

Statement on the need for assessment of environmental damage resulting from the recent armed conflict in Lebanon and Israel and mitigation of impact on humans, wildlife and natural resources

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In any armed conflict, the environment is an inevitable casualty. Long after the bombing and gunfire have ceased, humans and wildlife will bear the consequences of damage to both the natural and built environment, damage which, in some instances, may be practically irreversible.

Whether deliberately targeted or damaged unintentionally by munitions, industrial facilities and utilities such as power stations, fuel storage depots, water treatment plants and industrial/ waste storage or disposal facilities can, in particular, act as substantial (though by no means the only) point sources of hazardous chemical pollution. Oil and chemicals in storage tanks, drums or other containers can leak out, contaminating water, air and soil and resulting in pollution of the environment and vital natural resources which can persist for months or even years. In cases in which pollutants enter groundwater, contamination may last for decades.

In the case of the recent conflict, the oil spill arising from the thermal power plant and fuel storage depot at Jiyeh, south of Beirut, is among the most visual impact, and represents both a short and long-term threat to the coastal marine environment of Lebanon and southern Syria. This spill has, understandably, also attracted the greatest national and international focus to date regarding efforts to clean up and mitigate the impacts. However, fuel oil is highly unlikely to be the only chemical agent released from facilities damaged during the conflict. Determining the nature and extent of all other significant chemical releases and making safe any remaining storage facilities, which have been damaged, must be priorities for a co-ordinated post-conflict assessment, such as those previously conducted in the Balkans, Afghanistan and the Occupied Palestinian Territories, as soon as such an assessment can take place safely.

Under circumstances in which munitions are used in urban or industrial areas, fire is almost inevitable. Fires involving fuel and chemical storage facilities can be particularly dangerous, both for the fire crews attending and for the surrounding population exposed to smoke and fumes. No matter how well stored or controlled under normal operating conditions, as a result of explosions and/or outbreak of fire, bulk chemicals can engage in uncontrolled and highly unpredictable reactions. Depending on the mix of chemicals and other materials involved, a range of toxic and corrosive fumes and gases may be evolved, as well as dense clouds of harmful, particulate-laden smoke and ash.

The immediate hazard presented by toxic gases downwind of a chemical fire, such as carbon monoxide, hydrogen cyanide, hydrogen chloride, oxides of sulphur and nitrogen and fumes of

unburned chemical products, may be severe but fairly short-lived as the gases disperse to relatively low concentrations over time. Other contaminants, especially those associated with the particles of soot and ash and which can include chemicals formed from incomplete combustion of other materials, can be far more persistent, leading to long-term environmental contamination and exposure of humans and wildlife long after the fire has been extinguished. For example, uncontrolled open burning of chemicals and other materials, especially in fires involving chlorinated chemicals (e.g. some solvents, pesticides, other industrial chemicals) or plastics (e.g. PVC), represent ideal conditions for the formation of chlorinated dioxins and furans, toxic and potentially carcinogenic chemicals which are highly persistent, can accumulate in body tissues and can even be passed from generation to generation. A range of carcinogenic PAHs (polycyclic aromatic hydrocarbons) are also common contaminants in the soot and ash from such fires. Furthermore, the particulates in the smoke themselves, especially those in the smallest particle size ranges (less than one ten thousandth of a millimetre), are also hazardous if they are breathed in, especially for individuals already suffering from respiratory problems.

Although attention has been drawn to the substantial damage at the Jiyeh facility, unconfirmed information from the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and UNEP (Environmental Update No. 2, dated 4th August 2006) suggests that damage has also been done to the Zahrani power plant and refinery and fuel storage depots in other areas, as well as to a number of other utilities and industrial facilities in different parts of Lebanon. These include a plastics facility in Tyr (using, among other chemicals, the carcinogenic chlorinated monomer vinyl chloride), sections of the electricity supply grid which could conceivably still contain the persistent organic pollutants PCBs (polychlorinated biphenyls) as transformer fluids, drinking water and sewage treatment facilities which may have released highly toxic, corrosive and reactive chlorine gas and a food processing plant in Baalbeck which may have resulted in a leak of choking ammonia and damage to nearby water courses. There is currently no information regarding potential damage to other facilities, hazardous waste storage and disposal sites, etc., though it must be remembered that the current OCHA/UNEP Update is merely a preliminary assessment based primarily on media reports and online sources, and has yet to be confirmed by ground-truthing.

Even in the apparent absence of stores of hazardous chemicals, uncontrolled fires in buildings and urban areas can generate and release large quantities of toxic gases and particulates as building materials and furnishings burn.

As noted above, the precise mix of chemicals released unburned or partially burnt from a damaged industrial facility, utility or building depends greatly on the chemicals and materials present, the conditions of the fire and the presence or absence of pollution-control measures (such as bunding and spill collection systems) on the site. It can be almost impossible to predict at the time what types and quantities of hazardous chemicals may be released to air, water and soil, especially if only limited information is available regarding the types and quantities of materials involved. It is generally the case, therefore, that determination of the scale and extent of longer term contamination of the surrounding environment depends on detailed sampling and analysis of water, soil, ash and dust residues once the fire is extinguished. Given that the heat of a fire can carry particulate and other pollutants high into the atmosphere, a proportion can be

carried and deposited back to earth some distance from the fire itself. Thereafter, contaminated ashes and dusts can be carried over still wider areas by the wind and by rainfall.

For each chemical spill and major fire arising from the conflict, especially those relating to known chemical plant, utilities or storage facilities, there is an urgent need for case-by-case assessment of the resulting contamination and, wherever possible, immediate measures to remove and/or safely contain hazardous chemicals and contaminated materials to which people, wildlife and natural resources (especially surface and groundwaters) could otherwise be exposed. Characterisation and proper containment of chemical residues, including those residing in damaged containers, must be a priority in order to prevent further environmental releases or uncontrolled reactions. Industrial and/or urban sites which have been heavily contaminated, either by chemical spills or as a result of fires, must be sealed off to prevent access by children, animals and others and every effort made to clean-up and remediate the sites. Measures must also be taken to prevent public access to contaminated containers and other materials which may otherwise be recovered for other uses, leading to further chemical exposure.

A detailed assessment of the extent of damage to the environment in the region, and the resulting threats to wildlife, human health and natural resources, must be an urgent priority for the international relief effort, not least because, if left unchecked, such damage could be compounded over time. As well as the direct effects of chemical spills and fires outlined above, further environmental damage may be expected in the coming weeks and months as a result of the large scale displacement of people and the damage to, and breakdown of, essential infrastructures, especially those for providing fuel, water, transport, sewage and waste management services to the public and industrial enterprises. The significance of these impacts, as well as those which may arise from hazardous materials contained within munitions themselves, will necessarily form part of the co-ordinated post-conflict assessment which is so urgently required.
