CASE 2.
Oil fires:

Apocalyptic scenes in Qayyarah (Iraq, 2016)

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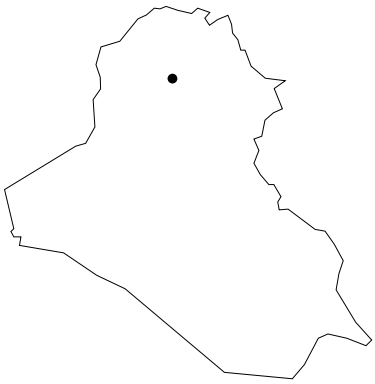
COUNTRY

Iraq



PERPETRATOR

ISIS

ACT

set oil wells and rigs on fire, and polluted water sources with oil

OBJECTIVES*

- to terrorise civilians
- to get cover from airstrikes
- to delay the advance of Iraqi troops
- to destroy valuable land, resources and infrastructure

* As far as we have been able to discern; the list may not be exhaustive in this regard

CONSEQUENCES

Internal displacement of Iraqis

↳ leading to a number of displacement-associated risks (e.g. reduced access to education, income and health care)

Short-term health problems (e.g. shortness of breath, suffocation, rashes)

Anticipated long-term health problems (e.g. cancer, pulmonary fibrosis, birth defects)

Extensive environmental damage

↳ hindering agriculture and the keeping of livestock

↳ causing loss of or reduced income

In the summer of 2016, Iraqi troops launched an offensive to retake Mosul, Iraq's second largest city and the biggest city under Islamic State of Iraq and Syria (ISIS) occupation. The first major military objective was Qayyarah, a town on the banks of the Tigris river, approximately 60 kilometres south of Mosul. By July, as Iraqi forces began their operation to retake Qayyarah, ISIS started to apply a scorched earth tactic, setting oil wells and rigs on fire in order to provide cover from aerial bombardment, delay Iraqi forces or simply to degrade valuable resources, land, and infrastructure, as well as terrorise communities (UN Institute for Training and Research [UNITAR], 2017a).

2.1 Case: 'Even the sheep had turned black'[1]

In late August, when Iraqi troops seized Qayyarah, ISIS set alight twenty wells and opened up oil pipes in the town, flooding the streets with crude oil (Al-Abadi, 2016; Rudaw, 2016). Some neighbourhoods were highly contaminated with oil sumps and at some wells, large lakes of solidified crude oil formed. The oil spilling into the Tigris river, the town's main source of drinking water, polluted the irrigation channels of nearby farms (Malsin, 2016; Iraq Oil Report, 2016a).

The total amount of burned and spilled oil cannot be ascertained but it is estimated by experts from the oil ministry to be 20,000 cubic metres. Several storage tanks were flooded, creating pools of liquid oil, which likely seeped into the ground (UN Environment Programme [UNEP], 2017a). Satellite imaging by the UN of the fires between July and October 2016 revealed that an area of around 256 square kilometres was covered by the smoke plumes for more than 21 days, depositing soot over Qayyarah, as well as a large area surrounding the town (Weir, 2016; UNITAR, 2017b).

Mines and improvised explosive devices left behind by ISIS complicated efforts by Iraqi firefighters to extinguish the burning wells. It took until March 2017 before the last well was extinguished, leaving a blackened and contaminated landscape (UNEP, 2017a; Zwijnenburg & Postma, 2017).

Sources on the ground painted apocalyptic scenes. Erik Solheim, Executive Director of the United Nations Environment Programme (UNEP) describes how the smoke that billowed from the burning oil fields was so thick it blocked out the sun:

> *By the time I reached Qayyarah, […] a film of black soot had settled over the Iraqi town like toxic snow. Even the sheep had turned black. Pools of thick oil ran in the streets. In the sky above the town, the black smog mixed with white fumes from a nearby sulphur plant that the jihadists had also set on fire as they retreated. (Solheim, 2017)*

Beneath the cloud the temperature was noticeably lower, and locals wore jackets despite it being unseasonably warm in the rest of northern Iraq (War Is Boring, 2016), leading locals to refer to it as the 'Daesh Winter' (Zwijnenburg & Postma, 2017, p. 8).

Closer to the flames, the heat built and the ground became uniformly black—covered by a coating of weeks-old residue which crunched underfoot. In some places, the oil erupted from the ground under extreme pressure and at one point, a thin, tall flaming tornado formed within the fire with a roaring hiss (War Is Boring, 2016). The closest proxy for the situation in Qayyarah is the 1991 Kuwait oil fires. Those fires released various hazardous chemicals (War Is Boring, 2016; US Department of Veterans, 2018).[2] But unlike in

Kuwait, the Qayyarah fires were located close to a population centre.

A rapid assessment published by the Joint UNEP/ Office for the Coordination of Humanitarian Affairs (OCHA) Environment Unit urged the Iraqi Ministry of Health and Environment and relevant ministries in neighbouring countries, to begin collecting data from its existing network of air monitoring stations (Joint UNEP/ OCHA Environment Unit, 2016). But while the town saw no shortage of journalists visiting it, environmental experts have been less visible.

2.2 Victims: Living under a black cloud

In Qayyarah, thousands of local people and more than 35,000 internally displaced persons (IDPs) in the nearby camps (REACH, 2017) lived under the dark cloud that blocked out the sunlight for months. Some families left because of it, but many of Qayyarah's inhabitants elected to stay in their homes rather than move to displacement camps. Many reasoned it was best to wait it out and restore the town as soon as the fires were put out. The Iraqi government forces had just retaken the town from ISIS, which meant that for the first time in two years, many people felt relatively safe again, despite their frustration with the slow pace of efforts to put out the fires.

And people adjust to almost everything. Journalists visiting the town describe how children – smeared with soot and oil – were playing happily near the burning wells, while others seemed as happy as any kid in school (War Is Boring, 2016).

Life was difficult though, with smoke and soot covering and creeping into everything from soil, waterways, to food, clothes, houses. Many people experienced suffocation or shortness of breath, sometimes requiring medical assistance. Teachers of a local school for girls described how they have tried to return to teaching against all odds. Many of the children have breathing problems and have been sent to hospital. 'One of the fires is just round the corner from here,' explained one teacher. 'The water is hardly on in the neighbourhood. We have had some at the school, but it has oil in it,' said another. 'What of our children, they are losing their future,' the teacher said, shaking her head as she started to cry (War Is Boring, 2016). Many people also experienced irritation of the eyes, nose, and throat, as well as coughing, rashes, and allergies.

Damages to the power grid and to the water supply worsened the problems of residents, as it made it virtually impossible to wash off the soot and smear. 'The only thing that can get the dirt off is petrol or solvents,' explained resident Abdul, neither of which are good for anyone's health (War Is Boring, 2016).

In a survey by the UN Development Programme and the Al Taheer Association for Development, residents expressed concern over pollution in the soil, water, and air in Qayyarah caused by the oil well fires, the Mishraq sulphur fire, and military remnants. Some mentioned that local health officials had told them that the pollution might have short-term consequences such as allergies and shortness of breath, as well as long-term consequences such as lung cancer and pulmonary fibrosis. Others expressed concern that,

> *locals have been suffering from burns, deformations and countless disability cases. Human genes are also affected due to the use of chemical weapons and the burning of oil wells and military remnants. The gene mutations will result in having more birth defects. (Zwijnenburg & Postma, 2017, p. 23)*

Residents expressed gratitude to the local hospital, where doctors were receiving

countless patients in a building damaged by the recent violence, while being understaffed and undersupplied.

One of the contributing factors for residents was the worry of not knowing more about the health risks involved. Studies of previous oil fires, such as the 1991 Kuwait oil fires, show that a lot of factors can influence the behaviour and the potency of toxic pollutants. A number of factors seemed to work against the civilians in Qayyarah: the type of oil produced by the Qayyarah oil field; the prevailing winds and atmospheric effects; and the close proximity of the residential areas to the oil fires and spillages.

The Qayyarah oil field produces so-called 'heavy sour crude' – oil rich in sulphur, usually in the form of hydrogen sulphide and, typically, metals such as nickel and vanadium. It is denser and more sulphur-rich than the majority of fields across the region (Weir, 2016).

How the smoke plumes behave is crucial for determining the risks to human health and the environment. In analogous cases, such as the Kuwaiti oil fires in the 1991 Gulf War, atmospheric conditions regularly allowed the plumes to rise to high altitudes – often travelling at a height of between two and six kilometres (Weir, 2016). However, in Qayyarah, residents describe how the black clouds would stay close to the surface, with one resident describing how nights were the worst time, when there would be no escape from the smoke. As the temperature drops in the evening, the smoke comes down to ground level, reducing visibility and lowering the temperature in the town and its homes (War Is Boring, 2016).

The hazardous substances produced by oil fires include volatile organic compounds[3] and gaseous pollutants[4], both of which produce particulate matter at sizes of concern to human health. Particulate matter can act as a vehicle for toxic materials to enter the lungs and the inhalation of high concentrations of particles over long periods can reduce the lungs' ability to clear themselves (Weir, 2016).

In addition to the oil fires, health and environmental concerns were aggravated by local oil spills, and the deliberate attempts by ISIS to contaminate water wells and the Tigris river. In October, ISIS also set a sulphur factory alight, leading to 1,000 people to require medical treatment, adding to the fears of residents in Qayyarah (Dearden, 2016). Qayyarah residents claim that their health problems had strong socio-economic dimensions. 'The most affected ones are the low-income families and chronic disease patients. Due to the pollution, locals are facing more economic burdens. Suffocations, respiratory problems, rash and allergy cases increased, making it difficult to afford the treatments costs' (Zwijnenburg & Postma, 2017, p. 23). There is also a lack of places to receive treatment in the area, which forces many locals to seek medical help in other cities. The pollution was said to impact the lives of humans, animals, plants and property, thereby affecting the well-being of people living in the affected areas.

Beyond health effects, months of deposition of toxic substances and the contamination of ground and surface directly affected livestock breeders and farmers, who lost access to their sources of income.

While the burning oil wells were a visual magnet for the media, vividly showing the toxic horrors of war, interest in the long-term health consequences of exposure to conflict pollution soon faded after the fires were extinguished. Reporting from numerous media sources and international organisations highlighted concerns expressed by the area's inhabitants over the health effects of the oil fires, yet there were no discernible risk education programmes or awareness-raising

initiatives targeted at the affected communities (Zwijnenburg & Postma, 2017).

Civilians became frustrated by the slow pace of efforts to stop the fires and by the lack of capacity to assess, monitor, and remediate pollution and wider environmental problems (Weir, 2016; Zwijnenburg & Postma, 2017; War Is Boring, 2016). Responsible remediation of the town of Qayyarah will place a huge technical and financial burden on Iraqi society. Civilians interviewed by PAX in Qayyarah suggested there should be a joint effort by the government, in cooperation with scientists, environmental organisations, and individuals, to tackle the pollution. More importantly, appropriate medical treatment and health services should be provided by the Iraqi government to those affected, with the support of specialised international organisations. And if local treatment is not possible, patients should have the opportunity to receive treatment abroad. They suggested that a health monitoring system, or health committees, be established in order to swiftly identify people who have been affected by the pollution.

The pollution caused by the oil fires, and the hazardous debris from damaged industrial sites, were viewed as a priority. One suggestion provided was to surround the polluted areas with plants, to form a protective belt of trees to prevent the spread of pollutants. Other participants suggested the development of laws to limit the use of weapons that release pollution and radiation. Lastly, they also called for risk education campaigns to be undertaken in the Qayyarah area to educate local communities on the pollution hazards (Zwijnenburg & Postma, 2017).

2.3 Perpetrators: Scorched earth tactics

Before the conflict began in 2014, the Qayyarah oil field had a production capacity of 30,000 barrels per day and there were plans to increase its daily output to 120,000 (Reuters, 2009). After ISIS captured the field in 2014, they decided to exploit it for revenue, smuggling crude oil across the Turkish border (Rasheed, 2014).

As Iraqi forces regained territory from ISIS, the group employed scorched earth tactics by setting alight oil wells and rigs on fire. In the case of the Qayyarah oil field, they did so without any warning to civilians in Qayyarah town, according to local residents (War Is Boring, 2016). In May 2016, the United Nations Operational Satellite Applications Programme detected fires at several wells around Qayyarah, which continued to burn intermittently until June. Then, in July 2016, as Iraqi forces began their operation to retake Qayyarah, the fires greatly increased in number and duration and by the end of August of that same year, nineteen of twenty oil wells were on fire.

ISIS also pumped heavy crude oil directly into the Tigris. Local witnesses said that oil was clearly visible polluting the irrigation channels of nearby farms (Iraq Oil Report, 2016a). The population of Qayyarah relies on the Tigris for its drinking water. Oil also flowed through the streets of Qayyarah after ISIS opened pipelines, and some neighbourhoods remain highly contaminated with oil sumps (UNEP, 2017a). At other wells, large lakes of solidified crude oil formed, which now require clean-up.

The environmental disaster served multiple purposes for ISIS. On a tactical level, it helped ISIS to provide cover from military surveillance and airstrikes by the Iraqi forces and to slow down their military advance. On top of that, by disrupting the oil production capabilities in Qayyarah and by damaging valuable land and infrastructure, ISIS denied the Iraqi government the use of the oil fields for supplying the advancing troops and revenues needed to rebuild Iraq.

Beyond these military objectives, ISIS also seemed to have the specific intent to terrorise civilians in Qayyarah. ISIS not only set fire to the wells, it also deliberately polluted the town with crude oil flows and it went out of its way to contaminate water sources. ISIS poisoned water wells in their retreat by dumping diesel into them, rendering it toxic for humans, plants and livestock (Zwijnenburg & Postma, 2017). They also deliberately polluted the Tigris by dumping crude oil and decomposing bodies in the river, on one occasion at least 100 of them (Schwartzstein, 2017).

2.4 Significance: The harmful effects of targeting oil

Oil facilities have been targeted during conflicts since the start of mechanised warfare. It is a practice that can have serious consequences for the environment and human health. In Iraq, the main pipeline for oil exports to Turkey was bombed, on average, once a week in 2013 alone (Van Heuvelen, 2017). In 2014, a pipeline near the Tigris was bombed, which resulted in a 70-kilometre long oil slick (Al-Atbi & Lando, 2014). In order to reduce the pollutants in the water, the oil was set on fire, generating black clouds and a persistent haze. Residents downstream on the Tigris were told not to use their tap water for three days, and cities like Baghdad closed off their water supply from the Tigris until the slick had passed (Zwijnenburg & Postma, 2017).

Throughout the conflict, pipelines have also been targeted for revenue purposes. ISIS's early oil trade largely depended on tapping pipelines (Iraq Oil Report, 2016b). In August and September 2017, several smuggling operations were uncovered, one of which was capable of tapping thousands of barrels of oil per day (Al-Aqily et al., 2017). These illicit operations involved plastic hoses several kilometres in length, underground storage tanks, and pumps originally used for agricultural purposes (Zwijnenburg & Postma, 2017).

With professional refineries taken out of production during the fighting, oil products were still in demand. In Syria and Iraq, this led to an enormous growth of artisanal oil refineries. Research by PAX identified at least 20,000 of these makeshift oil installations in 2016, in 30 clusters in north-east Syria. In 2017, this had grown to more than 50,000 artisanal refineries in 60 clusters. In Iraq, between 2015 and 2017, PAX identified at least 20 clusters, hosting more than 1,600 refineries. The largest was located south of Mosul, where more than 600 artisanal installations were found, together with some smaller clusters west of this location. Four other major sites, some with more than 100 installations, were located north-east of Tal Afar. In Hawijah, numerous smaller clusters were found in the hills and along the roadside east of the Tigris, with a larger site at a former Iraqi army base close to Hawijah town (Zwijnenburg, 2017). Producing fuels using artisanal refineries requires working in extremely unhealthy conditions. In Syria, various anecdotal reports from Hasakah and Deir ez-Zor Province note the serious health problems the workers, many of whom are children, face at these refineries. These range from acute risks from exposure to toxic waste, to concerns over health problems such as cancers and respiratory illnesses from chronic exposure to hazardous chemicals and inhaling crude oil fumes.

The at times *ad hoc* responses to environmental disasters like these during conflicts are a world away from what is expected during peacetime. For now, attention is focused on the immediate humanitarian needs of residents, and of those displaced by the fighting, but for Qayyarah and the wider region, the humanitarian and environmental risks have become inseparable (Weir, 2016).

In light of the seriousness of the humanitarian situation facing the region's residents, addressing their immediate needs for shelter, health care and sustenance are a priority. Nevertheless, the potential for acute and long-term consequences for human health and the environment from the fires makes work to document their impact vital, and the UN has called for Iraq and its neighbours to also deploy mobile air sampling equipment. However, it is not clear whether this has been heeded by the Iraqi government (Zwijnenburg & Postma, 2017).

By comparison, similar events in European countries trigger a much swifter response, with the "Buncefield Fire" in the UK a noteworthy example. When a total of twenty oil storage tanks went up in flames in December 2005, it took fast-responding firefighters three days to fully extinguish the blaze. The UK's Health Protection Agency moved swiftly to implement an environmental sampling campaign, collecting and analysing 72 samples from 33 locations by the end of the week (Troop, 2006). The agency tested for various toxins, heavy metals, and for toxic fire-fighting foams. They also prepared and circulated a health questionnaire to 5,000 nearby residents to build up a picture of any acute health problems associated with the fire. The questionnaire also served to identify the sources of information that people depended on for health advice – vital data for structuring risk communication programmes (Weir, 2016).

In the wake of the Kuwaiti fires, the US military were forced by law to establish a registry of exposed troops. This required the development of new methodologies that used satellite imaging and environmental sampling to build up a picture of individual exposures (Heller, 2011). This was made possible because the movement of military personnel could be tracked with some degree of accuracy –something that is not feasible for civilian populations. Environmental surveillance in the past decades has become commonplace for deployments, and the US airbase at Qayyarah West was taking hourly air samples to monitor for pollutants during the oil fires of 2016-17 (Weir, 2016).

International attention for pollution as a harmful effect of conflict has been growing in recent years[5], culminating in a ground-breaking resolution adopted at the third meeting of the UN Environmental Agency in December 2017 (UNEP, 2017b). The resolution recognises that conflict pollution can be 'delaying recovery, undermining the achievement of sustainable development and threatening the health of people and ecosystems' (UN Environment Agency, 2017, p. 1). The resolution also for the first time establishes some guidance on the provision of technical assistance to states affected by conflict pollution, and on the implementation of international agreements on chemicals. Sponsored by Ukraine and Norway, the resolution was tabled by Iraq and motivated in part by Iraq's recent experience of the widespread and severe pollution caused in the battle against ISIS (Weir, 2017).

Since most attention has gone to the immediate humanitarian response and less so to the damage to the environment, there is little insight in the environmental and public health effects of the prolonged exposure to smoke, soot and contaminated soil, water and air. The UN's environmental resolution recognises the problem, but large-scale international recognition and action is yet to be developed. While part of the harm to civilians in this case will only become fully apparent over a longer period of time, the Qayyarah fires are a distinct reminder of how devastating the targeting of oil wells and pipelines or their use as weapons of war can be to the environment and to the civilians living in that environment.

Images

Firemen sit amid the smoke caused by the oil fires.

A taxi covered by soot. Soot from the oil fires covers Qayyarah and the surrounding areas.

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Crude oil runs through the streets of Qayyarah.

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Endnotes

1 This case is based to a considerable extent on previous work by PAX´s Middle East and Humanitarian Disarmament Teams. See also the report 'Living Under a Black Sky' (Zwijnenburg & Postma, 2017).

2 Carbon dioxide, carbon monoxide, sulphur oxide, nitrogen oxides, volatile organic hydrocarbons, hydrogen sulphide, and acidic gases.

3 Such as benzene, carbonyls such as formaldehyde, polycyclic aromatic hydrocarbons (PAHs) like benzopyrenes and naphthalene, as well as dioxins and furans.

4 Such as sulphur dioxide, nitrogen oxides, hydrogen sulphide and carbon monoxide.

5 See also chapter 4 on the targeting of wastewater plants in Gaza for more information about the harmful implications of conflict-related environmental pollution on civilians.