



**Conflict and
Environment
Observatory**

Submission for the report on “*The rights of workers and toxic chemical exposure*”

Submitted by PAX and The Conflict and Environment Observatory.

Dear Mr. Tuncak,

In follow-up to your call for submissions for your investigation into adverse health impacts among workers caused by or linked to toxic chemical exposures, we would like to take this opportunity to highlight military origin exposures and the detrimental effects of conflicts on the working conditions of both civilian and military personnel.

As civil-society organisations working to promote peacebuilding, the accountability of States for their military conduct, and enhance the protection of civilians, we see the value in addressing concerns over the environmental health risks from conflict and military-origin toxic exposures as part of the wider discussion over the right to a healthy environment, including a healthy work environment. In our submission we provide a number of cases in peacetime and conflict settings where workers have faced exposure to toxic chemicals, and put forward recommendations to improve environmental health monitoring and reduce harm.

Toxic military exposures in peacetime and armed conflicts

Historically, the nature of military activities is intrinsically linked with the use of toxic chemicals, be it for munitions constituents such as explosives like TNT, RDX, PBX, for heavy metals used in bullets and projectiles such as lead, mercury, tungsten and depleted uranium, or for other military-use materials such as rocket propellants, special paints, chemical and nuclear weapons, and other toxic chemicals such as perchlorate and nitroglycerin.

Military workers, already often operating in dangerous environments, have been regularly and unwittingly exposed to hazardous substances.¹ Exposure may come from a number of different sources, ranging from the type of ammunition that is being used in conflicts, to the paint that is applied to military vehicles in peacetime; some examples of which are described below.

Military burn pits

During the wars in Afghanistan and Iraq, open burn pits were used to burn all kinds of waste, resulting in thick black clouds of smoke containing various pollutants. These toxic substances were subsequently inhaled by nearby troops, often over several years, exposures that have affected the health of thousands of soldiers.² More than 140,000³ US service members and veterans have signed up to the Burn Pit Registry in an effort to get medical coverage for related health complaints, which has so far been denied to them. The U.S. department of Veteran Affairs contends that research has not been able to support the claim that exposure to

¹ US Army (2018) Military Hazardous Exposures. Accessed at <https://www.benefits.va.gov/COMPENSATION/claims-postservice-exposures-index.asp>

² Propublica (2018) Congress Aims to Force Pentagon Reform on Open Burning of Munitions. Accessed at: <https://www.propublica.org/article/congress-aims-to-force-pentagon-reform-on-open-burning-of-munitions>

³ U.S. Department of Veteran Affairs (2018) VA's Airborne Hazards and Open Burn Pit Registry. Accessed at: <https://www.publichealth.va.gov/exposures/burnpits/registry.asp>

open burn pits is linked to negative long-term health effects.⁴ Only recently, a court ruled that these burn pits were connected to lung disease amongst veterans.⁵ In addition to military personnel, burn pits have also affected private contractors and may also have harmed communities living in proximity to bases, however assessments of the impact of the practice on local communities are largely unavailable. In Iraq, burn pits were operated by private military and security contractors and an ongoing case for compensation and recognition has pitted veterans against both the US Department of Defense and Kellogg, Brown and Root.⁶

In Afghanistan, the US's government's own reconstruction watchdog issued a scathing report after the Pentagon failed to stop the practice and install incinerators at bases.⁷ The Inspector General's report argued that: "It is indefensible that U.S. military personnel, who are already at risk of serious injury and death when fighting the enemy, were put at further risk from the potentially harmful emissions from the use of open air burn pits."

Open air burning of munitions

While the majority of developed countries have ended the practice of the open air disposal of ageing and surplus munitions and explosives due to domestic environmental standards, it continues in the United States, where there are still 61 sites where munitions are detonated or burned.⁸ At one such site, the ammunition plant in Radford, Virginia, tests have shown that the degree of pollution emitted is much higher than regulators had estimated.⁹ Arsenic, lead, and methyl chloride were found at rates several times higher than previously thought, with dire effects for the immediate community. There is not information available on exposure of military workers, though considering the failure to use appropriate risk modelling of release of pollutants, there is likely a risk to military staff involved in the operations.¹⁰

Other forms of pollution from military bases

While standards have improved in recent years, throughout the last century the massive Cold War military buildup and weak environmental standards created a global legacy of pollution from military installations in dozens of countries. These have affected local communities and military personnel alike. One such case was that of Camp Lejeune in the US, where drinking water contamination with TCE and PCE led to thousands of troops being exposed. A study published in 2009 by the US National Research Council Committee on Contaminated Drinking Water at Camp Lejeune found that there was insufficient evidence to determine a link between potential exposures and ill health,¹¹ and it wasn't until 2017 that Veterans Affairs recognized the link and initiated a system for compensation and health coverage – the first time such an approach had been taken for US troops with toxic exposures from peacetime.¹² Its presumptive disease model is based on that for veterans exposed to dioxin from defoliant use in the wars in South East Asia.¹³ With hundreds of contaminated military facilities affected by a wide range of emerging pollutants – such as PFOS and PFOA – it is inevitable that

⁴ U.S. Department of Veteran Affairs (2018) Burn Pits. Accessed at: <https://www.publichealth.va.gov/exposures/burnpits/index.asp>

⁵ Chiamonte, P (2018) Court Determines Military Burn Pits Caused Lung Disease in Troops. Military.com. 2018. Accessed at: <https://www.military.com/daily-news/2018/02/15/court-determines-military-burn-pits-caused-lung-disease-troops.html>

⁶ New York Times (2018) Veterans Go Back to Court Over Burn Pits. Do They Have a Chance? Accessed at <https://www.nytimes.com/2018/05/17/magazine/burn-pits-veterans.html>

⁷ Military Times (2015) IG thrashes DoD in final burn pit report. Accessed at <https://www.militarytimes.com/2015/02/12/ig-thrashes-dod-in-final-burn-pit-report>

⁸ Propublica (2018) Toxic Fires. Accessed at: <https://projects.propublica.org/graphics/burn-sites>

⁹ Lustgarten, A. (2017) Dangerous Pollutants in Military's Open Burns Greater Than Thought, Tests Indicate. Propublica. 2017. Accessed at: <https://www.propublica.org/article/health-threat-of-militarys-open-burns-greater-than-thought-tests-indicate>

¹⁰ Ibid. See also Huffington Post (2017) How the Pentagon's Handling of Munitions And Their Waste Has Poisoned America. Accessed at https://www.huffingtonpost.com/entry/open-burns-ill-winds_us_5970112de4b0aa14ea770b08?guccounter=1

¹¹ US National Research Council Committee on Contaminated Drinking Water at Camp Lejeune (2009) Contaminated Water Supplies at Camp Lejeune: Assessing Potential Health Effects: Accessed at <https://www.ncbi.nlm.nih.gov/books/NBK215286>

¹² CBS News (2017) Vets exposed to contaminated water may now apply for disability benefits. Accessed at <https://www.cbsnews.com/news/camp-lejeune-contaminated-water-veterans-benefits/>

¹³ US Veterans Affairs, Camp Lejeune: Past Water Contamination. Accessed at <https://www.publichealth.va.gov/exposures/camp-lejeune/>

toxic exposures will be ongoing for US military personnel. However those affected still face apparently deliberate policies of denial and delay when seeking remedy for harms.¹⁴

Depleted Uranium

Depleted uranium is a toxic and radioactive heavy metal used in armor piercing munitions, and is a known carcinogen. There are ongoing concerns from both veterans¹⁵ handling and cleaning-up DU, as well as workers¹⁶ in the US over exposure and the lack of information received from the US military on the associated health risks, and inadequate training on dealing with DU in conflict settings, that might have led to exposure to DU contaminated materials.

Chromium-6

In the Netherlands, military workers were exposed to chromium-6, a known human carcinogen.¹⁷ Chromium-6 was applied to military vehicles as paint to protect them from corrosion. Particles were released both during application and during the polishing of coated surfaces. At least 3000 employees working at military locations with Chromium-6 have sued the Dutch state, as the Ministry of Defence knew about the dangers of using the compound.¹⁸ A four-year investigation by the National Institute for Public Health and the Environment was presented on June 4, 2018 and found the MoD liable as they had knowledge on the health-effects of the toxic material, yet did not inform their personnel, and the MoD announced to pay compensation, yet will not stop the use of the toxic paint.¹⁹ The US Department of Defense has recognized the dangers of using Chromium-6 too and seeks to reduce its use, but considers the compound too important to ban immediately.²⁰

Firing ranges

During small arms fire, fumes are emitted which contains various metals in the form of particulate matter (PM). PM has been associated with respiratory and cardiovascular disease within both long and short-term exposure.²¹ Consequently, small arms fire happening indoors at, for example, shooting ranges, can have dire consequences for those breathing in the fumes where rooms are not properly ventilated. Lead in the form of dust can also gather on the clothing and equipment a shooter is wearing and using.²² A report from the U.S. National Academy of Sciences underscored this health hazard, showing that defence personnel and workers at civilian shooting ranges face significant health risks due to exposure to lead.²³

¹⁴ See examples from US Veterans <https://www.civilianexposure.org/lejeune-claims-denied-yet-you-d-think-this-should-be-easy-for-me/>; and https://www.theepochtimes.com/va-accused-of-denying-benefits-to-servicemen-sickened-by-toxins_1870841.html

Further notes by lawyers who started cases against the US government <https://www.woodslawyers.com/veterans-disability-lawyers/camp-lejeune-water-contamination-claims/>

¹⁵ US Department of Veteran Affairs (2018) Depleted Uranium. Accessed at https://www.publichealth.va.gov/exposures/depleted_uranium/

¹⁶ Guardian (2007) 'Safe uranium' that left a town contaminated. Accessed at <https://www.theguardian.com/world/2007/nov/18/usa.nuclear>

¹⁷ Brady, K. (2015) Dutch military staff awaits compensation in toxic paint case. Deutsche Welle, 12 February, 2015. Accessed at: <http://www.dw.com/en/dutch-military-staff-awaits-compensation-in-toxic-paint-case/a-18250624>

¹⁸ De Vries, J. (2014) Wat is chroom-6 en hoe gevaarlijk is het?. De Volkskrant, 21 August, 2014. Accessed at: <https://www.volkskrant.nl/wetenschap/wat-is-chroom-6-en-hoe-gevaarlijk-is-het--b480c32d/>

²⁰ Tritten, T.J. (2009) U.S. military seeks to reduce reliance on toxic hexavalent chromium. Stripes. 17 September, 2009. Accessed at: <https://www.stripes.com/news/u-s-military-seeks-to-reduce-reliance-on-toxic-hexavalent-chromium-1.94771>

²¹ Orru, H., Pindus, M. et. al. (2019) Metallic Fumes at Indoor Military Shooting Ranges: Lead, Copper, Nickel, and Zinc in Different Fractions of Airborne Particulate Matter. Propellants, Explosives, Pyrotechnics 2018.. Accessed at: <https://onlinelibrary.wiley.com/doi/pdf/10.1002/prep.201700225>

²² Chen, A. (2017) Lead Dust From Firearms Can Pose A Silent Health Risk. 10 May, 2017. Accessed at: <https://www.npr.org/sections/health-shots/2017/05/10/527648768/lead-dust-from-firearms-can-pose-a-silent-health-risk>

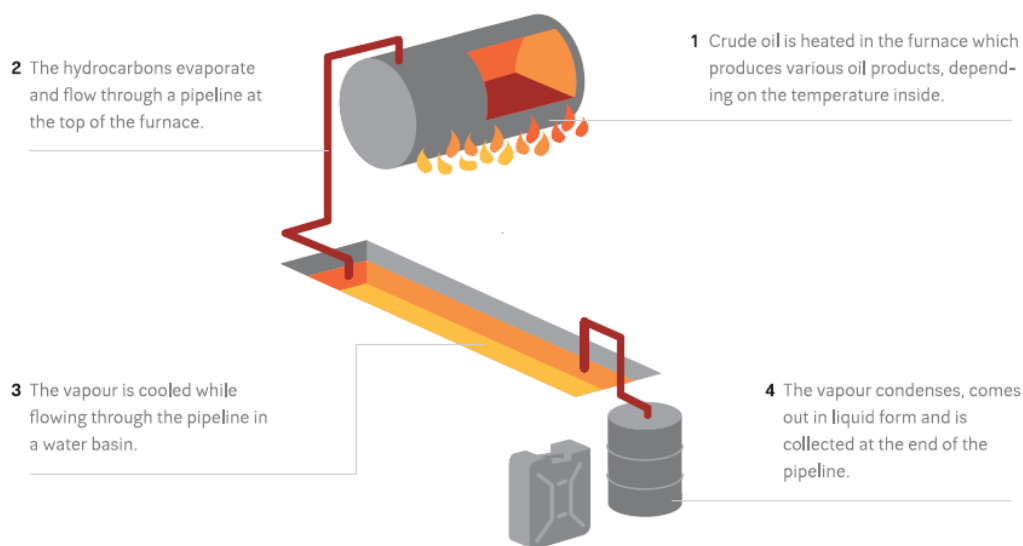
²³ National Research Council (2013) Potential Health Risks to DOD Firing-Range Personnel from Recurrent Lead Exposure. The National Academies Press. 2013. Accessed at: <https://doi.org/10.17226/18249>.

Civilian worker exposure to chemical toxics in conflict settings

The devastating impacts of wars and armed conflicts on civilian health often reach beyond the direct, visible impacts. In recent years, PAX has been exploring numerous conflict settings where we found serious environmental health risks from the collapse of environmental governance, and weakened regulation and protection for workers, both during and after the conflict. Civilians in armed conflicts often have a range of other priorities when it comes to the protection of their lives and those of their families, and the well-being of the communities they work in. Often, awareness of the risks associated with working in conditions that have ill effects on their health is low and, borne from the necessity to provide an income, workers have little choice but to work in conditions where there is a lack of sufficient oversight over toxic hazards. This section will provide a non-exhaustive list of cases we have encountered and where conflict has had a direct link with toxic chemical exposure.

Oil industry hazards

The collapse of state control over the oil industry in both Syria (2012) and Iraq (2014) after the beginning of the armed conflict, which in Syria was worsened by the targeting of professional refineries by the US-led coalition and the Russian Air Force, resulted in the rise of an artisanal oil industry. In 2016, PAX provided an overview²⁴ of makeshift oil refining in Syria, followed by an additional open-source investigative report on these practices in Iraq,²⁵ and further analysis of environmental damage caused by oil pollution in Syria.²⁶ Artisanal oil refining has become a major source of income for civilians in a large part of eastern Syria, while also occurring in other parts of the country. These artisanal refineries are simple structures that heat up crude oil. The vapour flows through a water trench, condenses and comes out as benzene, diesel or kerosene. See the image below



Most of these makeshift refineries are operated by civilians without the training or equipment to deal with working in these hazardous conditions. Therefore, this type of work will most certainly result in many of the workers dealing with acute health risks due to exposure to toxic substances, or chronic health problems, as they are inhaling noxious fumes day in and out. More worrisome is that children are often employed in this type of work – it is estimated that 30% of the workers are children and teenagers. There have been reported cases in northern Syria of protests against these practices by communities due to the health risks they

²⁴ PAX (2016) Scorched Earth and Charred Lives. Human health and environmental risks of civilian-operated makeshift oil refineries in Syria. Accessed at <https://www.paxforpeace.nl/publications/all-publications/scorched-earth-and-charred-lives>

²⁵ Zwijnenburg, W. (2017) No Country for Oil Men. Tracking Islamic State's Oil Assets in Iraq. Accessed at <https://www.bellingcat.com/news/mena/2017/08/11/no-country-oil-men-tracking-islamic-states-oil-assets-iraq/>

²⁶ Zwijnenburg, W. (2018) Nefarious Negligence. Post-conflict Oil Pollution in Eastern Syria. Accessed at <https://www.bellingcat.com/news/mena/2018/04/09/nefarious-negligence-post-conflict-oil-pollution-in-eastern-syria/>

involve.²⁷ However, as noted by many workers interviewed by the media in recent years, they have no other choice to provide income; as one worker noted: “Those who work here say if they don’t die of cancer or lung diseases, they will surely die of hunger”. Whereas a local doctor stated that: “What I learned in medical school is no longer enough to understand all the pathologies caused by oil and its exploitation in the region”.²⁸

Though not explored yet in detail due to security restrictions, it is likely that similar scenarios have also unfolded at professional refineries that have been retaken by the Syrian government or the Syrian Democratic Forces in the oil-rich Deir ez Zor Province. The ongoing economic dependency on oil exports will boost oil activities, yet considering the absence of trained personnel at these locations, less-skilled workers, and weak regulation and oversight will likely be commonplace at these locations, as well as at other factories and sites that process, store and transport toxic chemicals.

In the absence of government regulation, training, protective equipment and expertise, workers will continue to face exposure to toxics in their work place. Though there is a growing awareness on this within the humanitarian community, environmental health risks are rarely prioritised, or not fully understood due to a lack of visibility or sufficient documentation of these situations.

Other conflicts or conflict-prone areas with weak or absent governmental regulations, and where workers face increase exposure to toxics include bunkering and artisanal oil refining in the Niger Delta,²⁹ and mercury exposures linked to artisanal gold-mining in Colombia.³⁰

Civilian workers on military bases and clean-up of military waste

There have been past and ongoing concerns over civilians employed in the clean-up of military toxic waste without being provided sufficient information on the hazards, the necessary training on handling waste or sufficient information on the nature of toxic materials left in civilian areas. In Iraq, US and British armed forces fired over 400,000kg of depleted uranium munitions in 1991 and 2003, without providing full transparency over the locations, nor what work has been undertaken to clean-up this toxic and radioactive heavy metal. Workers on scrap metal sites and those cleaning up civilian areas were DU has been used had to process contaminated materials but lacked information, expertise and training to handle these materials and dispose of them in a safe way according to international regulations.³¹ Similarly in Bosnia and Herzegovina, workers at a tank repair facility targeted with depleted uranium by US aircraft operating under NATO auspices cleared hundreds of depleted uranium remnants without being aware of what they were- exposing themselves in the process.³²

This demonstrates the risks posed to workers by the military’s lack of transparency over the use of depleted uranium munitions which produce sites requiring rapid clean-up and remediation by trained personnel. Unlike anti-personnel mines, cluster munitions and explosive remnants of war there are no international obligations for the post-conflict remediation of depleted uranium or toxic remnants of war. Legal principles that would begin to address this have been proposed by the International Law Commission.³³

²⁷ See footage disseminated on Twitter of protest against artisanal oil refining by civilians, including many children, at the Syrian town of Yarubiya in east Hasakah province, November 2017. https://twitter.com/ver_scholl_en/status/932452160234835968. In case of removal, PAX obtained a copy of the video, available at request.

²⁸ PAX (2016). Ibid.

²⁹ UNEP (2017) Ogoniland Oil Assessment Reveals Extent of Environmental Contamination and Threats to Human Health. Accessed

<https://www.unenvironment.org/news-and-stories/story/unep-ogoniland-oil-assessment-reveals-extent-environmental-contamination-and>

³⁰ Gibb, H.; O’leary, K.G. (2014) Mercury exposure and health impacts among individuals in the artisanal and smallscale gold mining community: A comprehensive review. *Environ. Health Perspect.* 2014, 122, 667–672.

³¹ PAX (2014) No solution in sight for clean-up for Iraq’s radioactive military scrap. Accessed at <https://www.paxforpeace.nl/stay-informed/news/no-solution-in-sight-for-iraqs-radioactive-military-scrap>

³² ICBUW (2010) A Question of Responsibility: the legacy of depleted uranium in the Balkans: <http://www.bandedpleteduranium.org/en/docs/134.pdf>

³³ Weir, D (2016) Do the ILC’s draft principles on remnants and data sharing reflect state practice? <https://ceobs.org/do-the-ilcs-draft-principles-on-remnants-and-data-sharing-reflect-state-practice/>

If armed forces are unwilling to take responsibility for the consequences of the use of these munitions, by providing relevant authorities and organizations with the target coordinates and sufficient capacity for clean-up, they should refrain from using them, or face liability for the potential health effects caused by exposure.

Other involved of civilians at military bases.

At US military bases in the Philippines, local workers hired for clean-up of materials face ongoing health concerns and potential causes of death over exposure caused by handling toxic materials and dumping of chemical originating from the US military base.³⁴

Rubble clearance

Other areas of concerns are workers involved in clearing rubble and debris in towns and cities affected by the use of explosive weapons. In conflict settings, the destruction of houses, small and medium industrial facilities located in urban areas, hospitals, and other sites hosting or processing toxic chemicals can result in exposure of workers involved in clean-up. In the Iraqi city of Mosul alone, it estimated that 11 billion tonnes of rubble needs to be cleared,³⁵ in a city where there are numerous sites hosting toxic chemicals and other hazardous substances, as noted by UN Habitat.³⁶ Similar issues are also present in the Syrian cities of Aleppo, Damascus, Raqqa, and Homs, and numerous smaller towns.³⁷ The same problem has also been seen in the Gaza Strip after damage caused by Israeli bombing.³⁸ Critical infrastructure such as electricity networks poses particular risks. Energy facilities may contain polychlorinated biphenyl (PCBs); water filtrations stations often contain chlorine gas, while hospitals may contain nuclear materials. Asbestos is a perennial issue where residential areas are damaged.

Without being naïve about the health and security priorities in such circumstances, it is recommended that when the security situation allows, relevant responsible authorities and organizations involved in post-conflict assessment and reconstruction efforts should address the potential hazards for workers involved in the clean-up of rubble and (military) waste, and include environmental standards in the training of staff and work planning around remediation and the disposal of wastes.

Conclusion and recommendations

Military origin toxics, and the exposures associated with conflicts are a global issue where the bulk of the research and policy measures to address risks and remedy harms have focused almost entirely on military personnel. Civilian exposures remain understudied, and under addressed, in particular the role and responsibilities of armed forces towards civilian contractors involved in clean-up and remediation of toxic waste resulting from military activities. Even for military personnel, governments have contested claims and delayed remedies, often until many of those affected have died. The challenge of documenting historical exposures, uncertainty over health outcomes, particularly from mixed exposures, contested science, and a lack of transparency continue to pose barriers to veterans seeking healthcare or compensation.

Armed conflicts result in the collapse of environmental governance and weakening of regulations that aim to protect workers from exposure. Regulations such as the Stockholm, Rotterdam and Basel Conventions are all relevant for state responsibility for the management and control of chemical and hazardous waste. But as noted by the Toxic Remnants of War Project: *"It is clear from the experiences of many conflict-affected states that insecurity and conflict present a huge challenge to their successful implementation. Beyond the immediate pollution threats caused by how and where conflicts are fought, the legacy of the resulting collapse of environmental governance impedes the delivery of the conventions' core objectives."*³⁹ This often has direct implications for workers and their potential exposure to toxics.

³⁴ Stars and Stripes (2010) Decades later, U.S. military pollution in Philippines linked to deaths. Accessed at <https://www.stripes.com/news/decades-later-u-s-military-pollution-in-philippines-linked-to-deaths-1.98570>.

³⁵ UN Environment (2017) Technical Note Environmental Issues in Areas Retaken from ISIL: Mosul, Iraq. Accessed at https://postconflict.unep.ch/publications/Iraq/Iraq%20Technical%20Note_September2017.pdf

³⁶ UN Habitat (2017) Environmental Hazard Assessment Mosul. Accessed at http://unhabitatiraq.net/mosulportal/wp-content/uploads/2017/06/170515_Environmental-Hazards.pdf

³⁷ VOA news (2016) After the Syrian war, a huge costly clean up. Accessed at <https://www.voanews.com/a/after-the-syrian-war-a-huge-costly-cleanup/3286024.html>

³⁸ IRIN News (2009) Rubble removal uncovers potential health hazards. Accessed at <http://www.irinnews.org/news/2009/08/11/rubble-removal-uncovers-potential-health-hazards>

³⁹ Weir, D. (2017) How armed conflicts impact the Basel, Rotterdam and Stockholm conventions. Accessed at <http://www.toxicremnantsofwar.info/how-armed-conflicts-impact-the-basel-rotterdam-and-stockholm-conventions/>

Nevertheless, the growing number of cases where military personnel have been exposed to toxics, be it in South East Asia, the 1991 Gulf War, or the recent conflicts in Iraq and Afghanistan, have led to changes in practice, most notably in environmental health surveillance for personnel. Lessons learned from these approaches could be applied to the protection of civilians and civilian workers dealing with conflict pollution.⁴⁰ For example, many armed forces now have guidelines for dealing with depleted uranium munitions in peace and conflict settings. Yet this information is not currently disseminated among affected communities.⁴¹

In an era where warfare is increasingly shifting to urban areas, and to rapidly industrializing states, toxic exposure risks to workers and civilians seem likely to grow more common. There is therefore an urgent need to identify situations where such risks are likely to occur, and work toward minimizing and preventing such situations. This is also in line with the 2016 UN Environmental Assembly resolutions 2/15 on the *Protection of the Environment in Areas affected by Armed Conflict*,⁴² and 2017's 3/1 on *Pollution mitigation and control in areas affected by armed conflict or terrorism*.⁴³

We would also like to reiterate the issues and recommendations identified by UN Special Rapporteur Okechukwu Ibeanu in his 2007 report A/HRC/5/5 on the *Adverse effects of the illicit movement and dumping of toxic and dangerous products and wastes on the enjoyment of human rights*,⁴⁴ in which he outlines specific conflict-related toxic waste concerns and their relation to human rights.



⁴⁰ Weir, D. (2015) Military health surveillance – lessons for post-conflict civilian health monitoring Accessed at <http://www.toxicremnantsofwar.info/military-health-surveillance-lessons-for-post-conflict-civilian-health-monitoring/>

⁴¹ PAX (2012) Hazard Aware. The need need for civilian protection norms on depleted uranium. Accessed at <https://blogs.paxvoorvrede.nl/2012/10/02/hazard-aware-the-need-for-civilian-protection-norms-on-depleted-uranium/>

⁴² See full document at <http://wedocs.unep.org/handle/20.500.11822/11189>

⁴³ See full document at <https://papersmart.unon.org/resolution/uploads/k1800167.english.pdf>

⁴⁴ See full document at <http://dag.un.org/handle/11176/264686>

Based on the information provided above, we have the following recommendations:

For governments:

- Accelerate the identification of emerging contaminants and their replacement with less hazardous materials.
- Accelerate research on the health and environmental risks from military use substances, many of which are understudied.
- Strengthen systems of environmental health surveillance for military personnel and reduce the barriers to effective remedies for military personnel and civilian contractors exposed to toxics in the course of their work.
- Improve environmental practices domestically and on deployment to minimize exposures to personnel and civilian contractors for example by implementing a ban on open air burning in favour of controlled incineration.
- Minimise the use of hazardous materials and improve waste management policies, for example by ensuring that hazardous materials are exported from areas of deployment for safe domestic disposal.
- Improve training and awareness among military personnel and civilian contractors on the risks associated with exposure to the toxic chemicals.
- Share outcomes and assessment on risks with partner armed forces and where security considerations allow, make these risk assessment and research findings public, which can to increase transparency around military toxic chemicals and exposure risks.
- Provide information on toxic chemicals released into the environment during armed conflict in order to facilitate rapid response to clean-up and remediate contaminated areas that could also help to inform relevant local authorities in their awareness raising among workers active at these sites.
- Support the development of obligations for the post-conflict management of toxic remnants of war and develop models for victim assistance informed by the presumptive disease models applied to military personnel.

For relevant international organizations working in conflict-areas

- Identify potential sources of toxic chemicals and pathways of exposure in their country assessment programs and ensure this data is part of the humanitarian information cycle where relevant projects are undertaken with local workers on the clean-up and remediation of military materials, rubble, debris, and other types of waste.
- Develop and share best practice that can be discussed with other organizations and relevant authorities and which will build a clearer picture of the risks for workers in settings where they might be exposed to conflict pollution originating from military sources and/or activities.
- Promote their findings and recommendations in relevant international forums to highlight the risks to workers from exposure to toxics during and after conflicts, in order to facilitate raise awareness and strengthen the rights of workers.