



## **Evolution of the monitoring network of seaports to a consideration of European priority substances**

**Julie DROIT<sup>1</sup>, Jocelyn HILIOU<sup>2</sup>, Mohamed EL FADILI<sup>1</sup>, Marion MESSAGER<sup>1</sup>**

1. CEREMA eau, mer et fleuves, Institut for risks, environment, mobility and development, 155 rue Pierre Bouguer, BP 5, 29280 Plouzané, France.

*[julie.droit@cerema.fr](mailto:julie.droit@cerema.fr); [mohamed.el-fadili@cerema.fr](mailto:mohamed.el-fadili@cerema.fr); [marion.messenger@cerema.fr](mailto:marion.messenger@cerema.fr)*

2. IUEM, European Institute for Marine Studies, Technopôle Brest-Iroise, rue Dumont d'Urville, 29280 Plouzané, France.

### **Abstract:**

Established in 1997, the REPOM (REseau de surveillance des PORTs Maritimes) is a network for national monitoring of ports water and sediments quality implemented by the services in charge of the littoral waters control. Since 2010, the water monitoring program has been suspended in favor of a sediment program development. Thus, the monitoring of sediment quality was complemented by the integration of the priority substances of the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD).

Indicative threshold values in sediments relative to these priority contaminants have been defined considering the existing ecotoxicological data.

The frequencies of quantification of contaminants and threshold exceedance were determined for the ports of each maritime zone and for the entire metropolitan coastline. The Review of the REPOM transitional phase, from 2010 to 2015, allowed identifying a number of recommendations for monitoring of WFD and MSFD priority substances in port sediments.

**Keywords:** Sediments, Ports, Harbours, Monitoring network, Coastal environment, Ecotoxicology, Chemicals, European directives, Priority contaminants.

### **1. Introduction**

Established in 1997, the REPOM (MINISTRY OF ENVIRONMENT, 2015)) is a network for national monitoring of ports water and sediments quality implemented by the services in charge of the littoral waters control.

Since 2010, the water monitoring program has been suspended in favor of a sediment program development. Thus, the monitoring of sediment quality was complemented by the integration of the priority substances of the WFD and the MSFD. About one hundred contaminants are analyzed at each monitoring point, see table 1.

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*Table 1. Contaminants monitored under the REPOM.*

<b>Group of contaminants</b>	<b>Contaminants</b>
<i>Contaminants regulated for dredging activities</i>	<i>Heavy metals, HAP, PCB, TBT</i>
<i>Organostanics</i>	<i>TBT derivatives : DBT, MBT Triphenyltin cation</i>
<i>Organochlorines</i>	<i>(<math>\alpha</math>, <math>\beta</math>, <math>\gamma</math>) HCH, Aldrin, dieldrin, endrin, isodrin, HCB, DDT, endosulfan</i>
<i>Organophosphates</i>	<i>Trifluralin</i>
<i>Phenols and derivatives</i>	<i>Nonylphenol, octylphenol, pentachlorophenol, tetrabromobisphenol-A</i>
<i>Brominated compounds</i>	<i>PBDE, (<math>\alpha</math>, <math>\beta</math>, <math>\gamma</math>) HBCD (since 2014)</i>
<i>Phtalates</i>	<i>DEHP</i>
<i>Perfluorinated compounds</i>	<i>PFOS (since 2014)</i>
<i>Dioxins and Furans</i>	<i>2, 3, 7, 8-T4CDD, 2, 3,7, 8-T4CDF... (since 2014)</i>

The REPOM is now part of the MSFD monitoring network for the definition of good ecological status of marine waters.

The analysis of the "transitional phase" data 2010-2015 aims to improve knowledge on concentrations of priority substances in port sediments and to contribute to the evolution of the regulatory framework related to the assessment of the dredged sediments quality.

## **2. Method**

Between 2010 and 2014, 213 ports in metropolitan France and overseas territories were monitored each year, and for some at multiple monitoring points.

Since 2015, the number of monitoring points has been reduced to 193 (for 130 ports). In addition, the sampling frequency was reduced to once every 3 years.

The concentrations of priority contaminants measured in the sediments of these harbors between 2010 and 2015 were analyzed from this database.

Contaminants regulated for dredging activities (heavy metals, tributyltin, PAH, PCB) have been excluded of this study.

Indicative threshold values in sediments relative to priority contaminants have been defined by the CEREMA considering the existing ecotoxicological data:

- Quality standard for sediment (Qsed) derived from the Quality standards of the WFD available for the water compartment (EUROPEAN COMMISSION, 2005).
- Predicted No Effect Concentration (PNEC) based on ecotoxicological data.
- Ecological Assessment Criteria (EAC) established under the OSPAR (OSPAR, 2012) Convention.

In the absence of information, the concentrations were compared to the analytical quantification limits.

### 3. Results

The frequencies of quantification of contaminants and threshold exceedance were determined for the ports of each maritime zone and for the entire metropolitan coastline. The following table 2 presents the most frequently quantified substances for all the Mediterranean ports monitored by the REPOM (excluding regulated contaminants for dredging activities).

*Table 2. Most frequently quantified substances of the transitional phase of the REPOM in Mediterranean ports.*

Substances	Quantification frequency	Threshold exceedance frequency	Number of analyses
Hexabromocyclododecans (HBCDD)	100,0%	-	16
Dibutyltin (DBT)	92,7%	-	602
Monobutyltin (MBT)	90,7%	-	602
Diéthylhexylphtalat (DEHP)	84,6%	5,5%	547
Dioxins et furans	76,1%	-	272
PBDE 209 (Polybromodiphenylether )	72,5%	-	40
PBDE 47	52,5%	-	40
p,p'-DDT	48,7%	7,8%	419
DDT totaux (Dichlorodiphenyl trichlorated)	44,8%	10,3%	1384
Nonylphenols	35,7%	34,9%	678
Triphenyltin	32,6%	-	570
Beta endosulfan	25,8%	-	507
PBDE 207	25,0%	-	40

### 4. Conclusions

Review of the REPOM transitional phase allowed to identify a number of recommendations for monitoring of WFD and MSFD priority substances in port sediments:

- Substances that have never been quantified for the entire coastline or for one or more maritime zone may no longer be monitored in the concerned areas : gamma and beta HBCD, PFOS, Sulfate endosulfan.
- Substances that never exceed threshold values during all the transitional phase and with respect of the recommended quantification limits may no longer be monitored : Aldrin and isodrin.
- The monitoring of quantified substances on more than 20% of the samples and whose concentrations may exceed threshold values could be strengthened: DEHP, PBDE 209, DDT and derivatives, and Nonylphenol.

### 5. References

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