Conflict-affected industrial facilities in frontline areas of Ukraine

June – September 2023

REACH Informing more effective humanitarian action

zoï environment network

Content

01

The Hazardous Events Monitoring Initiative

Background

During the 2023 "summer counter-offensive" led by the Ukrainian Armed Forces, intense **military activities unfolded in areas with dense networks of industrial facilities**. Many of these industrial objects have been directly impacted by the conflict, resulting in infrastructure damage and destruction.

Prolonged intense fighting combined with the presence of hazardous facilities **pose significant threats to human health, the natural environment, and the livelihoods it sustains**.

Ongoing hostilities **present challenges to the implementation of prevention, impact mitigation and recovery measures** with regards to contamination events.

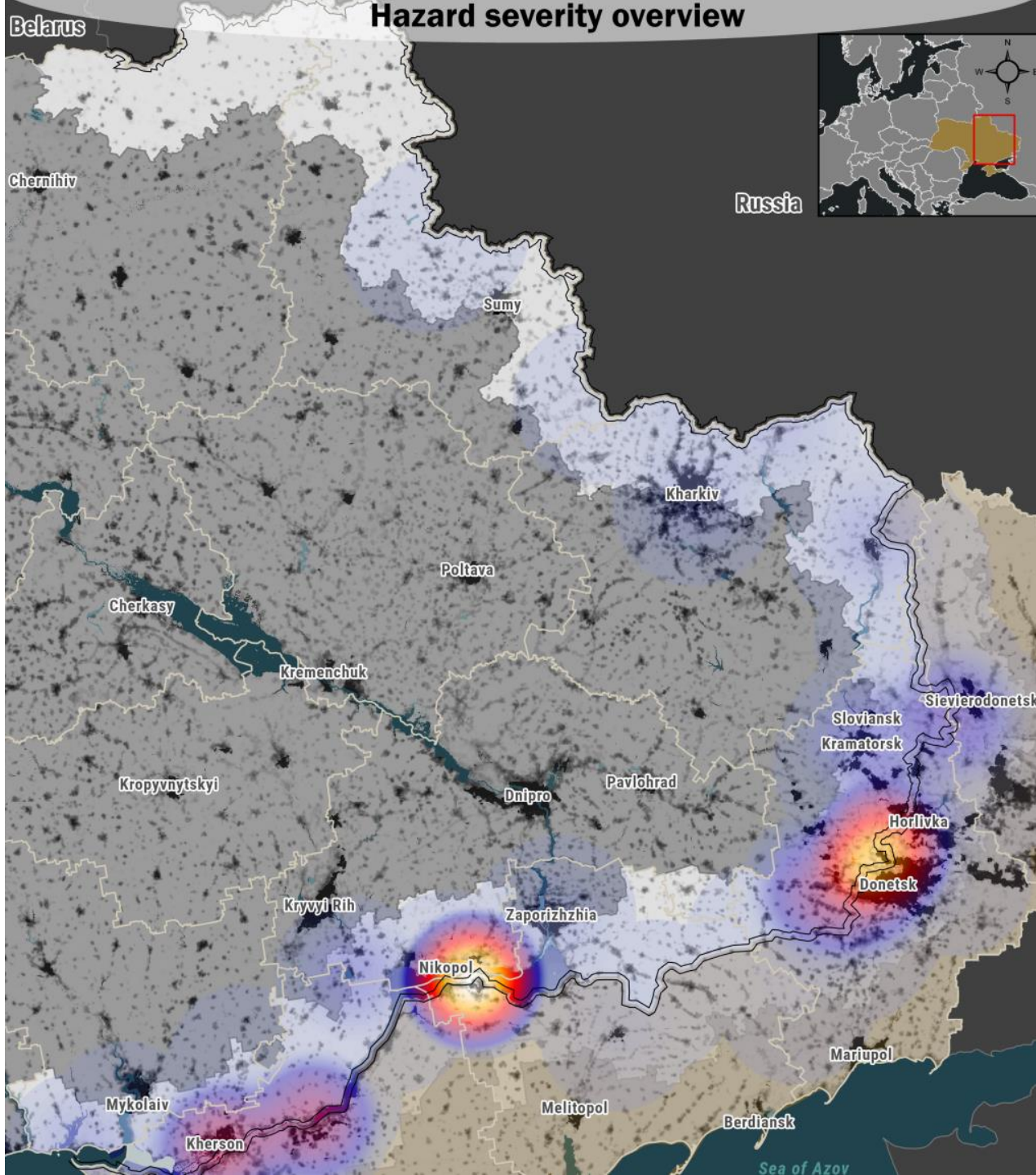
This presentation provides an overview of environmental contamination and public health hazards emanating from conflict-affected industrial facilities located in both sides of the front line (as of 27 June 2023) between June and September 2023.

Evidence of conflict-related damage at an oil depot in Makiivka, Donetska, damaged in July 2023. Source: Planet.

REACH's Hazardous Events Monitoring Initiative

Objective

Inform humanitarian and early recovery actions that address the impacts of conflict-related incidents to hazardous industrial infrastructure on the environment, human health and livelihoods.



Methodology

01

Media monitoring

Baseline data from Zoï Environment Network's Ecodozor.org. It consolidates multiple sources to monitor war-induced environmental impact, cataloging disruptions to infrastructure and utilities, with expert analysis and satellite verification, categorizing and geo-locating incidents in an updated database.

02

Remote sensing

Visual inspection conflict-affected facilities using satellite imagery to confirm damage, assess severity, and identify traces of environmental contamination.

03

Flash Environmental Assessment Tool

Helps to identify existing or potential acute environmental impacts that pose a threat to humans and ecosystems, following sudden-onset natural hazards and conflicts.

Limitations: Media-based monitoring can result in biases in the amount of attention certain incidents receive as compared to others. Results from remote sensing are also limited by the availability of high-resolution imagery and cloud cover.

Data utilization

Local authorities

Gain a localized understanding of hazardous events' impacts on people and the environment, to develop adapted impact mitigation and recovery measures.

Donors

Strategic allocation of funds to key areas such as ecosystem restoration, healthcare, and sustainable economic recovery.

Environmental NGOs

Develop targeted interventions for environmental restoration, advocate for resources, support affected communities with nature-based livelihoods.

Operational actors (State Emergency Service of Ukraine)

Develop emergency response and evacuation plans adapted to identified hazards to ensure rapid response to hazardous events.

Local humanitarian NGOs

Tailor localized response efforts addressing specific environmental, health, and livelihood challenges in affected communities.

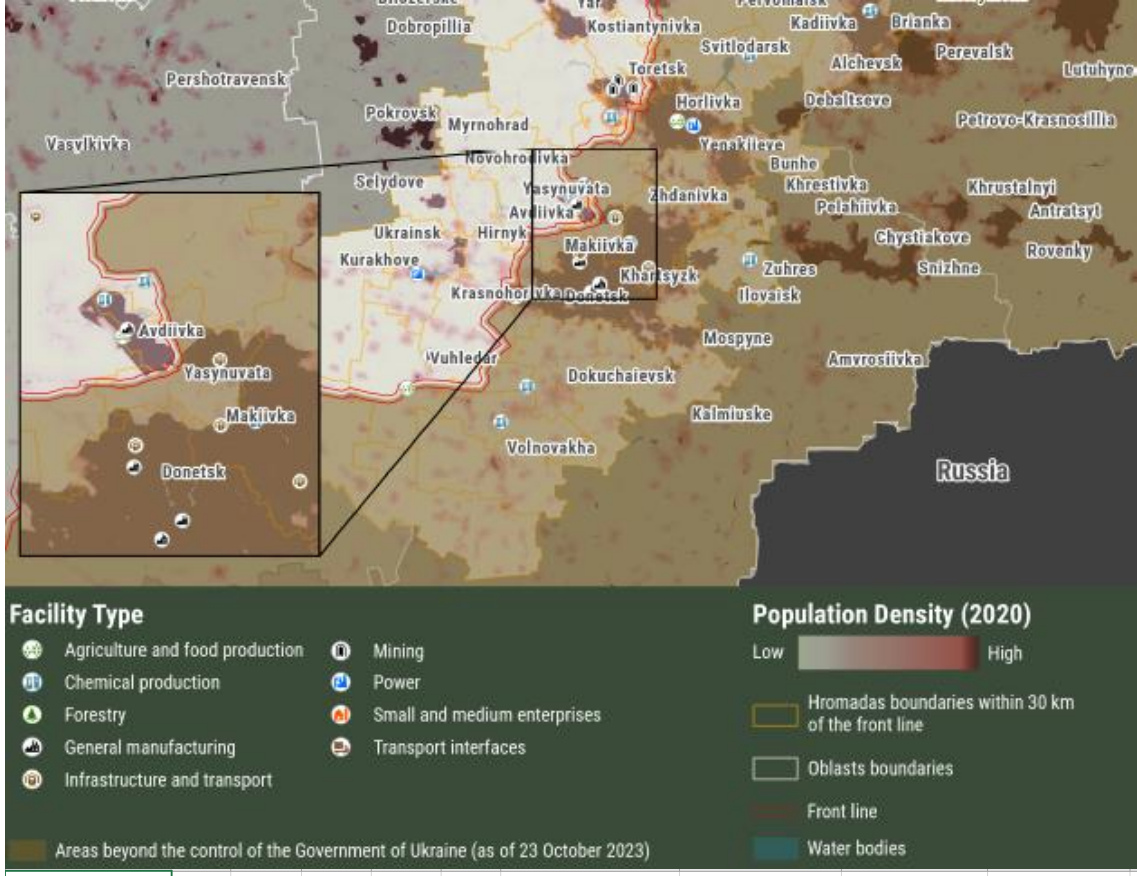
International humanitarian community

Coordinate and prioritize interventions, focusing on the most urgent environmental, health, and livelihoods-related needs.

The data informing REACH's Hazardous Events Monitoring Initiative (HEMI) is considered sensitive, and therefore not publicly available. This database is updated monthly.

Upon request, **REACH can bilaterally share reports, datasets and customized maps** with humanitarian and recovery actors.

Please contact us at impact.ukraine@impact-initiatives.org



Areas_of_control	Unique_F	Date_of_firs	Date_of_lat	Number_of	Number_(	Name_UKR	Name_EN	Facility_Type (Zoi)	Facility_Type_Matrix (Zo
government-controlled	1	28/05/2022	17/09/2022	4	3	Слов'янська ТЕС	Slovyansk Thermal Power Pl	Thermal power	Thermal power generati
non-government-controlled	12	19/03/2022	15/08/2022	34	32	Вуглегірська ТЕС	Vuhlehirsk Thermal Power	Thermal power	Thermal power generati
government-controlled	15	05/04/2022	15/06/2023	5	5	Торецький фенольний завод	Toretsk Phenol Plant	Chemical and coke-chem	Production of basic chen
non-government-controlled	17	03/03/2022	13/07/2023	11	6	Маріупольський металургійн	Ilyich Iron and Steel Works	Metallurgy and metal prc	Pig iron, steel, and ferro
government-controlled	18	13/03/2022	20/10/2023	81	79	Авдіївський коксохімічний зав	Avdiivka Coke and Chemical	Chemical and coke-chem	Production of basic chen
non-government-controlled	20	19/03/2022	21/03/2023	3	0	Шахта ім. О. О. Скочинського	O.O. Skochynskyi Mine	Mining	Coal mining and process
non-government-controlled	50	03/03/2022	26/05/2023	47	44	Металургійний комбінат «Азс	Azovstal Metallurgical Plant	Metallurgy and metal prc	Pig iron, steel, and ferro
government-controlled	64	08/09/2022	31/10/2023	22	21	Курахівська ТЕС	Kurakhove Thermal Power	Thermal power	Thermal power generati
government-controlled	68	29/05/2022	21/10/2023	3	2	Шахта «Торецька»	Toretska Mine	Mining	Coal mining and process
non-government-controlled	76	18/04/2022	18/04/2022	1	1	Бахмутський аграрний союз	Bakhmut Agricultural Union	Agriculture	Livestock and poultry far
government-controlled	100	03/06/2022	03/06/2022	1	1	Красногорівський вогнетрив	Krasnohorivka Refractory Pl	Construction	Construction materials
non-government-controlled	108	02/03/2022	02/03/2022	2	1	Єнакіївський металургійний з	Yenakiieve Iron and Steel W	Metallurgy and metal prc	Pig iron, steel, and ferro
non-government-controlled	111	29/05/2022	29/05/2022	1	1	Донецькокс	Donetskcoke	Chemical and coke-chem	Production of basic chen
non-government-controlled	114	01/03/2022	14/07/2022	22	19	Сєвєродонецьке об'єднання	Severodonetsk Association	Chemical and coke-chem	Production of basic chen
non-government-controlled	115	02/03/2022	02/03/2022	1	1	Стахановський завод феросп	Stakhanov Ferroalloy Plant	Metallurgy and metal prc	Pig iron, steel, and ferro
non-government-controlled	120	21/02/2022	23/02/2022	3	3	Луганська ТЕС	Luhansk Thermal Power Pla	Thermal power	Thermal power generati
non-government-controlled	127	15/06/2022	30/06/2022	2	2	Лисичанський содовий завод	Lysychansk Soda Plant	Chemical and coke-chem	Basic inorganic chemical
non-government-controlled	139	02/03/2022	13/03/2022	3	3	Попаснянський вагоноремонт	Popasnyansky Wagon Repai	Machine building	Machinery manufacturin
non-government-controlled	142	18/03/2022	21/04/2022	2	1	Завод «Азовмаш»	Azovmash Factory	Metallurgy and metal prc	Machinery manufacturin
non-government-controlled	149	22/03/2022	14/08/2023	21	21	Лисичанський нафтопереробн	Lysychansk Oil Refinery	Chemical and coke-chem	Petroleum refining and
non-government-controlled	159	28/02/2023	01/03/2023	2	2	Стахановський вагонобудівни	Stakhanov Wagon-Building	Machine building	Machinery manufacturin
non-government-controlled	176	05/03/2022	05/03/2022	1	1	Шахта ім. Д. Ф. Мельникова	D.F. Melnykov Mine	Mining	Coal mining and process
government-controlled	182	27/03/2022	19/08/2023	7	6	Новокраматорський машино	Novokramatorsky Machine	Machine building	Machinery manufacturin
non-government-controlled	186	05/04/2022	11/05/2022	3	3	НВП «Зоря»	Zorya Scientific and Product	Chemical and coke-chem	Explosives manufacturin
government-controlled	206	14/03/2022	10/03/2023	6	1	Карлівська фільтрувальна ста	Karlivka water treatment pl	Water and waste water	Drinking water supply
government-controlled	208	24/04/2022	24/04/2022	1	1	Насосна станція III підйому ка	Pumping station III of the Si	Water and waste water	Drinking water supply
non-government-controlled	212	24/04/2022	24/04/2022	1	0	Насосна станція I підйому Пів	Pumping station I of the Sou	Water and waste water	Drinking water supply
non-government-controlled	307	09/03/2022	01/04/2022	4	2	Шахта «Золоте»	Zolote Mine	Mining	Coal mining and process
non-government-controlled	311	24/02/2022	06/06/2023	20	13	Каховська ГЕС імені П. С. Нєпс	Kakhovka Hydropower Plant	Hydropower	Hydropower generation

02

Key findings

Key findings

Between 1 June and 30 September 2023, **348 conflict-related incidents impacted 289 industrial facilities in frontline areas**.

The majority of these facilities (273) are situated within populated settlements, intensifying risks for residents.

In the short-term, **hazardous events may result in the aggravation of humanitarian needs** (such as access to potable water), **generate long-lasting health impacts, and disrupt environment-based livelihoods**.

These incidents are likely to have **resulted in significant contamination of the environment through the release of mainly flammable substances** (i.e. petroleum products are the most common substance in affected facilities) **and other hazardous substances posing risks to human health**, such as toxic gases or liquids, explosives, aquatic pollutants.

The data presented in this presentation covers the period from June to September 2023. REACH's Hazardous Events Monitoring Initiative database is updated monthly. Please contact REACH to the access latest data.

Key findings (continued)

Environmental consequences are likely to go unaddressed in the short-term due to access constraints in frontline areas, limiting opportunities for rapid field assessments and the implementation of mitigation and response measures. This could however change with the evolution of the military situation.

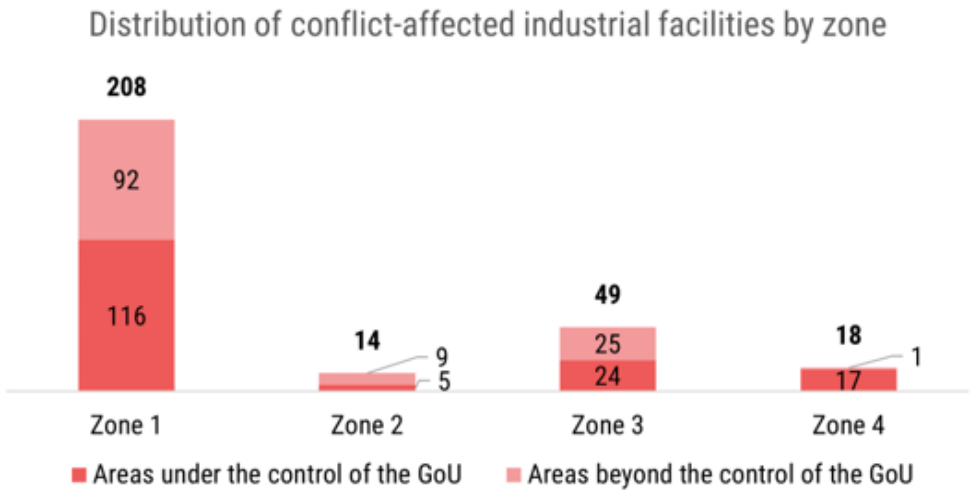
Over the long-term, additional **resources will be required to mitigate impacts on the environment, livelihoods may be lost** through the degradation of natural and cultivated resources, **and people may be affected by adverse health outcomes.**

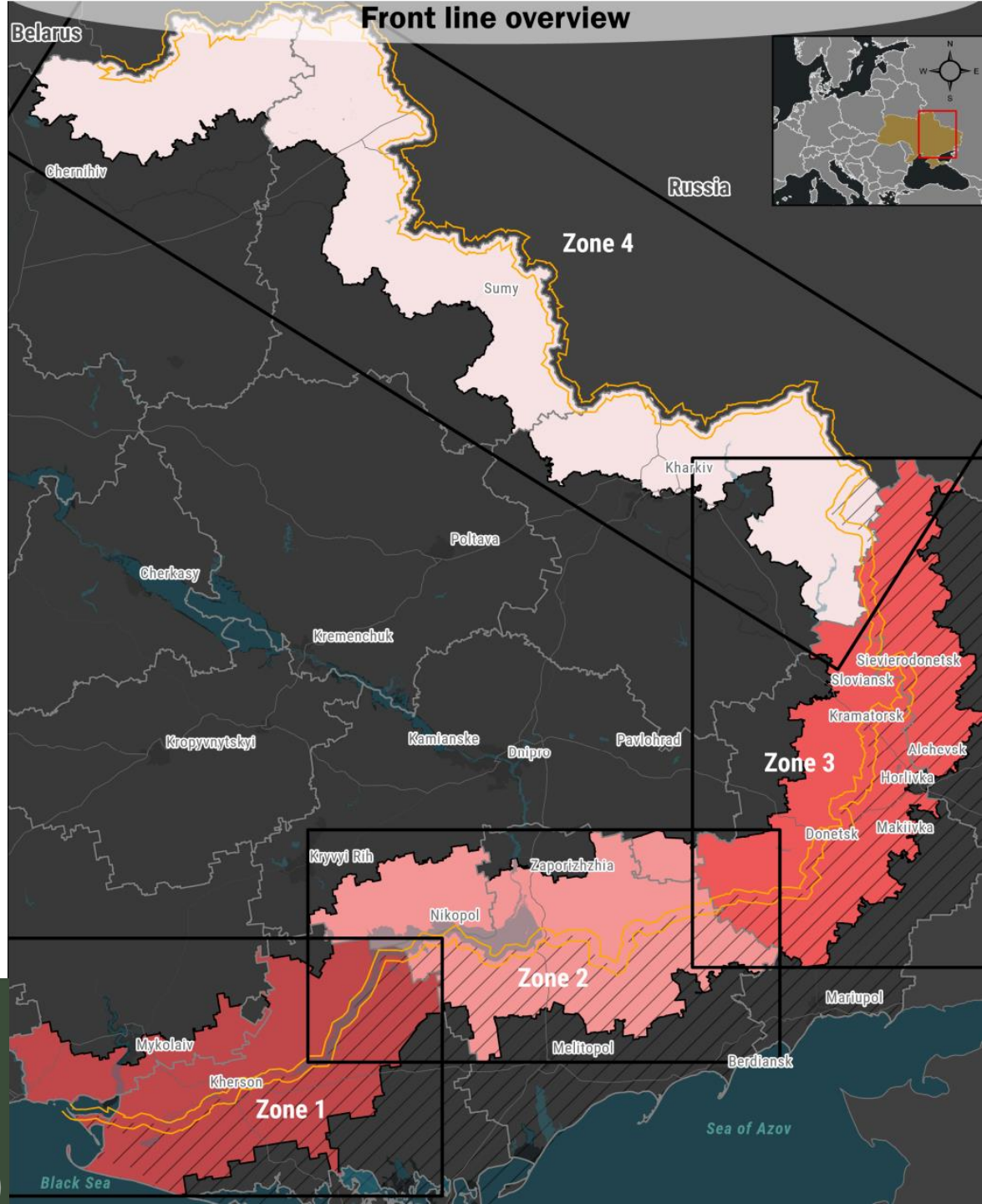
03

Conflict-related incidents at industrial facilities in frontline areas

Front line overview

Frontline areas are defined as the **30 km zone on both sides of the main front line**, as of 27 June 2023. They are **divided into four zones**, based on administrative boundaries and the intensity of military activities.

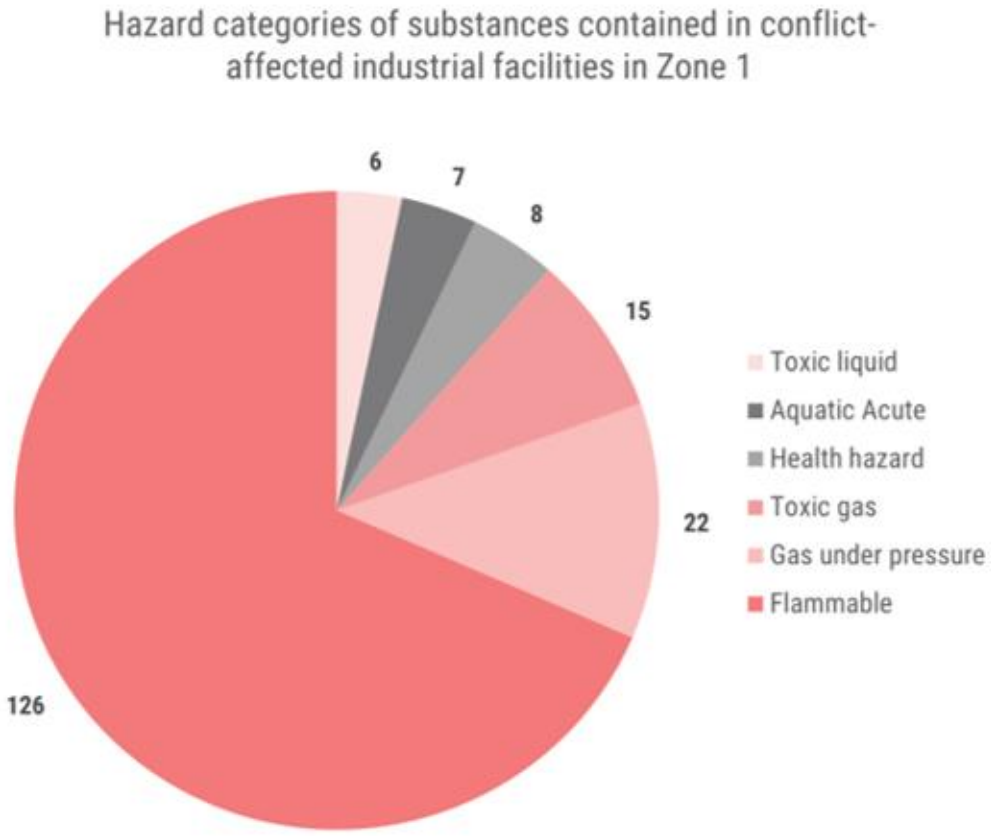


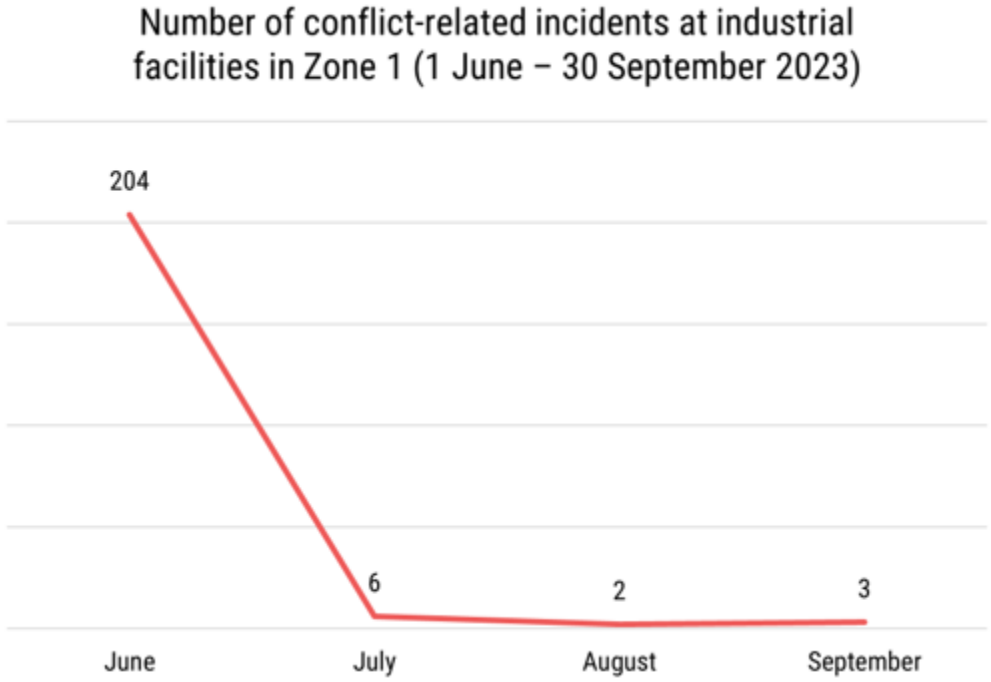


Zone 1

Khersonska and Mykolaivska oblasts

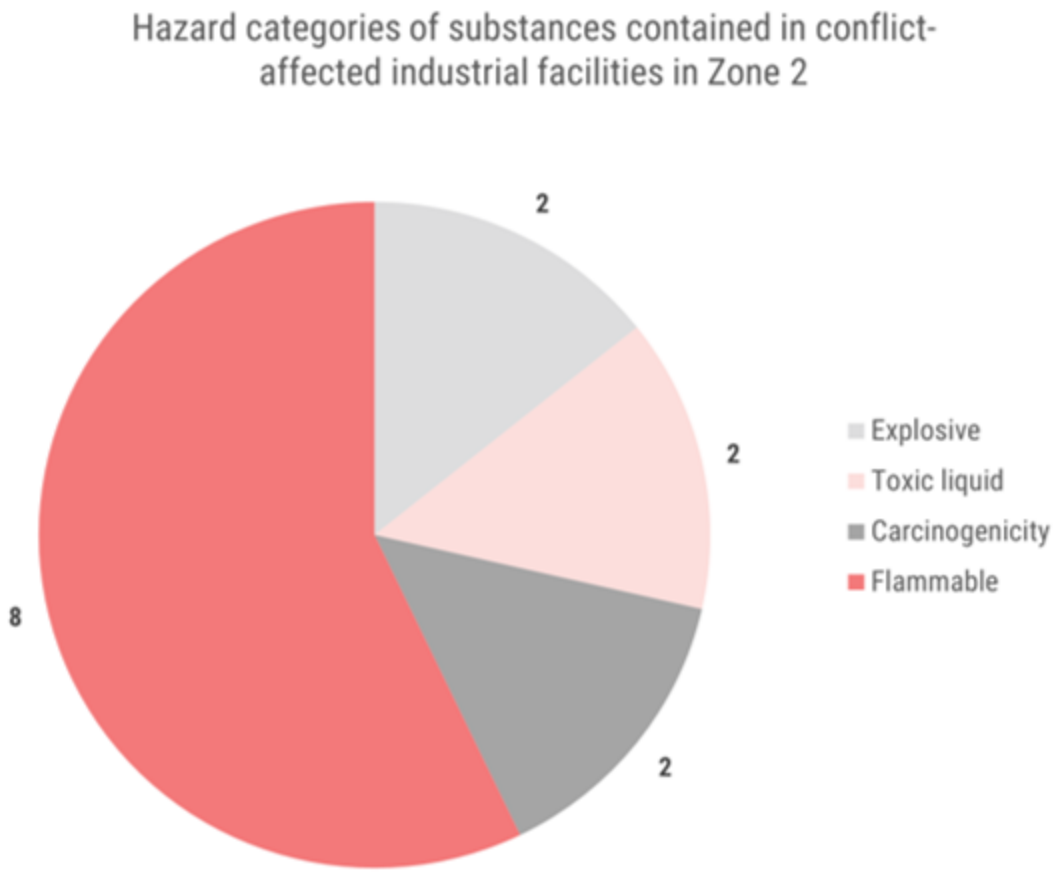
Kherson and its surroundings constitute the **frontline area with the highest concentration of hazardous events during the assessed period** due to the **Kakhovka Dam collapse**. Khersonska has the **largest concentration of conflict-related impacted facilities** of all assessed oblasts.



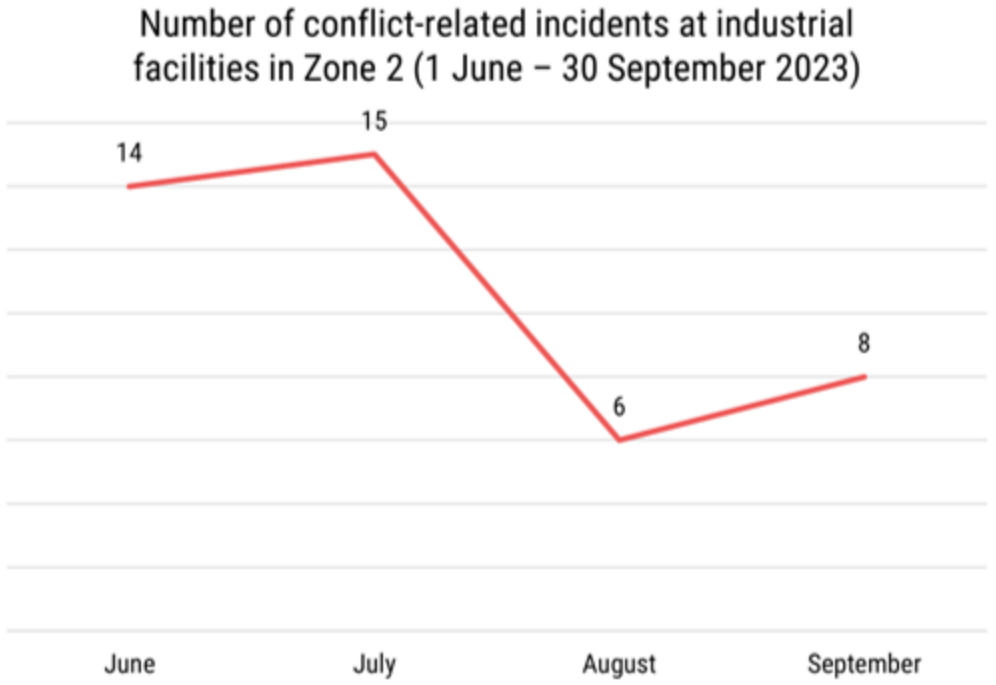


Zone 2

Dnipropetrovska and Zaporizka oblasts



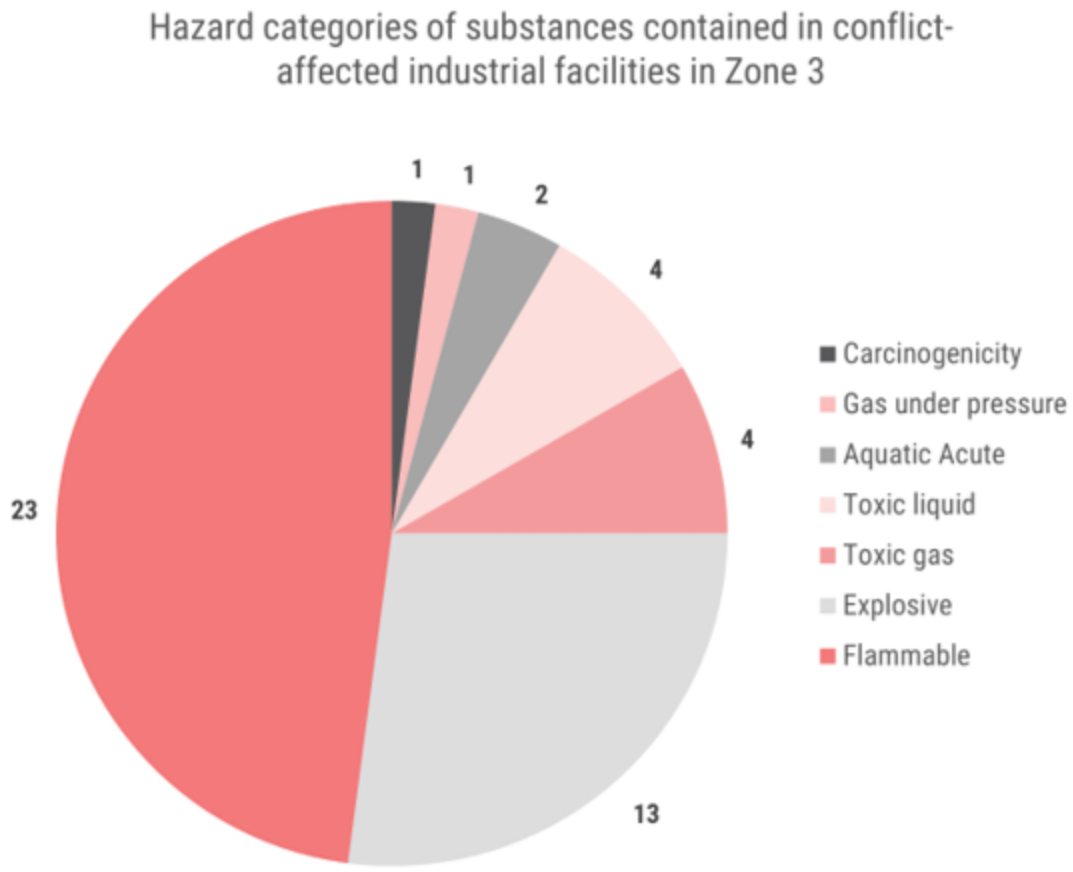
43 incidents were recorded at 14 facilities (12 in Zaporizka oblast and two in Dnipropetrovska oblast), with the **Zaporizhzhia Nuclear Power Plant being the facility posing the greatest threat.** Zone 2 has the **largest percentage of its conflict-affected industrial facilities located in areas beyond the control of the GoU** (64% of all incidents).

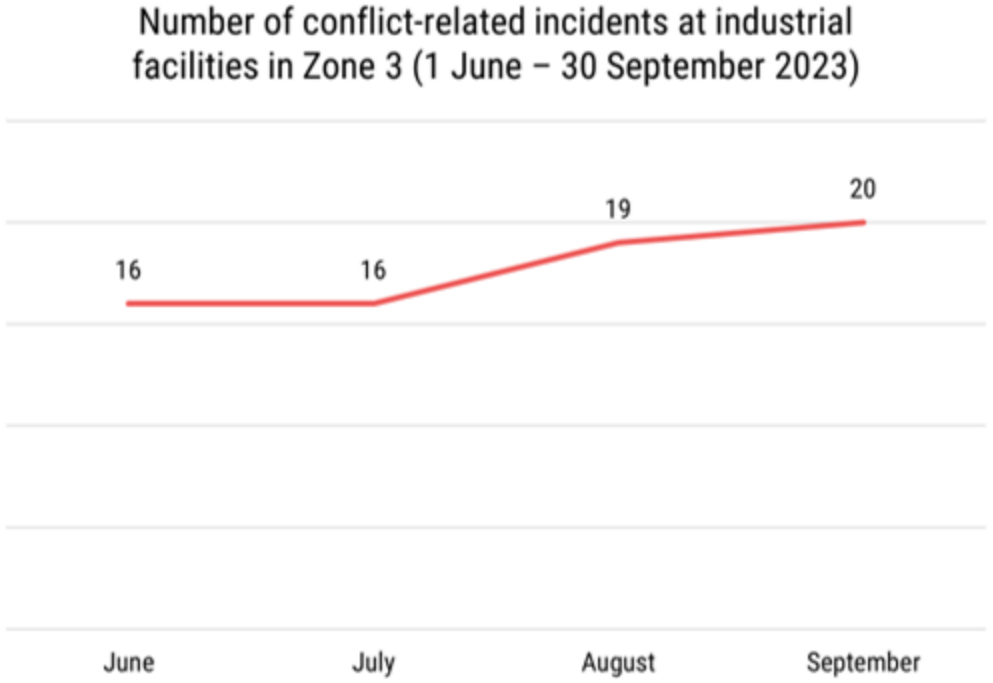


Zone 3

Donetska and Luhanska oblasts

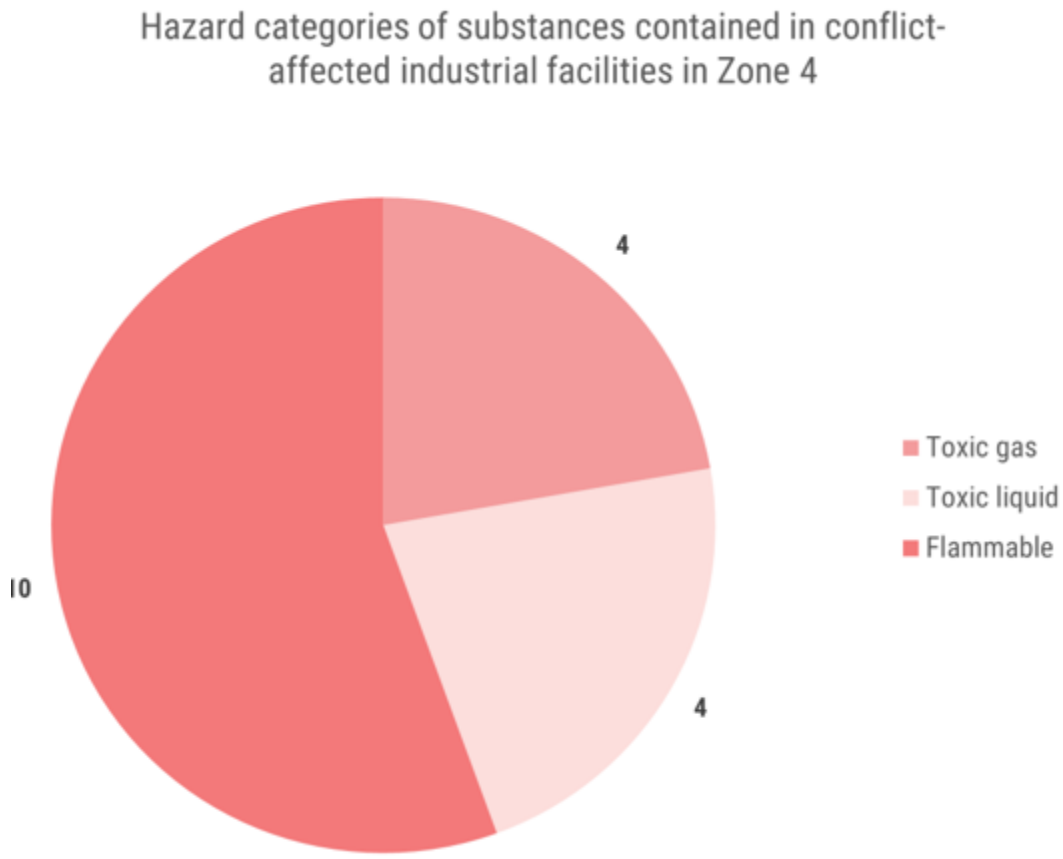
Zone 3 has experienced intense hostilities, contributing to a relatively high number of incidents at hazardous facilities and the attendant risk of environmental pollution from hazardous materials. **Donetska is the second most affected oblast by number of impacted facilities in Ukraine's frontline areas.**



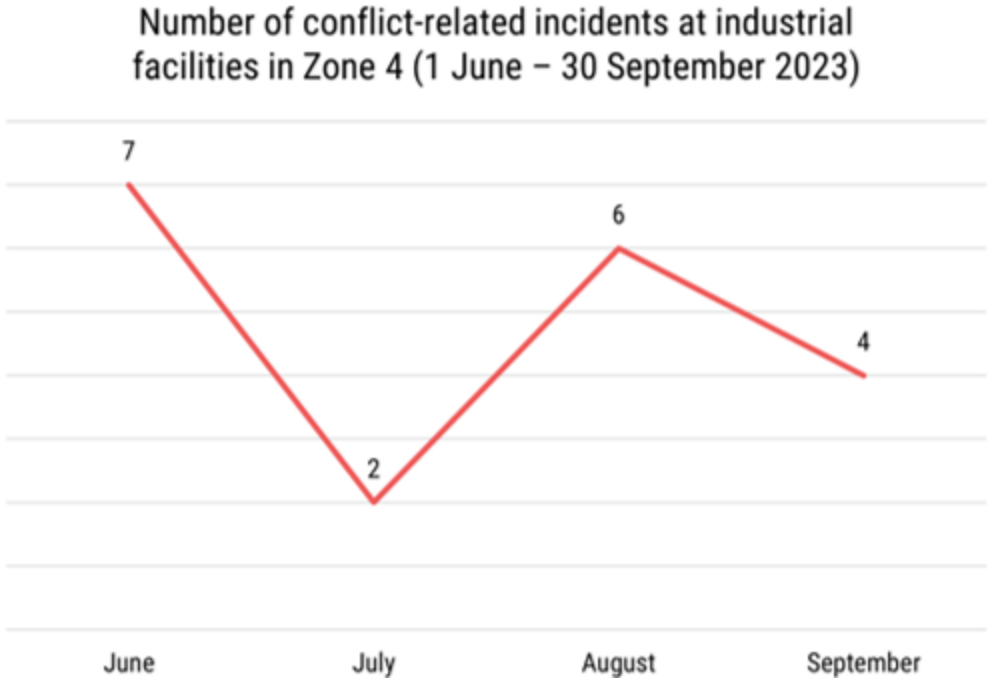


Zone 4

Chernihivska, Kharkivska and Sumska oblasts



The vast majority (15) of affected facilities in Zone 4 are in Kharkivska, with a few (3) in Sumy, and none in Chernihivska. The most prevalent hazardous substances found are petroleum products, ammonia, and organophosphate (pesticides).



Impacts of hazardous substances on health and environment (top 3)

Hazardous substance	Health Impacts		Environmental Impacts
	Negative impacts on:		
Petroleum products (Gasoline and Lubricating oils) (91 facilities)	• Nervous system • Respiratory system • Cardiovascular system • Gastrointestinal tract • Liver • Kidneys • Blood • Skin • Eyes	• Reproductive functions	**Gasoline** pollutes the atmosphere, water, and soil with hydrocarbons that remain in the air for a long time and can be transported over long distances. **Lubricating oils** cause changes in the physical, chemical, and biological properties of water, soil and natural habitat.
Oil and solvents (37 facilities)		• Endocrine system	**Oil** changes the physical, chemical, and biological properties of water, soil and natural habitats. It is toxic to aquatic organisms. **Solvents** are toxic to aquatic organisms, disrupt the ecological balance when entering water and suppress many species of bacteria.
Ammonia (23 facilities)		• Throat and lungs • Spleen	**Ammonia** disrupts the acid-base balance when entering in water bodies or soil. It is extremely toxic to aquatic organisms with long-term effects, alters the organoleptic properties of water, and impairs its self-purification.

04

Impact on community and livelihoods

Impact – Aggravation of humanitarian needs

Disrupt access to **potable water supply**

Shelling, mines and UXOs pose acute threats to the life and health of people

Displacement and **relocation**

Disruptions to transportation networks, affecting movement and continuation of logistic chains

Reduced access to productive natural assets due to active conflict, mines and UXOs (agricultural lands, water bodies, recreational areas, etc.)

The release of hazardous substances could generate long-lasting **health impacts on the affected population**

Impact on hazardous infrastructure could release hazardous substances causing **air pollution** and **soil contamination**

The full assessment report , as well as other HEMI products, are not publicly available due to the sensitive information they contain. However, **REACH can share the reports bilaterally upon request** with humanitarian and governmental actors to enable the inclusion of industrial risks in sectoral programming, support operational preparedness and response, and inform recovery activities.

REACH is also able to **share extracts of its hazardous events database** and **produce customized maps** upon request.

To access these products, share information or collaborate, please contact REACH at impact.ukraine@impact-initiatives.org

Thank you for your attention

Please contact IMPACT for the full reports and data at

impact.ukraine@impact-initiatives.org

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