terminology Panel meeting the idea that clearance decon being essentially a bi/national requirement, most suitably be conducted after transfer of authority. If you go into a mission, you turn over authority to the Nato commander; after the mission is completed in the theatre he will return the authority, and if you need to do some additional decontamination of vehicles, for example, then it is a national responsibility. From our new perspective, after thorough decontamination there is not a need for such action.

**CW: Is it that simple though? There was a case where the UK decontaminated a Challenger II tank that had been destroyed by a depleted uranium (DU) round; it was "clean" when it went on board ship, but the oscillation in transit loosened particle of uranium and contaminated the ship. So does this mean there has to be a different process if it is rad, or is there the same threat from all agents?**

HN: The problem is that this "thorough" decon was not thorough decon. What was missing was the control after decon; otherwise they would have found the DU. Thorough decon in our terms means the tank is safe to handle without IPE; therefore we will need specialised decontamination procedures, including the capability to control the



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# Generation gap

**CW: Will the new policy have any impact on wider doctrine and procedures?**

HN: Yes there will be some impacts; the changes, in my opinion, are best understood with the difference between a battlefield scenario and a crime scene. The Cold War required a very systematic approach to decontamination in order to ensure that decontamination procedures were fast and met the need for large capacities. The NBC Defence Corps was responsible for operating so-called Main Decontamination Sites, which were established for company to battalion-size thorough decontamination operations. Below that, the decontamination sites were established and maintained within the framework of all-arms NBC defence. This approach changed with the new challenges. Capacity is now not regarded as a driving issue. Emphasis is now laid upon the level of proficiency required to conduct thorough decontamination. The enhanced level – the non-CBRN specialist unit and battalion level (all-arms-level) – is now not trained to conduct thorough decontamination operations, they are only trained to conduct immediate and operational decontamination. The capability to conduct thorough decontamination is now solely allocated to the qualified therefore specialist level.

**CW: Does this mean the decontamination chemicals/procedures would be more scientific and technical and less soldier-friendly?**

HN: The specialists must bring into the armed forces an appropriate profession from their civilian life – chemical assistants, bio assistants, etc – and then they are trained in Sonthofen and at the WIS. They will have a great deal of knowledge and it will be their main profession; they only do decon. Personnel at the qualified level will be organised in the CBRN Defence Corps of the German Army, in the CBRN Defence Squadron of the German Air Force, in the Task Force Medical CBRN Defence of the German Medical Service. These soldiers will also be specially trained during exercises and missions, a lot of them will also go through multinational certification processes, for example for NRF certification.

**CW: Does this mean they will use existing assets – such as TEP 90 – in a better way, or will new procedures and technology been developed for them as their skills are so far advanced?**

HN: This is what we are undertaking now

in our capability development process. We are not looking for a decon solution, which means this is for everything. With regards to what solutions are best we are not there yet; this new concept was only finalised last year in November in our “Subconcept for CBRN Defence”. Now we are starting the process from the concept to develop new capabilities, but as we are capability-driven we have to describe the capability requirement and then develop the TTPs, the organisation and training. We are in that phase. We have our capability requirements and they are different to the requirements we had before. For example, with “qualified” personnel and “enhanced” personnel, we had something similar with the NBC defence Corp and All-Arms. The difference between both was that they had the same mission but with a different quantity; all arms CBRN defence capabilities had the same procedures but on a smaller scale and if the amount of contaminated material and personnel was too big you called the specialists from the NBC defence Corp. In the future you have to call the specialists in the Chemical Corp, and it does not matter if you have 5, 50 or 5,000 casualties. That is the difference; in the future thorough decon will only be done by qualified personnel.

Our TEP 90 system – a multi-functional decon truck capable of thorough decontamination of personnel, equipment and vehicles – will be the core of our decontamination capabilities. Because it is modular – sensitive equipment, mass decontamination, etc – the commander has a wide variety of options he can choose from to put together the components required to give the right answer to a given operational situation.

**CW: There is not just TEP90 that is entering service; there is also the new lightweight decon capability...**

HN: For our new light CBRN defence companies we are going to develop the Light Decontamination Systems for the thorough decontamination of personnel, sensitive equipment and materiel. One light decontamination system must be air-transportable by the standard German transport helicopter and fit on no more than two small, protected vehicles (like the Mungo). The Light Personnel Decontamination System is currently in a field test phase (you showed a photo in the last issue of CBRNe World). A prototype for the light decontamination

sensitive equipment system will be delivered in 2008, and the materiel and infrastructure modules are in the conception phase.

**CW: If it is going to be heli-lifted, how will you deal with the need for water? So in places like Iraq or Afghanistan, where you might need to take your own water, would you have to rely on traditional assets?**

HN: That is a problem because within our considerations we always assume we have water, and as long as we do not have other means of decon we will have to rely on water. We believe we will have enough water, either via national resources, in theatre or we would have to bring it. Then you have to assess what you need to decon, how much water you need, how you bring it into theatre, and so on. This is a tricky situation and we did not find a sufficient solution up to now. Assessing the missions we have today, we do not think it will be a problem to find enough water for decon, even in Afghanistan.

There also some new techniques, and in the area of new decontaminants we are undertaking a lot of research activities. Our research is now focused on new decontamination solutions which meet the required purpose of the decontamination being required (immediate, operational or thorough) as well as taking into consideration occupational safety standards. We are also researching other decontamination methods such as hot gas and hot steam techniques or vacuum techniques to decontaminate sensitive equipment. Enzymatic decontamination and reactive nano particles are techniques which will be investigated in the future. As you can see, there are a lot of new changes, considerations, developments and research currently being undertaken in the field of decontamination in the Bundeswehr. We have done a lot so far, but there are still a number of challenging tasks ahead of us.

**CW: What are your next development milestones? When are you looking at full and initial operating capability?**

HN: We are changing our organisation and structure. We will have the organisational aspects ready within 1-2 years – we have to agree between the different services and harmonise the training and personnel requirements, and that will last two years. The technical aspect is more difficult; new solutions and techniques mean looking into a crystal ball – if you ask five scientists you get six answers!

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