

ENVIRONMENTAL IMPACT ASSESSMENT

PROJECT:

NEPTUN DEEP

PROJECT TITLEHOLDERS:

OMV Petrom S.A

Romgaz Black Sea Limited

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 8 – DESCRIPTION OF MEASURES CONSIDERED TO AVOID, PREVENT, REDUCE OR, IF POSSIBLE, COMPENSATE ANY IDENTIFIED SIGNIFICANT NEGATIVE EFFECTS ON THE ENVIRONMENT AND DESCRIPTION OF ANY PROPOSED MONITORING MEASURES

Revision history

Revision no	Date	Description	Author	CHECKED	APROVED
00	03.04.2023	Document drafting	Blumenfield® Working group	Cristiana Crapcea	F.Gabriela Stanciu
01	17.07.2023	Internal issue	Blumenfield® Working group	Cristiana Crapcea	F.Gabriela Stanciu
02	24.10.2023	Issued for authorities	Blumenfield® Working group	Cristiana Crapcea	F.Gabriela Stanciu

DOCUMENT REFERENCE: BMF – ND – EIA – 08 -002

Company	Project	Study type	Chapter	Revision
BMF	Neptun Deep	EIA	8	02

CONTENTS

8 DESCRIPTION OF MEASURES CONSIDERED FOR AVOIDANCE, PREVENTION. REDUCTION OR, IF POSSIBLE, COMPENSATION OF ANY IDENTIFIED SIGNIFICANT ADVERSE EFFECTS ON THE ENVIRONMENT AND DESCRIPTION OF ANY PROPOSED MONITORING MEASURES	4
8.1 DESCRIPTION OF MEASURES TAKEN TO AVOID, PREVENT, REDUCE OR, IF POSSIBLE, COMPENSATE ANY SIGNIFICANT NEGATIVE EFFECTS ON THE ENVIRONMENT	4
8.2 Monitoring of environmental factors	19
8.2.1 Proposed monitoring program for the construction phase	20
8.2.2 Proposed monitoring program for the operation stage.....	25
8.2.3 Monitoring of environmental factors during the decommissioning period.....	32

List of tables

<i>Table 8.1 Environmental protection measures proposed for physical environmental factors and social environment</i> ____	5
<i>Table 8.2 Environmental protection measures proposed for biological environmental factors</i> _____	13
<i>Table 8.3 Measures to prevent/ mitigate/ reduce the impact in the border context (for Bulgaria)</i> _____	17
<i>Table 8.4 Plans developed for all phases of the Neptun Deep project</i> _____	19
<i>Table 8.5 Monitoring and auditing requirements for all stages of project development</i> _____	19
<i>Table 8.6 Proposed monitoring program for the construction phase</i> _____	20
<i>Table 8.7 Biodiversity monitoring during the construction stage</i> _____	24
<i>Table 8.8 Monitoring of technological parameters in the operating stage</i> _____	25
<i>Table 8.9 Program proposal of monitoring impact of effluent on marine environment in during production operations within the Neptun Deep project</i> _____	27
<i>Table 8.10 Eco-toxicological monitoring of effluent effects – laboratory tests</i> _____	29
<i>Table 8.11 Proposal Program for monitoring marine water quality indicators</i> _____	30
<i>Table 8.12 Proposal for sediment monitoring program</i> _____	31
<i>Table 8.13 Proposals looking PROGRAM of mONITORING A iMPACT EFFLUENT on ENVIRONMENT marine in the time production operations within the Neptun Deep project</i> _____	32

CHAPTER 8 DESCRIPTION OF MEASURES CONSIDERED FOR AVOIDANCE, PREVENTION, REDUCTION OR, IF POSSIBLE, COMPENSATION OF ANY IDENTIFIED SIGNIFICANT ADVERSE EFFECTS ON THE ENVIRONMENT AND DESCRIPTION OF ANY PROPOSED MONITORING MEASURES

8.1 DESCRIPTION OF MEASURES TAKEN TO AVOID, PREVENT, REDUCE OR, IF POSSIBLE, COMPENSATE ANY SIGNIFICANT NEGATIVE EFFECTS ON THE ENVIRONMENT

Considering the impact of the project on the environment, as it results from the presentation in **Section 6.2 Evaluation of significant impacts on the environment**, as well as the specifics of its main activity, the environmental objectives that need to be met and monitored are as follows:

- the protection of the soil and the water quality, by reducing the infiltration of pollutants;
- maintaining the ambient air quality by controlling air emissions;
- the preservation of the biodiversity of specific habitats, as well as the preservation of habitats of conservation interest, in order to ensure the continuous development of species in the project implementation area;
- the correct management of the waste resulting from each stage of the project.

In order to maintain the quality of the environmental factors within the limits of acceptability, in accordance with their reference state, a series of preventive measures are required to be implemented within the life cycle of the Neptun Deep project.

At the same time, in order to reduce the environmental impact to an insignificant level on the environmental factors for which the analysis resulted in a moderate impact, a series of measures specific to the affected environmental factor are proposed.

Table 8.1 below presents the prevention and avoidance measures as well as those to reduce the impact for the physical factors and social environment, which will be an integral part of the project.

Table 8.2 below presents the measures to prevent/ mitigate/ reduce the impact on biodiversity, extracted from the Adequate Assessment Study.

Table 8.3 presents the measures to prevent/ mitigate/ reduce the impact in the cross-border context.

Table 8.1 Environmental protection measures proposed for physical environmental factors and social environment

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/Prevention	Reduction		Construction	Operation	Decommissioning
Land use	Temporary occupation of land/ temporary disturbance of fauna species of community interest	The occupation of additional land areas, compared to those provided by the technical project, will be avoided;	√		Onshore	√		
		Construction/decommissioning works will take place only in the areas demarcated for the works	√		Onshore	√		√
		The transport of materials will only be carried out on the developed/ existing access roads	√		Onshore	√		√
Soil and basement	Soil degradation in the excavation area and changes in soil and subsoil stratigraphy	Soil excavation work will only take place in the areas demarcated for the work	√		Onshore	√		
		The topsoil will be stored separately to be used for landscaping, after the completion of construction works	√		Onshore	√		
		Surplus excavated soil will be transported to authorized economic agents or waste dumps to be used as cover material	√		Onshore	√		
		Avoiding the direct placement of assembly/ construction materials and waste resulting from the works on the ground	√		Onshore	√		
	Waste management	Waste management according to its category and types	√		Onshore	√	√	√
	Accidental hydrocarbon pollution	Compliance with the accidental pollution prevention and control plan	√		Onshore	√	√	√
		The provision of absorbent materials for the intervention in case of accidental pollution with hydrocarbons	√		Onshore	√	√	√
		Staff training on how to act and respond in the event of accidental pollution	√		Onshore	√	√	√
Sedimentary substrate	Structural change at the level of the sedimentary substrate	Installation of a suspended solid matter retention curtain to mitigate the dispersion of suspended sediments for the construction work in shallow water where such curtains can be effective (measure in line with the protection of marine habitats of conservation interest within ROSAC 0273 Cape Tuzla marine area)	√		Offshore	√		

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/Prevention	Reduction		Construction	Operation	Decommissioning
	Sedimentation of chemical residues contained in the discharged effluent	Compliance with the dose of chemical products in the hydrotest water, the produced water to avoid changing the chemical parameters of the sediments	√		Offshore	√	√	
Water bodies and the marine environment	Modification of sea water quality indicators	Auditing of vessels involved in the project to ensure compliance with MARPOL 73/78 requirements regarding the planned discharge from ships of treated sewage, food waste, uncontaminated water into the sea	√		Offshore	√	√	√
		Waste water exceeding 15ppm hydrocarbons will be collected and transported to shore for treatment as per MARPOL international convention regulations.	√		Offshore	√	√	√
		Installation of wastewater monitoring and sampling points on the drilling platform to ensure that planned wastewater discharges meet MARPOL 73/78 compliance requirements	√		Offshore	√		
		Equipping the Neptun Alpha platform with appropriate containment, treatment and monitoring systems as part of the design.	√		Offshore		√	
		Adherence to chemical product dosage in pipeline hydrotest water and planned discharge of produced water	√		Offshore	√		√
	Modification of sea water quality indicators	Maintaining standard requirements and best practices regarding preventive maintenance of Neptun Alpha equipment and facilities to avoid hydrocarbon leaks and other contaminants that could enter the drainage system	√		Offshore		√	
		Internal audit of compliance with the requirements imposed in the permits and authorizations regulating the impact of the activity on the quality of marine water.	√		Offshore		√	
	Accidental pollution with marine fuel	Develop and implement safe fuel transfer procedures	√		Offshore	√		√
		Hydrocarbon and chemical storage areas are to be banded with no residues/spills permitted to enter the overboard drainage system.	√		Offshore	√	√	√

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/Prevention	Reduction		Construction	Operation	Decommissioning
Water bodies and the marine environment		Establishing operational procedures for the vessels affected by the Project in the work area, to avoid the collision of vessels	√		Offshore	√	√	√
		Enforcement of safety zones around project facilities and activities	√		Offshore	√	√	√
		Proposing a schedule and an adequate number of vessels for the transport of construction materials and equipment to avoid congestion in the area, if possible	√		Offshore	√	√	√
	Accidental pollution with marine fuel	Implementation of adequate staff training and field drills for marine fuel spill prevention, containment and response	√		Offshore	√	√	√
		Ensuring that spill response and containment equipment used in the event of spills is regularly inspected and maintained, operationally checked and tested, and used during activities or available as required for the response	√		Offshore	√	√	√
	Changing the ecological state of the marine water body BLK_RO_RG_MTO 1_APE MARINE	Conducting the eco-toxicity study through chronic toxicity tests for chemicals for which there are no discharge limits set by national legislation, to validate/demonstrate that the maximum allowable discharge limits set for discharge into the marine environment, at the level of each chemical substance, ensure the protection of the marine environment, have a reduced impact on the marine aquatic ecosystem, and do not lead to the failure to achieve the environmental objectives set by the Marine Strategy Framework Directive (2008/56/EC), in correlation with the requirements set in the Water Management Permit.		√	Offshore		√	
Air quality	Local modification of air quality	In periods without precipitation, wetting of access roads and areas with active works will be ensured in order to reduce particle emissions and bring concentrations (PM10/PM2.5) within the limit values provided by the legislation in force	√		Onshore	√		

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/Prevention	Reduction		Construction	Operation	Decommissioning
Air quality		Avoiding the execution of works that involve the handling of soil quantities (excavation/filling) during periods of strong winds	√		Onshore	√		
		When placing topsoil and excavated soil deposits, the prevailing wind direction will be taken into account to reduce the likelihood of affecting sensitive receptors	√		Onshore	√		
		In strong wind conditions, dust-generating activities will be reduced or surfaces will be sprinkled with water to reduce dust dispersion	√		Onshore	√		
		Setting a maximum speed limit on temporary access roads	√		Onshore	√		
		Vehicles carrying powdery materials will be covered	√		Onshore	√		
		Machinery and vehicles engaged in construction activities should be of the latest generation for reduced fuel consumption and a lower volume of emissions.	√		Onshore			
	Reduction of atmospheric emissions	Use of MARPOL 73/78 Annex VI class certified vessels and drilling platform – Prevention of air pollution from ships		√	Offshore	√	√	√
		Use of ships and drilling platform holding the "Ship Energy Efficiency Management" class certification		√	Offshore	√	√	√
		Use of low sulphur fuel in accordance with IMO requirements		√	Offshore	√	√	√
		Maintaining good operating practices, inspection and maintenance schedules for all equipment, facilities and vehicles involved in the project		√	Onshore/Offshore	√	√	√
Climate	Reduction of GHG emissions; Contribution to climate change	Adhere to relevant design guidelines and include mitigation measures to reduce accidental gas leaks	√		Onshore/Offshore	√		
		Incorporating BAT studies into the design and operation process, including review of design, equipment efficiency and appropriate sizing of equipment as needed, in later stages of the project	√		Onshore/Offshore	√		
	Reduction of GHG emissions;	Compliance with any relevant legal requirements regarding emission limits	√		Onshore/Offshore	√	√	√

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/Prevention	Reduction		Construction	Operation	Decommissioning
	Contribution to climate change	Inform and impose the emission reduction company policies to the Neptun Deep Project contractors.	√		Onshore/Offshore	√	√	√
		Use of equipment and machinery with low fuel consumption to limit GHG emissions	√		Onshore/Offshore	√	√	√
		Maintaining routine maintenance procedures to ensure that engines of machines, equipment, ships are operational at the defined operational performance and at the specified emission level	√		Onshore/Offshore	√	√	√
		Implementation of environmental management plans, preparation and response for emergency situations and intervention in case of accidents that might generate additional GHG	√		Offshore	√	√	
Acoustic environment (terrestrial)	Mitigation of the level of noise produced by machinery, equipment and vehicles during construction and/or operation	Carrying out the works staged in time and space, according to the work schedule as much as possible	√		Onshore	√		√
		Installation of mobile panels to reduce the noise level during the execution of the microtunnel launch shaft, for the activities that might exceed the maximum allowable limits, in order to protect the inhabited areas		√	Onshore	√		
		Carrying out work execution activities during the day, in accordance with the declared work hours schedule.	√		Onshore	√		
		Carrying out maintenance work on the equipment according to the maintenance schedule, so that the level of noise produced is below the maximum permissible limits.	√		Onshore		√	
		Perimeter planting of trees for sound attenuation when propagating through vegetation	√		Onshore		√	
The underwater acoustic environment	Attenuation of the noise level produced in the underwater environment	Standard management and mitigation procedures, such as pre-start (MMO and soft-start techniques. These procedures will have to be re-done after every pause in activity longer than 60 minutes		√	Offshore	√		

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/Prevention	Reduction		Construction	Operation	Decommissioning
		The construction works will be carried out in phases, and during the installation of the jacket pilings, no other activities which would lead to an increase in the cumulative impact of noise will be conducted.		✓	Offshore	✓		
		All vessels used in the project must comply with MARPOL 73/78 regulations		✓	Offshore	✓	✓	✓
Cultural heritage	Protection of the objectives of interest for the national cultural heritage identified in the marine area in the vicinity of the project site	Maintaining the safety zone of cultural heritage sites identified in the marine area of the project	✓		Offshore	✓		
		In the case of archaeological chance finds, the specific legal requirements for onshore or offshore activities will be applied.	✓		Onshore/Offshore	✓		
		In the event of the discovery of archaeological complexes that require "in situ" conservation, the project will adapt to the realities revealed by archaeological research as per applicable legal provisions.	✓		Onshore/Offshore	✓		
The landscape	Mitigating the visual impact due to the presence of machinery, equipment and onshore installations (NGMS).	It will be avoided to occupy additional land areas compared to those provided for in the project	✓		Onshore	✓		
		Construction work will only take place in the designated work areas	✓		Onshore	✓		
		Only the indicated access roads will be used for the transport of materials	✓		Onshore	✓		
		A curtain of vegetation will be installed and maintained to reduce the visual impact of the NGMS.		✓	Onshore	✓	✓	
Human health	Noise attenuation	Installation of mobile panels to attenuate the noise level for activities exceeding the permissible noise level, at the execution of the microtunnel entrance manhole in order to protect the inhabited areas	✓		Onshore	✓		

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/Prevention	Reduction		Construction	Operation	Decommissioning
		All mechanical equipment must comply with standards regarding environmental noise emissions according to <i>GD 1756/2006 on limiting the level of noise emissions in the environment produced by equipment intended for use outside buildings.</i>	√		Onshore	√		√
		Complete avoidance or reduction of oversized transport during the night.	√		Onshore	√		√
		All vehicles will turn off their engines - no vehicle will have its engine running at standstill.	√		Onshore	√		√
		Adopting a flexible work schedule, so as to ensure the comfort of residents during the quiet period during the day and at night;			Onshore	√		√
		Perimeter tree planting for sound attenuation when propagated by vegetation	√		Onshore		√	
	Mitigating the increase in the concentration of dust and pollutants in the air	During periods without precipitation, it will be ensured the wetting of access roads and areas with active works to reduce particulate emissions and to comply with concentrations (PM10 / PM2.5) in the limit values provided by the legislation in force	√		Onshore	√		√
		Avoiding the execution of works that involve the handling of soil quantities (scrapings / fillings) during periods of strong winds	√		Onshore	√		√
		Setting a maximum speed limit on temporary access roads	√		Onshore	√		√
	Material goods and	Marking of areas where planned works overlap with pipelines	√		Onshore	√		√

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/Prevention	Reduction		Construction	Operation	Decommissioning
natural resources	Preventing any impact on material assets	Work in areas of overlap with public utility pipes will be done manually	√		Onshore	√		√
	Preventing the inefficient use of resources for sustainable exploitation	The use of natural resources in the quantities allocated by the technical design, in order to avoid the depletion of natural resources	√		Onshore	√		
		Compliance with the natural gas exploitation program agreed with the regulatory authorities	√		Offshore		√	
		Implementation of emergency preparedness and response plans, in order to avoid major accidents	√		Onshore/Offshore	√	√	√
Economic and social environment	The actual development of the Neptun Deep project (change of land use owned by OMVP, present NGMS and CCR, Neptun Alpha)	Implementation of a communication plan with the local community to provide information regarding the evolution of the project, and the achievement of the environmental performances established by the regulatory acts, while providing the opportunity to respond to the community's concerns in connection with the project	√		Onshore	√	√	√
	Prevention of the risk of major accidents as a result of the collision with ships within or outside the project	Ensuring 500m safety zones around the drilling platform/production platform to avoid collision with vessels within and outside the project; as well as exclusion zone along sub-sea pipeline to avoid accidental entanglement with fishing and trawling gear or anchors.	√		Offshore	√	√	

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/Prevention	Reduction		Construction	Operation	Decommissioning
Economic and social environment	Prevention of congestion of naval traffic and port operation activities	Coordinating schedules regarding the loading/unloading and movements of the ships in the project with the economic activities in the port area	√		Offshore	√	√	√
	Prevention of affecting the naval traffic of other vessels (commercial, fishing)	Informing the port authorities about the project's vessel traffic schedule	√		Offshore	√	√	√
	Prevention of damage to recreational and/or tourist activities in the coastal area of Tuzla and Costinești communes.	To avoid increasing the turbidity in the coastal waters during the summer season, the execution of the microtunnel's exit into the sea will be scheduled for the off-season.	√		Offshore	√		

Table 8.2 Environmental protection measures proposed for biological environmental factors

Measure-description	Measure type (P/E/R)	Affected habitat species	Parameter to which the measure is addressed	The impact to which the measure is addressed	The period of implementation of the measure	The location of the implementation of the measure
ROSAC0273 Cape Tuzla marine area						
MS 1. The anchor plan will be followed which minimizes (7 positions) the use of anchors in ROSAC0273. Any change to the planning of anchorages in ROSAC0273 will be made only after informing and with the consent of the authorities for environmental protection (APM and ANANP).	E/P	1170(E) and 8330(P)	Habitat area	Habitat alteration	Construction stage	Barge anchor points in ROSAC0273: T1.1, T1.5, T2.1, T2.5, T3.1, T3.5, T8.4

Measure-description	Measure type (P/E/R)	Affected habitat species	Parameter to which the measure is addressed	The impact to which the measure is addressed	The period of implementation of the measure	The location of the implementation of the measure
MS 2. For the anchor that overlaps with the charted area of habitat 8330 (outside ANPIC), a new position will be identified in the vicinity that will not intersect habitats on hard substrate.	p	8330	Habitat area	Losses from the habitat area outside the ANPIC	Construction stage	Barge mooring point outside ROSAC0273: T6.3
MS 3. Anchor drop work will be assisted by biodiversity conservation specialists and anchor placement areas will be inspected prior to commencing work using ROV equipment.	p	8330	Habitat area	Losses from the habitat area outside the ANPIC	Construction stage	Barge anchor points
MS 4. In order to limit the expansion of the sediment plume inside and outside the ANPIC, turbidity curtains will be installed around the work areas of the transition trench, which will retain most of the sediments in suspension.	E	1110, 1170, 8330	Habitat area Characteristic invertebrate species	Habitat alteration Losses from the habitat area outside the ANPIC	Construction stage	Gas pipeline trench
MS 5. Carrying out excavation works in the shore area only during periods of calm sea (maxim Beaufort 3).	E	<i>Alosa tanaica</i> , <i>Alosa immaculata</i> , <i>Tursiops truncatus</i> , <i>Phocoena phocoena</i> , 1110, 1170, 8330	The ecological status of water based on physico-chemical indicators	Disruption of species activity Habitat alteration	Construction stage	Gas pipeline trench Pct. M3/PM1 microtunnel entrance from the marine side of the project
MS 6. Realization of intervention plans in case of accidental pollution. Barges and ships to be equipped with intervention equipment in case of accidental pollution.	P/E	<i>Alosa tanaica</i> , <i>Alosa immaculata</i> , <i>Tursiops truncatus</i> , <i>Phocoena phocoena</i> , 1110, 1170, 8330	The ecological status of water based on physico-chemical indicators	Disruption of species activity Habitat alteration	Construction stage	Gas pipeline trench Pct. M3/PM1 microtunnel entrance from the marine side of the project
ROSCI0311 Viteaz Canyon						
MS 6. Realization of intervention plans in case of accidental pollution. Barges and ships to be equipped with intervention equipment in case of accidental pollution.	P/E	<i>Tursiops truncatus</i> , 1180, 1170	The ecological status of water based on physico-chemical indicators	Disturbance of species Habitat alteration	Construction stage and Operation stage	Platform Neptun Alpha (offshore)

Measure-description	Measure type (P/E/R)	Affected habitat species	Parameter to which the measure is addressed	The impact to which the measure is addressed	The period of implementation of the measure	The location of the implementation of the measure
MS 7. Imposing a marine mammal exclusion zone. The work of fixing the platform will only start if there are no dolphins present in the exclusion zone of 500 m around the work after a 30-minute observation period.	p	<i>Tursiops truncatus</i> , <i>Phocoena phocoena</i> (not a conservation objective of ROSCI0311)	Population size	Reduction of population numbers through accidental injury or killing	Construction stage	Platform Neptun Alpha (offshore)
MS 8. To avoid potential injury or accidental killing of cetaceans, as a result of noise and vibration emissions, at the beginning of the work of fixing the piers to the platform jacket, only 20% of the power of the installation of driving these piers will be used during of 120 minutes (<i>soft start</i> procedure), so that the individuals in the affected area (3.5 km in the case of <i>T. truncatus</i> and <i>D. delphis</i> ; 19-20 km in the case of the <i>P. phocoena species</i>) can safely leave the area affected by project. The <i>soft start</i> procedure will be applied every time the piling fixing works will be interrupted for more than 60 minutes.	p	<i>Tursiops truncatus</i> , <i>Phocoena phocoena</i> (not a conservation objective of ROSCI0311)	Population size	Reduction of population numbers through accidental injury or killing	Construction stage	Neptun Alpha platform (offshore)

Measure-description	Measure type (P/E/R)	Affected habitat species	Parameter to which the measure is addressed	The impact to which the measure is addressed	The period of implementation of the measure	The location of the implementation of the measure
MS 9. Carrying out the eco-toxicity study by performing chronic toxicity tests, for all chemical substances that will be discharged into the sea, including biocide and methanol, through which to validate/demonstrate that the maximum permissible limit values established for discharge into the marine environment, at the level of each chemical substance, ensures the protection of the marine environment, has a low impact on the marine aquatic ecosystem and does not lead to the non-achievement of the environmental objectives established by the Marine Environment Strategy Framework Directive (2008/56/EC). In the situation where the chronic toxicity study will highlight negative effects on the biological components of the marine environment, the beneficiary will have the obligation to adapt/reconsider the substances used (Measure in correlation with the requirements of the Water Management Notice)	E	1170, 1180, <i>Tursiops truncatus</i>	Ecological status of water based on ecological indicators	Disruption of species activity Habitat alteration	Before starting the works and during the construction stage	Neptun Alpha platform (offshore)
ROSCI0293 Costinești- August 23						
MS 5. Carrying out excavation works in the shore area only during periods of calm sea (maximum Beaufort 3).	E	<i>Alosa tanaica</i> , <i>Alosa immaculata</i> , <i>Tursiops truncatus</i> , <i>Phocoena phocoena</i> , 1110, 1170, 1140, 8330	The ecological status of water based on physico-chemical indicators	Disruption of species activity Habitat alteration	Construction stage	Gas pipeline trench Pct. M3/PM1 microtunnel entrance from the marine side of the project
MS 6. Realization of intervention plans in case of accidental pollution. Barges and ships to be equipped with intervention equipment in case of accidental pollution	P/E	<i>Alosa tanaica</i> , <i>Alosa immaculata</i> , <i>Tursiops truncatus</i> , <i>Phocoena phocoena</i> , 1110, 1170, 1140, 8330	The ecological status of water based on physico-chemical indicators	Disruption of species activity Habitat alteration	Construction stage	Gas pipeline trench Pct. M3/PM1 microtunnel entrance from the marine side of the project
ROSPA0076 Black Sea						

Measure-description	Measure type (P/E/R)	Affected habitat species	Parameter to which the measure is addressed	The impact to which the measure is addressed	The period of implementation of the measure	The location of the implementation of the measure
MS 5. Carrying out excavation works in the shore area only during periods of calm sea (maximum Beaufort 3).	E	All species of water-fowl	The ecological status of water based on physico-chemical indicators	Disruption of species activity Habitat alteration	Construction stage	Gas pipeline trench Pct. M3/PM1 microtunnel entrance from the marine side of the project
MS 6. Realization of intervention plans in case of accidental pollution. Barges and ships to be equipped with intervention equipment in case of accidental pollution	P/E	All species of water-fowl	The ecological status of water based on physico-chemical indicators	Disruption of species activity Habitat alteration	Construction stage	Gas pipeline trench Pct. M3/PM1 microtunnel entrance from the marine side of the project

Table 8.3 Measures to prevent/ mitigate/ reduce the impact in the border context (for Bulgaria)

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/ Prevention	Reduction		Construction	Operation	Decommissioning
Land use	No impact in cross-border context	No measures required						
Soil and basement	No impact in cross-border context	No measures required						
Sedimentary substrate	No impact in cross-border context	No measures required						
Water bodies and the marine environment	Accidental pollution with marine fuel	Implementation of adequate staff training and field drills for fuel spill prevention, containment and response	√		Offshore	√	√	√
		Ensuring that spill response and containment equipment used in the event of spills is regularly inspected and maintained, operationally checked and tested, and used during activities or available as required for the response	√		Offshore	√	√	√
Air quality and climate change	No direct impact to air quality in cross-border context	No additional measures required besides the ones listed in Table 8.1						

Environmental factor	Impact aspect	Measure	Measure type		Location	Project stage		
			Avoidance/ Prevention	Reduction		Construction	Operation	Decommissioning
Acoustic environment (terrestrial)	No impact in cross-border context	No measures required						
The underwater acoustic environment	Attenuation of the noise level produced in the underwater environment to protect the marine mammals	Standard management and mitigation procedures, such as pre-start MMO and soft-start techniques. These procedures will have to be re-done after every pause in activity longer than 60 minutes.		✓	Offshore	✓		
Cultural heritage	No impact in cross-border context	No measures required						
The landscape	No impact in cross-border context	No measures required						
Population health	No impact in cross-border context	No measures required						
Material goods and natural resources	No impact in cross-border context	No measures required						
Economic and social environment	No impact in cross-border context	No measures required						

8.2 Monitoring of environmental factors

To ensure that prevention/mitigation/reduction measures are implemented, a series of plans will be developed and implemented to include specific monitoring activities and milestones for checking compliance.

These plans will set out how to implement the corrective actions to be applied in the shortest possible time when necessary. Table 8.4 summarizes the plans and audits required for each phase of the project both onshore and offshore. Environmental audits are expected to be initiated prior to the start of construction work and maintained throughout the life cycle of the project.

Table 8.4 Plans developed for all phases of the Neptun Deep project

Plan name	Project stage			
	Construction/ installation	Drilling	Operation	Decommissioning
Environmental management and monitoring plan	√	√	√	√
Waste management plan	√	√	√	√
Waste water management plan	√	√	√	√
Hydrotest Water Management Plan	√			
Analysis of the anchoring system (Disturbance of the sedimentary substrate)	√			
Underwater inspection plan (of the sedimentary substrate)	√			
Accidental pollution preparedness and response plan	√	√	√	√
Emergency preparedness and response plan	√	√	√	√
Crisis management plan	√	√	√	√
Decommissioning and abandonment plan				√

Table 8.5 summarizes the monitoring and auditing requirements for all project development phases both onshore and offshore. The plans mentioned in table 8.4 will include the details of monitoring activities, such as frequency, monitoring and data recording modalities, and their implementation will be periodically audited to verify compliance.

Table 8.5 Monitoring and auditing requirements for all stages of project development

Monitoring/auditing	Stages of the project			
	Construction/ installation	Drilling	Operation	Decommissioning
MODU audit before mobilization		√		
Auditing support ships before mobilization	√	√	√	√
Fuel consumption monitoring	√	√	√	√
Soft start protocol for driving piles	√			
Auditing sampling points for waste water discharges from ships, produced water at sea.	√		√	
Monitoring of water quality parameters	√	√	√	√

Monitoring/auditing	Stages of the project			
	Construction/ installation	Drilling	Operation	Decommissioning
Monitoring soil quality parameters	√			√
Monitoring sediment quality parameters	√	√	√	√
Air quality monitoring onshore	√		√	
Monitoring the acoustic pressure level onshore	√			
Biodiversity monitoring	√	√	√	√

8.2.1 Proposed monitoring program for the construction phase

Before the start of construction work both onshore and offshore, measurements, sampling and analysis of parameters will be carried out to establish the reference condition before the start of work.

The results of the analyses for those parameters that are not found in the reference norms with maximum admissible values, or whose values are usually found in a natural state higher than the reference value established by normative acts, will be reported to the value resulting from the determination reference state (e.g. Hg, or Pb in seawater).

The report on the reference state of the physical environmental factors will be submitted to the competent authority for environmental protection, before the notification of the start of construction work.

The parameters to be monitored both before the start of the works and during the period of the works, the location and frequency of monitoring can be found in table 8.6 below.

Table 8.6 Proposed monitoring program for the construction phase

Environmental factor	Proposed parameters for monitoring	Measurement/Sampling (Number of stations)	Sampling/measuring location	Frequency
Air	PM10, PM2,5, PTS	Minimum 4 hourly measurements/ 1 campaign	Within the boundaries of the location of onshore work areas, in the direction of sensitive areas (housing)	Quarterly (throughout the execution of works)
	Settling dust	Minimum 4 (30 days sampling)	Within the boundaries of the location of onshore work areas, in the direction of sensitive areas (housing)	Quarterly (throughout the execution of works)
Noise and vibration	Ambient sound pressure level dB(A) and vibration	Minimum 4	Within the boundaries of the location of onshore work areas, in	Quarterly throughout the execution of works)

Environmental factor	Proposed parameters for monitoring	Measurement/Sampling (Number of stations)	Sampling/measuring location	Frequency
			the direction of sensitive areas (housing)	
Soil	PAH, THP, heavy metals	Where applicable	Within the limits of the location of on-shore work areas, following observations/reporting of accidental pollution incidents	In situations of accidental pollution by oil, or hazardous chemicals
Domestic wastewater	pH, CCO-Cr; BOD5, MTS, Extractable substances in light petroleum, Anionic surfactants	Minimum 1	Onshore site organization	When emptying
Seawater	pH, salinity, dissolved oxygen, oxidizability, conductivity, total suspended matter, temperature, heavy metals (Barium, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc), PAH, TPH	Minimum 4 / work area; On the horizon of depth in the water column	Exit point of the micro-tunnel located in the coastal waters of the Black Sea	<i>Before the construction period: one sampling campaign</i>
				<i>During the construction period: monthly</i>
				<i>After completion of the construction period: one sampling campaign</i>
Seawater	Temperature (T), Salinity (S), pH, Dissolved Oxygen, Oxidizability, Conductivity, Total Suspended Matter (MTS), Heavy Metals (Cu, Cd, Cr, Ni, Pb, Ba, Zn, Hg), Total Petroleum Hydrocarbons (THP) and Polycyclic Aromatic Hydrocarbons (PAHs)	Minimum 4 samples	Black Sea sampling points located along the route of the gas production pipeline	<i>Before the construction period: one sampling campaign</i>
				<i>During the construction period: quarterly</i>
				<i>After completion of the construction period: one sampling campaign</i>
Seawater	Temperature (T), Salinity (S), pH, Dissolved Oxygen, Oxidizability, Conductivity, Total Suspended Matter (MTS), Heavy Metals (Cu, Cd, Cr, Ni, Pb, Ba, Zn, Hg), Total Petroleum Hydrocarbons (THP) and Polycyclic Aromatic Hydrocarbons (PAHs)	Minimum 4 samples	Black Sea sampling points located along the routes of supply/transmission flow-lines and umbilical cords	<i>Before the construction period: one sampling campaign</i>
				<i>During the construction period: quarterly</i>
				<i>After completion of the construction period: one sampling campaign</i>

Environmental factor	Proposed parameters for monitoring	Measurement/Sampling (Number of stations)	Sampling/measuring location	Frequency
Seawater	Temperature (T), Salinity (S), pH, Dissolved Oxygen, Oxidizability, Conductivity, Total Suspended Matter (MTS), Heavy Metals (Cu, Cd, Cr, Ni, Pb, Ba, Zn, Hg), Total Petroleum Hydrocarbons (THP) and Polycyclic Aromatic Hydrocarbons (PAHs)	4 samples	4 sampling points in the Black Sea located North, East, South and West of the Marine Production Platform	<i>Before the construction period: one sampling campaign</i>
				<i>During the construction period: quarterly</i>
				<i>After completion of the construction period: one sampling campaign</i>
Seawater	Temperature (T), Salinity (S), pH, Dissolved Oxygen, Oxidizability, Conductivity, Total Suspended Matter (MTS), Heavy Metals (Cu, Cd, Cr, Ni, Pb, Ba, Zn, Hg), Total Petroleum Hydrocarbons (THP) and Polycyclic Aromatic Hydrocarbons (PAHs)	4 samples/ drilling center	4 sampling points in the Black Sea located to the North, East, South and West from drilling centers DODC1, DODC2, PSDC1	<i>Before drilling and installation periods: one sampling campaign</i>
				<i>During drilling and installation periods: quarterly</i>
				<i>After completion of drilling and installation periods: one sampling campaign</i>
				<i>After completion of drilling and installation periods: one sampling campaign</i>
Sediment	PAH, TPH, Heavy metals: Barium, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc	Minimum 4 samples / work area	Exit point of the micro-tunnel located in the coastal waters of the Black Sea	<i>Before the construction period: one sampling campaign</i>
				<i>During the construction period: monthly</i>
				<i>After completion of the construction period: one sampling campaign</i>
Sediment	PAH, TPH, Heavy metals: Barium, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc	Minimum 4 samples	Black Sea sampling points located along the route of the gas production pipeline	<i>Before the construction period: one sampling campaign</i>
				<i>During the construction period: quarterly</i>
				<i>After completion of the construction period: one sampling campaign</i>
Sediment	PAH, TPH	Minimum 4 samples	Black Sea sampling points located along	<i>Before the construction period: one sampling campaign</i>

Environmental factor	Proposed parameters for monitoring	Measurement/Sampling (Number of stations)	Sampling/measuring location	Frequency
	Heavy metals: Barium, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc		the routes of supply/transmission pipelines and umbilical cords	<i>During the construction period: quarterly</i> <i>After completion of the construction period: one sampling campaign</i>
Sediment	PAH, TPH Heavy metals: Barium, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc	4 samples	4 sampling points in the Black Sea located North, East, South and West of the Marine Production Platform	<i>Before the construction period: one sampling campaign</i> <i>During the construction period: quarterly</i> <i>After completion of the construction period: one sampling campaign</i>
Sediment	PAH, TPH Heavy metals: Barium, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Zinc	4 samples/ drilling center	4 sampling points in the Black Sea located to the North, East, South and West from drilling centers: DODC1, DODC2, PSDC1	<i>Before drilling and installation periods: one sampling campaign</i> <i>During drilling and installation periods: quarterly</i> <i>After completion of drilling and installation periods: one sampling campaign</i>
Climate	NMCOV, NO ₂ , CO, NO _x , SO ₂ emissions	Calculation of emission factors	Fuel consumption monitoring onshore/ offshore	Annual
Waste	Chronological record of the quantities of waste generated;	-	Onshore / Offshore	Monthly

Biodiversity monitoring during the construction stage of the project is essential in terms of receptors sensitive to the effects of the activities carried out in this stage. According to the appropriate assessment study, the following taxonomic groups may be affected by the construction works:

Proposed biodiversity monitoring program is presented in the Table 8.7 below.

Table 8.7 Biodiversity monitoring during the construction stage

Proposed parameters for monitoring	Measurement/Sampling (Number of stations)	Sampling/measuring location	Frequency
Chlorophyll a Phytoplankton Zooplankton	Minimum 4 / work area; On the horizon of depth in the water column	Exit point of the microtunnel located in the coastal waters of the Black Sea	<i>Before the construction period: one sampling campaign</i>
			<i>During the construction period: monthly</i>
			<i>After completion of the construction period: one sampling campaign</i>
	Minimum 4 samples	Black Sea sampling points located along the route of the gas production pipeline	<i>Before the construction period: one sampling campaign</i>
			<i>During the construction period: quarterly</i>
			<i>After completion of the construction period: one sampling campaign</i>
	Minimum 4 samples	Black Sea sampling points located along the routes of supply/transmission pipelines and umbilical system	<i>Before the construction period: one sampling campaign</i>
			<i>During the construction period: quarterly</i>
			<i>After completion of the construction period: one sampling campaign</i>
	4 samples	4 sampling points in the Black Sea located North, East, South and West of the Marine Production Platform	<i>Before the construction period: one sampling campaign</i>
			<i>During the construction period: quarterly</i>
			<i>After completion of the construction period: one sampling campaign</i>
	4 samples/ drilling center	4 sampling points in the Black Sea located to the North, East, South and West from drilling centers DODC1, DODC2, PSDC1	<i>Before drilling and installation periods: one sampling campaign</i>
			<i>During drilling and installation periods: quarterly</i>
			<i>After completion of drilling and installation periods: one sampling campaign</i>
			<i>After completion of drilling and installation periods: one sampling campaign</i>
Zoobentos	Minimum 4 samples	Exit point of the microtunnel located in the coastal waters of the Black Sea	<i>Before the construction period: one sampling campaign</i>
			<i>During the construction period: monthly</i>
			<i>After completion of the construction period: one sampling campaign</i>

8.2.2 Proposed monitoring program for the operation stage.

8.2.2.1 Monitoring technological processes during the operating period

In the operation stage of the project, a series of monitoring activities concern technological processes, both on the Neptun Alpha platform and at NGMS, in order to achieve the environmental performance objectives. These are shown in table 8.8 below.

Table 8.8 Monitoring of technological parameters in the operating stage

Technological monitoring to maintain air quality indicators	
Neptun Alpha platform	NGMS
Gas pressure	Volumes of gas discharged through venting
Gas temperature	Gas pressure and temperature
Volumes of gas burned by open flame LP, HP	Diesel consumption - Working hours and monthly driving distances (for calculating fuel consumption)
Technological monitoring for the maintenance of sea water quality indicators at the Neptun Alpha platform	
The volume of water produced	
The salinity of the produced water	
Produced water temperature	
Hydrocarbon content in discharged effluent	
Hydrocarbon content in water of open water drain effluents	
The volume of discharged effluents	
Free chlorine analyser for compliance monitoring with NTPA-001	
Fluid level and consumption of production chemicals	
Injection rates for production chemicals	

8.2.2.1 Monitoring of the resulting effluent during the production operations of the Neptun Deep project

Although the inputs to the Neptun Alpha platform's open drain system are normally assumed to be uncontaminated, a remote drain capability is therefore installed whereby the contents of the open drain tank can be removed via the caisson discharge of produced water, this activity will only be carried out after confirming the fact that, in the discharged wastewater, the hydrocarbon content respects the limit of 15 ppm.

This measurement will be made by an online OIW (oil in water) analyser installed on the water discharge route. The analyser location is upstream of the recirculation line back to the open drain tank and provides an escape route via a hose connection to the FSV (Floating Storage Vessel) should the water quality does not meet disposal standards.

However, in order to monitor compliance with the maximum values allowed for discharge of effluent (produced water) during the operating period of the Neptun Alpha Platform, the monitoring

will also consider taking samples from the effluent, with a **quarterly frequency**. The sampling point will be before the discharge of the effluent.

The purpose of the effluent monitoring program is to verify compliance with the limits established in the water management permit and to maintain the impact level of this effluent within the agreed limits.

As soon as possible after the start of production activities in stable operating parameters, after the completion of testing and regulation activities, samples will be collected for toxicity testing of the entire effluent to confirm the results obtained during the toxicity testing of simulated effluents conducted by INCDM "Grigore Antipa".

Testing will be performed using a sample collected from the effluent prior to mixing with the cooling water so that the result obtained is not influenced by the sodium hypochlorite contained therein. The samples will be diluted in the laboratory with seawater, corresponding to the dilution of production water when combined with cooling water.

The monitoring indicators will follow:

- **Analytical monitoring** aims to verify compliance with the limits established in the water management permit for substances in well management products and for some parameters provided for by NTPA-001 in the effluent resulting from operation and maintenance. This will be carried out simultaneously with the download, once a quarter. Samples will be collected from the effluent before discharge into the natural receiver. For the substances included in the well management products, it is proposed to monitor the substances with the majority weight or that can produce chronic effects at the concentration proposed for discharge from the composition of each product.
- **Whole effluent toxicity testing** will be performed once a quarter for operation and maintenance effluent. Samples will be collected downstream of the point where any substances may be added (prior to mixing with the cooling water). If compliance with the agreed toxicity limit has been demonstrated for a full year (four quarters), the frequency of testing may be reduced to once a year. If an annual test results in toxicity greater than the limits specified in the monitoring program, testing will return to a quarterly interval. If the quarterly testing results in toxicity greater than the agreed limits, an accelerated monitoring program will be followed and the use of chemicals used in operation and maintenance will be evaluated to determine the possible cause of the increased toxicity. Effluent toxicity testing is included as a monitoring parameter and will serve to document the potential combined effects of substances originating from the reservoir water and those intentionally added to the system.

Samples will be collected in sufficient volume to ensure that all monitoring activities can be carried out and repeated if necessary. The method of collection, storage and handling must be recorded for all samples.

Before monitoring begins, a sampling and analysis plan will be generated that will include details such as container type, preservation methods, volume.

- **The monitoring of the long-term effects** produced by the effluent on the biota will be carried out by mounting cages with *Mytilus galloprovincialis* in the area of influence of the discharge and the evaluation of chronic effects by investigating some general pollution biomarkers to

determine the effects on growth, reproduction, oxidative stress etc., twice a year. The evaluation of the results will be done by comparison with the results obtained from a reference area with similar environmental conditions.

The parameters to be monitored, the analysis method and the reference values are specified in table 8.9 and table 8.10 below.

Table 8.9 Program proposal of monitoring impact of effluent on marine environment in during production operations within the Neptun Deep project¹

Monitored parameter Indicator of quality	Units	The maximum admissible value (NTPA001 or the maximum admissible limit established by regulatory acts)	Analytical method (standard, if is available)	Frequency	Neptun Alpha sampling point
Temperature	°C	35 (1)	Equipment SANDERS	Quarterly	From the effluent, from the point before discharge (NTPA Art.12.1)
pH	unity of pH	6.5 - 8.5 (1)	Method potentiometry (SR		
Suspended solids (TSS)	mg/dm ³	35.00 (60.00)	Gravimetric method (SR EN 872:2009) According to NTPA STAS 6953-81		
Biochemical oxygen consumption per 5 days (CBO5)	mgO ₂ /dm ³	25.0 (1)	SR EN 1899-2		
Chemical oxygen consumption - potassium dichromate method (CCO-Cr)	mgO ₂ /dm ³	125.0 (1)	SR ISO 6060-96		
Sulphides and hydrogen sulphide, S ²⁻	mg/dm ³	0.5 (1)	SR ISO 10530-97, SR 7510-97		
SO ₄ ²⁻	mg/dm ³	1400-1700 (2)	STAS 8601-70 or calculated from salinity data *		
Mg ²⁺	mg/dm ³	700-800 (2)	STAS 6674-77, SR ISO 7980-97, SR ISO 6059:2008 or calculated from salinity data *		
HPT (Petroleum Products)	mg/L	5 (1) 15 (3)	GC-FID (Determination of hydrocarbon index - SR EN ISO 9377-2) or According to NTPA SR 7877/1-95 - gravimetric, SR 7877/2-95 - spectrophotometric		
Free residual chlorine, Cl ₂	mg/dm ³	0.2 (1)	SR EN ISO 7393-1:2002; SR EN ISO 7393-2:2002; SR EN ISO 7393-3:2002		
Cl	mg/dm ³	9700-12000 (2)	SR ISO 9297:2001	Quarterly	From the effluent, from the point before discharge (NTPA Art.12.1)
Salinity	‰	17 -23 (2)	SR ISO 9297:2001 (Mohr Method) SR EN ISO 6332:1996/ C91:2006		
Total ionic Fe (Fe ²⁺ , Fe ³⁺)	mg/dm ³	5.0 (1)	SR EN ISO 17294-2:2017		

¹ According to INCDM - Eco-toxicity study for the environmental documentation of the Neptun Deep project, 2023. Study that is the basis for issuing the Water Management Notice.

Monitored parameter Indicator of quality	Units	The maximum admissible value (NTPA001 or the maximum admissible limit established by regulatory acts	Analytical method (standard, if is available)	Frequency	Neptun Alpha sampling point
Hg (Hg2+)	mg/dm³	0.05 (1)	Inductively coupled plasma mass spectrometry (ICP-MS)		
Cu2+	mg/dm³	0.1 (1)			
Cd2+	mg/dm³	0.2 (1)			
Pb2+	mg/dm³	0.2 (1)			
Ni2+	mg/dm³	0.5 (1)			
Cr total	mg/dm³	0.1 (1)			
Zn2+	mg/dm³	0.5 (1)			
2-Butoxyethanol*	mg/L	4.27 (4)	Gas chromatographic method with flame ionization detector (GC_FID)		
Ethoxylated fatty acid (3EO)	mg/L	0.80 (4)	Gas chromatographic method with mass spectrometer detector (GC_MS)		
2-Mercaptoethanol*	mg/L	0.14 (4)	Liquid chromatographic method with mass spectrometer detector (LC-MS/MS)		
Fatty acids, C18-unsaturated, reaction products with acrylic acid and polyethylene polyamines	mg/L	1.35 (4)	Gas chromatographic method with mass spectrometer detector (GC_MS)		
Fatty acids, reaction products with triethanolamine	mg/L	0.26 (4)			
monoethylene glycol*	mg/L	1.62 (4)	Gas chromatographic method with flame ionization detector (GC_FID)		
Glycerin*	mg/L	0.90 (4)			
L-aspartic acid, sodium salt of the homopolymer in water	mg/L	0.60 (4)	Liquid-chromatographic method with mass spectrometer detector (HPLC or LC/MS)		
Glycerin*	mg/L	0.90 (4)	Gas chromatographic method with flame ionization detector (GC_FID)		

(1) Maximum allowable values according to NTPA001.

(2) Maximum allowable values proposed by INCDM Grigore Antipa based on natural background values.

(3) Maximum allowable value according to the International MARPOL Convention.

(4) Maximum allowable values proposed by INCDM Grigore Antipa for substances not found in NTPA001.

Table 8.10 Eco-toxicological monitoring of effluent effects – laboratory tests

Monitored parameter Indicator of quality	Units	Maximum allowa- ble value	Analytical method (standard, if is available)	Frequency	SAMPLING
Effluent (produced wa- ter) result out of opera- tion and maintenance	% growth in- hibition <i>Skele- tonema cos- tatum</i>	92 (5)	Testing on <i>Skeletonema costa- tum</i> (ISO 10253:2016, Marine algal growth inhibition test with <i>Skeletonema sp.</i> and <i>Phaeodactylum tricornutum</i>) adapted to the conditions of the Black Sea	Quarterly	From the effluent, before mix- ing with the cooling wa- ter
Effluent (produced wa- ter) result out of opera- tion and maintenance	% mortality <i>Acartia tons</i>	0 (5)	Testing on <i>Acartia tonsa</i> (ISO 14669:1999, <i>Determination of toxicity lethal acutely for ma- rine copepods (Copepoda, Crustacea)</i> adapted to the conditions of the Black Sea		
Effluent (produced wa- ter) result out of opera- tion and maintenance	% <i>Chelon au- ratus</i> mortal- ity	0 (5)	Testing on <i>Chelon auratus</i> (OCSPP 850.1075, <i>Test of acute toxicity of freshwater and saltwater fish</i>) adapted to the conditions of the Black Sea		

(5) Preliminary maximum allowable values based on the acute toxicity testing results (INCDM Grigore Antipa)

8.2.2.2 Monitoring marine environment for impact evaluation on receivers areas during operation

For the monitoring of the marine environment, it is proposed to cover the area adjacent to the Neptun Deep project in accordance with the results of the DREAM modelling that highlight the risk of the effects of the effluent discharge. The results will be interpreted in relation to the evaluation before the start of the production activity (reference study).

The monitoring parameters are proposed according to *Annex III - Indicative lists of ecosystem elements, anthropogenic pressures and important human activities for marine waters from DIRECTIVE (EU) 2017/845*.

So, in the conformity with the goal project Neptun Deep, have former SELECTED parameters relevance for the pressures associated with the theme *Extraction of non-biological resources*, the activity *Extraction of oil and gas, including infrastructure*.

The anthropic pressures are corresponding to the theme *Substances, Waste and Energy*, and consist of:

- placing of nutrients and materials body
- placing other substance
- placing of water

Seawater quality monitoring during operation

In order to assess the impact on seawater quality, in the operational stage it is proposed to establish a network of 8 monitoring stations outside the 500m safety zone of the Neptun Alpha Platform. Thus, 4 monitoring stations at a maximum distance of 600m from the platform in the area of each side, 4 monitoring stations at a maximum distance of 1300m from the platform.

Sea water samples will be taken in the water column, at horizons between 0-10m, 10-30m, 30-50m, 50-80m, 80-100m, 100-120m.

"Box corer rosette niskin bottles " type equipment will be used with CTD (temperature sensor, dissolved oxygen, salinity, conductivity).

Samples will be collected in sufficient volume to ensure that all monitoring activities can be carried out and repeated if necessary. The method of collection, storage and handling must be recorded for all samples.

Table 8.11 Proposal Program for monitoring marine water quality indicators

Monitored parameter Indicator of quality	Units	Analytical method (standard, if is available)	Frequency
Temperature	°C	Equipment calibrated (in situ)	Quarterly
Dissolved oxygen	mg O ₂ / dm ³	Equipment calibrated (in situ)	
Salinity	PSU	Equipment calibrated (in situ)	
Conductivity	µS/cm	Equipment calibrated (in situ)	
Turbidity	NTU	Equipment calibrated (in situ)	
pH	unity of pH	Equipment calibrated (in situ)	
Suspended solids (TSS)	mg/ dm ³	Gravimetric method (SR EN 872:2009) According to NTPA STAS 6953-81	
Free residual chlorine, Cl ₂	mg/ dm ³	SR EN ISO 7393-1:2002; SR SR EN ISO 7393-2:2002; SR EN ISO 7393-3:2002	
Cl	mg/ dm ³	SR ISO 9297:2001	
TPH (Petroleum products)	mg/ dm ³	GC-FID (Determination of hydrocarbon index - SR EN ISO 9377-2) or According to NTPA SR 7877/1-95 - gravimetric, SR 7877/2-95 - spectrophotometric	
PAHs	mg/ dm ³		
Total ionic Fe (Fe ₂ +, Fe ₃ +)	mg/ dm ³	SR EN ISO 17294-2:2017 Inductively coupled plasma mass spectrometry (ICP-MS)	
Hg (Hg ₂ +)	mg/ dm ³		
Cu ₂ +	mg/ dm ³		
Cd ₂ +	mg/ dm ³		
Pb ₂ +	mg/ dm ³		
Ni ₂ +	mg/ dm ³		
Cr total	mg/ dm ³		

Monitored parameter Indicator of quality	Units	Analytical method (standard, if is available)	Frequency
Zn ²⁺	mg/ dm ³		
As	mg/ dm ³		
Ba	mg/ dm ³		

Sediment quality monitoring during operation

The objective of monitoring chemical parameters in sediments is to record potential changes in sediment quality as a result of the sedimentation process of the substances contained in the effluent (produced water).

The network of stations for sediment quality monitoring will be similar to that for seawater.

Sampling will be done with a "corer" type of equipment for taking undisturbed samples in the structure, at a depth of 0-30cm of the sedimentary substrate.

Samples will be collected in sufficient quantity to ensure that all monitoring activities can be carried out and repeated if necessary. The method of collection, storage and handling must be recorded for all samples.

The monitoring parameters and frequency can be found in table 8.12 below.

Table 8.12 Proposal for sediment monitoring program

Parameter	Standard method of analysis	Frequency
Heavy metals: Al, As, Ba, Ca, Cu, Cr, Hg, Ni, Pb, Zn	SR EN ISO 17294-2:2017 Inductively coupled plasma mass spectrometry (ICP-MS) method	Annual
Total PAHs TPH	SR EN 17503:2022 SR 13511:2007 The extraction method followed by gas chromatography	Annual
COT	SR EN ISO 15936:2002 Infrared spectrometry method	Annual

Monitoring of habitats and biodiversity during the operating period

The major types of habitats in the water column and on the seabed will be monitored: phytoplankton, zooplankton, and benthic communities - zoo benthos.

The sampling of biological samples will be done from the monitoring stations for water and sediment quality, using net equipment for samples from the water column, and ground grabber (Van Veen Grab) for zoo benthos.

Samples will be collected in sufficient quantity to ensure that all monitoring activities can be carried out and repeated if necessary. The method of collection, storage and handling must be recorded for all samples.

Table 8.13 *Proposals for the monitoring program of the effluent impact on the marine environment during production operations within the Neptun Deep project*

Theme	Ecosystem elements	Possible parameters and characteristics	Frequency	Number of stations	Obs.
Habitats and biodiversity	Major types of habitats in the water column (pelagic - phytoplankton and zooplankton) and on the seabed (benthic - zoo benthos)	For every type of habitat: - the composition, abundance and/or biomass of the species (spatial and temporal variation) - the structure of the species according to size and age (if applicable) - for habitats pelagic: concentration of chlorophyll "a" planktonic bloom frequency and spatial extent	Seasonal	Minimum 5 (from which 1 reference)	Water column samples from representative (minimum 5) and sediment horizons.

8.2.2.4 Air quality monitoring during the operating period

During the operating period, for normal operating conditions, air quality monitoring is not considered necessary. Emissions reporting will be determined by calculation based on technological process monitoring reports (**Section 8.2.2.1**).

8.2.3 Monitoring of environmental factors during the decommissioning period

The decommissioning (abolition) of the installations and facilities of the Neptun Deep project will be the subject of a decommissioning (demolition) project that will be approved/ authorized in advance.

The program for monitoring environmental factors during the decommissioning and post-decommissioning period will be the subject of documentation and studies for the issuance of the Environmental Agreement upon termination.