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Black Sea: Shadow of the Mines

OMV to Build Gas Platforms and Pipelines Amidst Black Sea War Zone

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Executive Summary

- **OMV is planning the EU's largest gas extraction project in the Black Sea, close to where the fighting continues to rage.** The Black Sea is both a scene of Putin's war of aggression against Ukraine and a key area for Russian interests. Disruptions and accidents could occur if the Neptun Deep field is developed in the vicinity of active hostilities.
- **The ongoing conflict has seen the deployment of naval mines.** One ship has already been sunk and a life lost due to these deadly explosives. Even after the fighting ends, free-floating naval mines can continue to cause problems for years to come; they could also pose a significant long-term risk in the Black Sea.
- **The environmental impact assessment for the Neptun Deep project fails to consider the risk caused by naval mines.** Yet, they pose a significant threat to the project. These deadly weapons, containing up to 160 kg of explosives, are designed to cripple ships. Nearly 100 naval mines have been neutralised since the war began, an average of one a week.
- **Insurance companies consider the risks for ships in the Black Sea to be very high.** Insurance premiums for ships in the Black Sea have risen up to 30-fold and are significantly higher than in other crisis areas such as the Red Sea.

Introduction

The Black Sea, which links Asia and Europe, has been a hot spot of conflict and war since Russia's invasion of Ukraine. Before the Russian-Ukrainian war, more than 50% of Ukraine's exports passed through the Black Sea. For the European Union member states, particularly Romania and Bulgaria, the Black Sea and its surrounding countries are emerging as a key corridor for transporting goods and energy between Asia and Europe. One example of this is the sharp increase in imports of gas and oil from Azerbaijan to the European Union, which

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have more than tripled since the start of the Russian invasion in 2022.[1] Fossil fuels are transported to Europe through the crisis-ridden region of Georgia and Türkiye. Russia is currently attempting to expand its influence in Georgia. Mass protests are taking place against this, and the situation remains tense.[2]

Amidst this volatile mix, OMV is pushing ahead with plans to develop a gas field in the Black Sea. The environmental impact assessment currently underway fails to give due weight to the significant risks posed by the ongoing war[3].

In addition to its obvious impacts on the climate crisis, the project is problematic in several respects: the project's close proximity to the war and the Russian sphere of influence is a security disaster. Despite all the security concerns, the project is being promoted as an important step towards independence from Russian gas. In May 2024, the Romanian general director of the Employers' Association for Oil and Gas announced that natural gas from the Black Sea would guarantee Europe's energy security.

Moreover, since Russia's invasion began, it has become evident that gas supplies and infrastructure are affected by the war: on the one hand, energy supply is a welcome lever for achieving political goals; on the other hand, the acts of sabotage on the Nord Stream pipelines have demonstrated that direct violent action is possible and poses a significant strategic threat.

Adding to the dangers, a new, indirect threat has emerged as collateral damage to the fighting: naval mines drifting freely throughout the Black Sea. These pose a significant risk to critical infrastructure projects.

Information Box: Naval Mines

Naval mines, also known as sea mines, are underwater weapons that have been in use for almost 250 years. They are floating explosive devices that are triggered by various means (such as contact, magnetic fields, sound waves, water pressure changes, or even remote detonation). Aircraft, submarines or ships can lay these mines. Primarily strategic weapons, they are used for area denial, blocking access to specific sea routes or ports. Additionally, they can be used to protect harbours and beaches or act as a deterrent.

Naval mines are grouped into the following categories:[4]

1. **Moored mines**: Moored or buoyant mines are anchored to the seafloor and held in place by tethers or chains. They can be placed at various depths and are typically used in water up to 200 metres deep.
2. **Bottom mines**: Bottom or ground mines are placed on the seafloor, usually where the water is less than 200 metres deep.

[1] Süddeutsche Zeitung, 14 March 2023: Geschäfte mit Aserbaidschan: Öl und Gas vom autoritären Regime in Baku (in English: Doing business with Azerbaijan: oil and gas from Baku's authoritarian regime)

[2] Deutschlandfunk, 15 May 2024: Parlament beschließt umstrittenes Gesetz trotz Massenproteste (in English: Parliament passes controversial law despite mass protests)

[3] Greenpeace CEE 13 February 2024: OMV & Romgaz Neptun Deep Environmental Impact Analysis

[4] Interestingengineering.com, 5 October 2019: How do naval mines work? (an overview of naval mines and their effects)

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3. **Drifting mines**: Drifting or floating mines are placed in open water and float on or just below the surface. They move with the current and are uncontrollable. High collateral damage to people and the environment can occur.

Types of mines found in the Black Sea:

Contact mine type R-421-75 The explosive power of this type of mine ranges from 80 to 160 kilograms of TNT equivalent. These mines can be deployed as drifting or moored mines. Equipped with contact detonators, they explode upon contact with anything strong enough to hit them.[5]	
Moored mine type YaM or MYaM A mine of this type weighs more than 150 kilograms, contains about 20 kilograms of TNT as an explosive charge and is equipped with a contact detonator. Storms or weak materials can rip these mines from their anchors, tethers or chains, causing them to drift off with the current in an uncontrolled manner.[6]	
Moored mine type YaRM A mine of this type weighs 13 kilograms, contains about 3 kilograms of TNT as an explosive charge and is equipped with a contact detonator. These mines are used in shallow waters close to riverbanks, lakeshores and coastlines to counter landing craft and other amphibious vehicles.[7]	

[5] Medium.com, 9 August 2023: Ukraine's Sea Drones Are a Nightmare for Russia
[6] navweaps.com, accessed on 23 May 2024: Russia/USSR Mines
[7] Bomb Techs Without Borders, 2023, Ordnance of the Week: YaRM-Anti Landing Mine

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The Shadow of Naval Mines: Understanding the Threat in the Black Sea

Since Russia invaded Ukraine in February 2022, large parts of the Black Sea coastline have been mined by the warring parties. In addition, a significant number of land and river mines (see "moored mine type YaRM" in the information box above) have been swept away by floods, such as the one caused by the destruction of the Kachowka dam in June 2023. These mines are now floating down the Dnieper River into the Black Sea. Most of the mines are YaM-type moored mines containing 20 kilograms of explosive material. This type of mine was developed during World War II, and most of the stockpiles still date back to the Soviet Union. These ageing weapons can break free from their anchors and tethers in storms or due to material weakness; once loose, they transform into deadly floating bombs, ready to detonate on contact. The current is carrying the mines from the war zone to Romania and on through Bulgaria to Türkiye and the Bosporus Strait. It is not possible to estimate the number of naval mines that have been laid and are currently drifting around. The potential hazard from mines in the Black Sea is very high; the NATO Shipping Centre has repeatedly emphasised the perils arising from these drifting time bombs.[8]

Since the outbreak of the war, the shipping industry has been stepping up its security measures, and the local port authorities in Romania, Bulgaria and Türkiye are providing daily updates on the situation. In November 2023, insurance companies responded by increasing war risk insurance premiums to as much as 3% of a vessel's value.[9] These premiums are usually well below 0.1%.[10] In other crisis regions, such as the Red Sea, ships have to pay between 0.5 and 0.7% of their value as an additional premium for war risks.[11]

The naval forces of the Black Sea NATO countries are conducting regular mine-clearance patrols in the Black Sea. In 2023, Romania also acquired two minesweeping vessels from the British navy.[12] As recently as January 2024, Bulgaria, Romania and Türkiye agreed to work together to address the threat posed by naval mines in the Black Sea. They pledged to coordinate their efforts to detect and destroy or detonate these deadly explosives.[13]

The Romanian military as well as insurance companies are advising all vessels to navigate with extreme caution, closely monitoring the surface of the water by setting up dedicated observation posts on board. In practice, this means that a crew member should be designated to continuously watch the water's surface for drifting mines – one of the few measures that can help prevent contact with these floating explosive devices. All suspected sightings must be reported immediately.

The minefield also poses a significant threat to Black Sea fisheries: fishers report that mines have sunk to the seafloor or are drifting just below the surface, where they can get caught in fishing gear. Several such incidents

[8] Steamshipmutual.com, 16 May 2023: Drifting Mines and Other Threats – North-western, Western and Southwest Black Sea

[9] Reuters, 17 November 2023: Grain ship lightly damaged off Ukraine, likely hit sea mine – sources

[10] Insurancejournal.com, 5 December 2023: War Risk Insurance Rates Edge Up After Surge in Red Sea Ship Attacks

[11] Bocquel-news.de, 19 December 2023; Gefahrenzone Rotes Meer – Versicherungsprämie steigt (in English: Red Sea danger zone – insurance premiums on the rise)

[12] RadioFreeEurope, 14 January 2024: The Battle To Clear The Black Sea Of Mines

[13] Tagesschau, 11 January 2024: Gemeinsam gegen Minen im Schwarzen Meer (in English: Together against mines in the Black Sea)

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have occurred in Romania, Bulgaria and Türkiye.[14] Fishers are urged to exercise extreme caution as the mines, depending on their type, can detonate with even minimal contact.

Documented Naval Mine Incidents in the Black Sea

From the beginning of the war until February 2024, 94 naval mines were neutralised in the Black Sea during clearance operations. The majority of these mines were detonated.[15] This data is the result of a request made by Greenpeace to the Romanian Naval Directorate. The number 94 means that about one mine has been "neutralised" every week since the beginning of the war. Most of these mines are of the YaM type (see information box about naval mines). The Romanian defence minister said in early March this year that the danger from naval mines in the Black Sea was enormous.[16]

The Black Sea has witnessed a number of incidents involving naval mines: cargo ships have, on several occasions, suffered damage ranging from minor to severe, with some crew members being injured. An Estonian cargo ship even sank after colliding with a naval mine.[17] In a documented incident, a man lost his life while searching for sea snails in the shallow waters off the Black Sea coast.[18] In August 2023, a naval mine exploded after hitting a pier near the Romanian resort village of Costineşti. One person was injured as a result of the explosion.[19] In early March 2024, the Romanian navy was called in to neutralise a drifting mine near the Neptun Deep gas field.[20]

The information graphic below shows the currents in the Black Sea. The area where incidents and hazardous situations involving free-floating mines have occurred is highlighted in red. Incidents close to the Neptun Deep field that could be more accurately pinpointed are marked with pins.

[14] In January, Türkiye experienced the most recent incident where fishermen found a naval mine in their net. Cf. Tagesschau, 11 January 2024: Gemeinsam gegen Minen im Schwarzen Meer (in English: Together against mines in the Black Sea)

[15] Most mines were detonated by firing at them. In a few exceptions, the mines were neutralised by divers.

[16] Digi24.ro, 7 March 2024: Exclusiv – Ministrul Apărării: Pericolul minelor marine în largul Mării Negre este urias (in English: Defence Minister, exclusively: the danger from naval mines in the Black Sea is enormous)

[17] Navalnews.com, 3 March 2022: Estonian Cargo Ship Sinks Off The Coast Of Odessa

[18] Theguardian.com, 11 July 2022: Sea mines: the deadly danger lurking in Ukraine's waters

[19] Pravda.com, 14 August 2023: Naval mine explodes near resort in Romania

[20] Hotnews.ro, 7 March 2024, O mină marină ar pluti în derivă în largul Mării Negre, la 4 km de Costinesti

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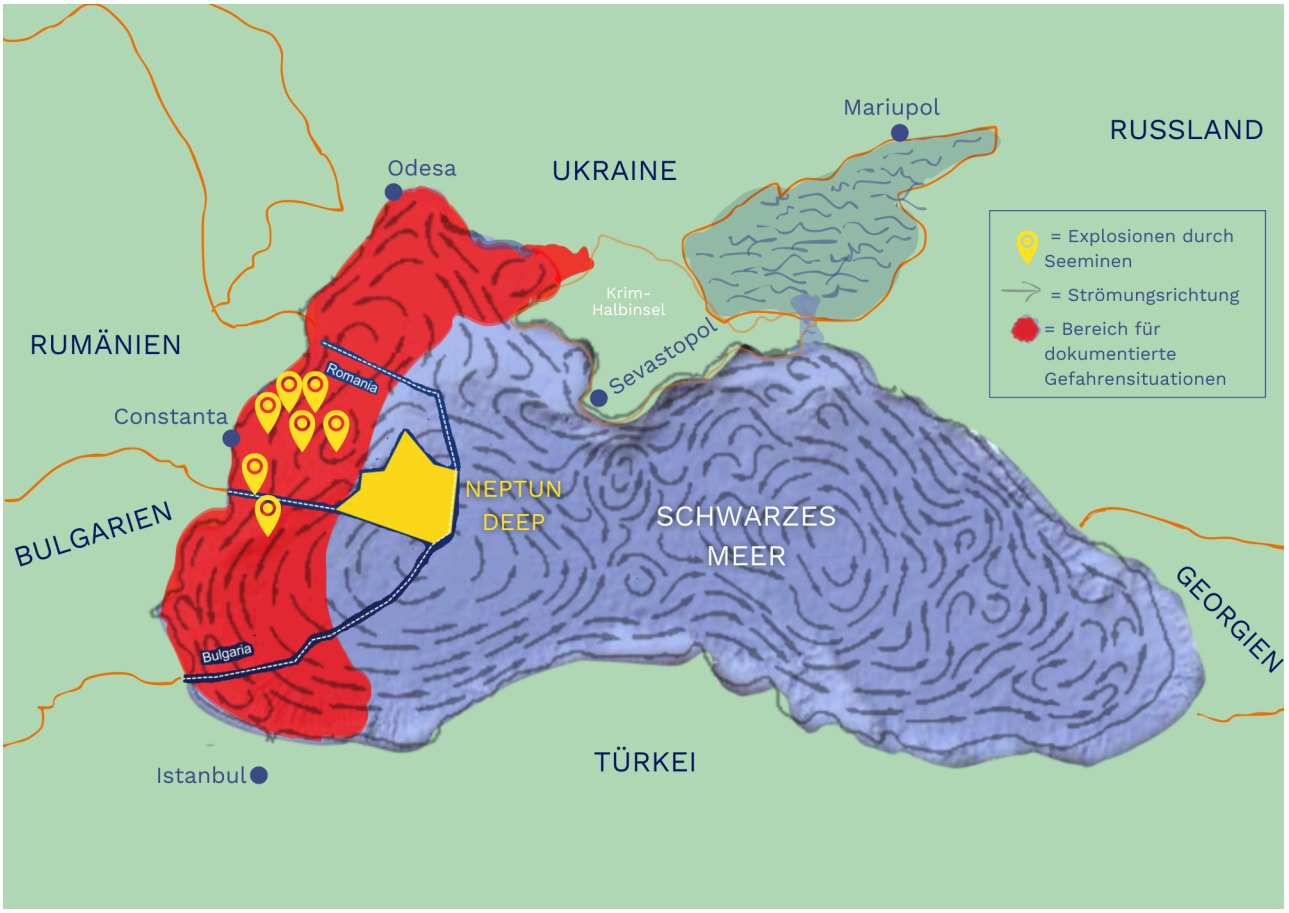

Information Box: Neptun Deep

Neptun Deep is the largest planned fossil gas extraction project in the EU. It is located 160 km off the Romanian coast and only 200 km from Russian-occupied territory. The extraction of natural gas from two wellbores, each reaching depths of up to 1,000 metres below sea level, is planned to begin in late 2027. According to documents from the ongoing environmental impact assessment, the project will have accumulated 276 million tonnes of greenhouse gases by its expected closure in 2047; this is equivalent to Austria's emissions over a period of three and a half years. There are also plans to discharge the chemical-laden produced water back into the sea over the 20-year life of the project. Furthermore, the Black Sea's biodiversity, already under pressure, faces additional threats from potential gas leaks and construction noise.

The Neptun Deep Project: Mired in High Risks

Environmental Impact Assessment Fails to Address Mine Risks

The ongoing environmental impact assessment for Neptun Deep is considering a range of potential risks to the project, including earthquakes and other geophysical hazards, as well as external factors. However, it fails to

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address naval mines or what are known as “unexploded ordnance” (UXO), which are explosive weapons that did not detonate when used and still carry the risk of exploding. It is common practice for projects as large as Neptun Deep to assess such risks, as unexploded ordnance could cause an environmental disaster in the event of an incident. For instance, the Scottish NorthConnect project, which involved laying a submarine cable near Scotland and therefore has many construction similarities to laying submarine pipelines, included a dedicated report on explosive ordnance and a chapter on naval mines in its documentation.[21]

Specific Hazards for the Neptun Deep Project

Hazards vary at different development stages and for different components:

1. **Development and construction phase:** Particularly critical is the phase during which numerous ships shuttle back and forth between the construction site and the ports to transport materials and equipment. During this phase, drifting mines in the open sea pose a significant threat to the ships and boats involved.
2. **Platform and infrastructure:** The individual components, such as the wellbore, piping systems or anchors, are vulnerable to explosions in the surrounding area or directly on the platform.
3. **Pipeline:** A special case is the 160-kilometre connection pipeline that has to be laid on the seafloor from the platform to the mainland. In the case of pipelines, the severity of the consequences of a mine explosion depends on several factors: the distance of the pipeline from the exploding naval mine; the explosive power of the mine; the density of the water[22]; the material of the pipeline and the manner in which it has been laid (under or on the seafloor). The effects of exploding naval mines on underwater pipelines have been extensively researched due to the large number of live mines left over from the world wars. The risk of a pipeline being damaged or destroyed is significant, with disastrous consequences for people and the environment.[23]

The Devastating Effects of Mine Detonation on Marine Mammals

While the use of mines in war has far-reaching consequences, so too does their deactivation. Discovered naval mines are typically “neutralised” by targeted detonation. This has devastating effects on marine life, including mammals. The explosions unleash enormous shockwaves and loud noises that can injure or even kill these animals. This is not just a risk to creatures in direct contact; the detonation of a single mine, for instance, can damage or destroy the auditory organs of marine mammals even if they are many kilometres away from the explosion. Hearing is an essential sense for mammals that rely on the ocean to survive.[24] As a result of the

[21] Cf. Alpha Associates, 2017: Unexploded Ordnance (UXO) Threat & Risk Assessment with Risk Mitigation Strategy for Cable Installation

[22] The density of water varies depending on the dissolved substances, such as salt, as well as the temperature and depth of the water. The density of the water will affect the propagation of the blast wave resulting from an explosion.

[23] Y.-G. Wang et al, 2018, Dynamic response of pipelines with various burial depth due to underwater explosion, Oceans Engineering 164

[24] Sciencenorway.no, 4 October 2022: Norway’s practice of blowing up WWII sea mines is deadly for marine mammals

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hearing impairment or loss, the animals can become isolated, unable to communicate or find food. This can lead to starvation and stranding.

Researchers have estimated that the recent detonations of 88 naval mines in the Netherlands' maritime area in just one year caused between 1,000 and 5,000 whales to permanently lose their hearing.[25]

In Germany, 24 harbour porpoises were found dead on the coast of the federal state of Schleswig-Holstein after several mines from World War II were detonated during a clearance operation in the Baltic Sea. In 8 of the 24 animals, subsequent examinations revealed a clear link to the blast injuries, suggesting that the explosions may have been fatal to these porpoises. In addition, two other animals were found with signs of blunt force trauma and evidence of blast injury.[26] The critically endangered harbour porpoise can also be found in the Black Sea.

Deflagration: A Safer Approach to Mine Neutralisation

Detonation is not the only option for neutralising mines. These explosives can also be rendered harmless by a slow and controlled burning process known as deflagration. Preliminary studies conducted by the US Army several decades ago revealed deflagration to be a more effective, safer and cheaper method for clearing land mines. Unfortunately, research into this technology for use in neutralising naval mines remains limited.

Greenpeace Demands

"There is no end in sight to Russia's war of aggression. Developing a highly explosive gas field so close to Russian occupied-territory without addressing safety and security concerns is utterly reckless. The Romanian environmental authorities must halt the environmental impact assessment of Neptun Deep until OMV Petrom and Romgaz provide a comprehensive risk assessment."
Marc Dengler, climate and energy expert at Greenpeace Austria

Greenpeace demands that OMV and Romgaz stop the Neptun Deep project and calls for the Romanian authorities to refuse environmental permits. A project that is highly vulnerable to the risks of Putin's war cannot be a viable solution to the energy security concerns caused by the war. In addition, new fossil gas projects like Neptun Deep are directly at odds with the goal of keeping global warming below 1.5 degrees Celsius.[27]

Greenpeace therefore demands an EU-wide ban on new oil and gas projects, coupled with a decisive push to rapidly expand renewable energies. This is the only way to ensure a secure, affordable and climate-friendly energy supply in the long term.

[25] Sciencenorway.no, 4 October 2022: Norway's practice of blowing up WWII sea mines is deadly for marine mammals

[26] U. Siebert et al, 2022, Blast injury on harbour porpoises (Phocoena phocoena) from the Baltic Sea after explosions of deposits of World War II ammunition, Environment International 159

[27] IEA, 2021: Net-Zero by 2050: A Roadmap for the Global Energy Sector

Imprint

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