

METHODOLOGICAL CRITERIA FOR ENVIRONMENTAL MONITORING OF AN OFFSHORE PLATFORM IN THE CENTRAL ADRIATIC SEA

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Abstract

In order to assess the potential environmental impacts due to the installation of an offshore gas platform, the Central Institute for Marine Research (ICRAM) worked out a long-term monitoring plan. The plan encompasses multidisciplinary investigations aimed at evaluating possible biotic and abiotic environmental alterations. The present work reports on the methodological approach used in the study.

Keywords: monitoring, offshore platform, multidisciplinary study

The Eni S.p.A - Agip Division delivered, on 1999 to the Italian Ministry of Environment, the results the environmental impact study (1) regarding the potential effects on the atmosphere, marine ecosystem and seascape of the installation of the offshore platform "Emilio". The Ministry of Environment, after the evaluation of the study, gave the authorization to get under way the project.

The project foresaw the installation of the platform "Emilio" and two connection alongside pipelines (13 km long) to "Eleonora" platform, in an area of the Central Adriatic Sea (Italy) approximately 29 km from S. Benedetto del Tronto coastline.

The production cycle for the exploitation of the liquid petroleum gas field is expected to be approximately 10 years, mostly during the period 2001-2005.

Following the instructions of the Ministry of Environment, the drilling and production operations were carried out using low-impact technologies and ensuring that no discharges of produced waters or others oil-containing wastes were occurring.

In addition, Ministry of Environment requested to perform a long term monitoring study in accordance with the prescriptions of the ministerial decree DEC/VIA/5222 (2).

The ENI S.p.A. funded the Central Institute for Marine Research (ICRAM) to elaborate a monitoring plan to assess the environmental impacts on the marine ecosystem of the offshore structure.

A four-years monitoring plan was proposed by ICRAM and started up in December 2002.

A multidisciplinary approach was considered the most suitable to identify areas where contamination is responsible for ecosystem degradation and to monitor long-term effects of anthropogenic activities (3;4).

The proposed monitoring plan, takes into consideration a variety of biotic and abiotic parameters, encompassing chemical and physical analyses of water and sediments, benthic fauna analysis, bioaccumulation testing, fish stock assessment and indirect acoustic investigations.

Bearing in mind that a sampling design may play an important role in environmental impact assessment for detecting significant changes due to anthropogenic disturbances, an *ad hoc* sampling plan, was proposed.

In the area surrounding the platform a "gradient" sampling design was elaborated, allocating stations according to distance rather than using a randomized placement of stations. This sampling design seemed to be more appropriate to highlight environmental changes when the point source of disturbance is known (5).

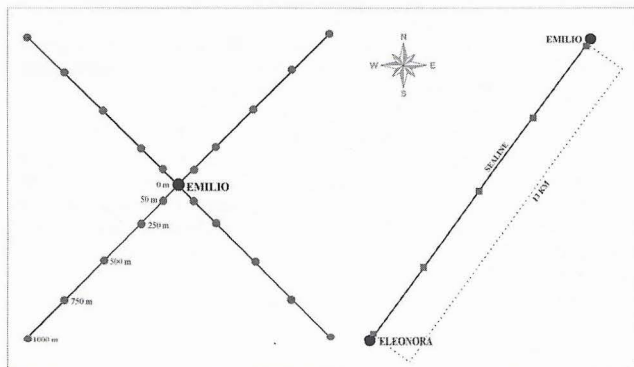


Fig. 1. The proposed sampling design in the "Emilio" area and along the sealines.

A total of 28 stations were fixed; 21 were located around "Emilio" along two orthogonal transects, one of which oriented in the direction of the NW-SE dominant current, 3 stations were in a presumably undisturbed site and 4 along the sealines (Fig. 1).

Two sampling surveys were planned for each year, aimed at collecting data on water column, benthic fauna and sediments; one was scheduled for the spring season and the second for summer, for detecting possible natural fluctuations due to seasonal variability.

In every sampling station, the following parameters have been selected for the investigation (Tab.1). Mussels (*Mytilus galloprovincialis*) bioaccumulation testing was planned in the same period above mentioned; samples should be collected on the four platform legs at two different depth (near the water surface and at -12 m, corresponding to the lower limit of the presence of the organisms). Bioaccumulation results can provide relevant information on the real environmental risk and bioavailability of some contaminants (As, Ba, Cd, Cr, Cu, Hg, Ni, Pb, Zn, PAHs, PCBs, TBT).

Tab. 1. Parameters to investigate on the samples collected during the two seasonal campaigns.

Matrix	Parameters
Water column	Acoustic current profiler, temperature, pH, salinity, transparency, dissolved oxygen, Chlorophyll a, nutrients, particulate matter
Sediments	Grain size, heavy metals (As, Ba, Cd, Cr, Cu, Hg, Ni, Pb, Zn), PAHs, PCBs, TBT, TOC, % water
Biota	benthic fauna study

Studies on fish population are to be conducted every month in proximity of the platform. Such investigations should allow to assess possible impacts of the platform on biodiversity.

The acoustic investigations, consist of a Side Scan Sonar survey to study the morphological characteristics of the bottom in an area of 4 km² surrounding the Emilio platform and along the sealines (13 km²); in addition, a Multibeam study for a detailed bathymetric survey (only in the 4 km² area), was proposed.

Periodic R.O.V. (Remotely Operated Vehicle) investigations and scuba diving surveys in the area around the platform were also planned to monitor the biocoenoses existing along the platform legs.

In relation with the results of the first year, the monitoring plan in the succeeding years could be revisited.

The proposed methodological approach, based on a long-term multidisciplinary study, will allow to collect integrated data, thus providing environmental information particularly useful for the public administration and decision makers for the protection of the marine ecosystem.

References

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