OSPAR COMMISSION

Protecting and conserving the North-East Atlantic and its resources

Agreement on CEMP Assessment Criteria for the QSR 2010

Agreement number: 2009-2

1. The assessment criteria set out in the attached tables should be used to assess CEMP monitoring data for the QSR 2010. A background document[1] provides justification of the selection of this set of criteria.

2. This set of assessment criteria has specifically been compiled for the assessment of CEMP monitoring data on hazardous substances contributing to the QSR 2010 to support the use of a three class assessment system. The use of this set of criteria is considered an interim solution for the purposes of the QSR 2010 until more appropriate approaches to defining certain assessment criteria can be agreed upon and implemented, taking into account, *inter alia,* the requirements of the EC Marine Strategy Framework Directive. In this regard, the further developments at § 16 below are recognised as necessary. The caveats set out below in relation to each type of criterion should be taken into account and, where necessary, stated in the relevant part of the assessments contributing to the QSR.

3. The assessment criteria set out in this document do not represent target values or legal standards under the OSPAR Convention and should not be used as such.

Tools for assessing unacceptable risks from the presence of hazardous substances

4. The Environmental Assessment Criteria (EAC), Effects Range Low and EC maximum concentrations in foodstuffs to protect public health values (EC) set out in the attached table are to be used in the QSR 2010 assessment to assess where concentrations of hazardous substances in the marine environment are at levels which may pose an unacceptable risk to the environment and its living resources.

Environmental Assessment Criteria for sediments and biota

5. EACs are assessment tools intended to represent the contaminant concentration in sediment and biota below which no chronic effects are expected to occur in marine species, including the most sensitive species. EACs continue to be developed for use in data assessments. Concentrations below the EACs are considered to present no significant risk to the environment and to that extent EACs may be considered as being related to the EQSs applied to concentrations of contaminants in water, for example under the Water Framework Directive. Concentrations below the EAC are unlikely to give rise to unacceptable biological effects.

[1] Publication number: 2009/461

6. Caution should be exercised in using these generic environmental assessment criteria in specific situations. Their use does not preclude the use of common sense and expert judgement when assessing environmental effects and/or the potential for them. Furthermore, the environmental assessment criteria, set out below, do not take into account specific long-term biological effects such as carcinogenicity, genotoxicity and reproductive disruption due to hormone imbalances, and do not include combination toxicology.

Effects Range Low in sediments

7. Effects Range values developed by the US EPA as sediment quality guidelines are used to protect against the potential for adverse biological effects on organisms. The ER-Low (ERL) value is defined as the lower tenth percentile of the data set of concentrations in sediments which were associated with biological effects. Adverse effects on organisms are rarely observed when concentrations fall below the ERL value, and the ERL therefore has some parallels with the philosophy underlying the OSPAR EACs and WFD EQSs. The procedure by which ERL criteria are derived is very different from the methods of derivation of EACs and EQSs, and so precise equivalence between the two sets of criteria should not be expected. ERL values are to be used in sediment assessments of contaminants (e.g. PAHs and metals) as an interim solution where recommended EACs are not available.

EC maximum concentrations in foodstuffs to protect public health

8. EC maximum concentrations in foodstuffs to protect public health values (EC) are set out in Commission Regulation no 1881/2006 (and subsequent additions and amendments). The maximum levels for Pb, Hg and Cd in bivalve molluscs and fish muscle set out in this document are to be used as alternatives to EACs for metals in both fish and shellfish species. These values are firmly established in EC statute, but have the disadvantage that the standards for cadmium and lead have not been directly designed for all the matrix/contaminant combinations required for the assessment. It is recognised that the use of dietary standards is not fully satisfactory in the context of an assessment addressing environmental risk, but their use is an interim solution for addressing the need for criteria until a more appropriate approach and values can be defined and agreed. In particular, it is not clear what degree of environmental risk may arise from concentrations less than the EC values, but greater than the Background Assessment Concentrations. This uncertainty needs to be acknowledged in the relevant part of the assessment.

Tools for assessing against the background

9. The Background Concentrations (BCs), Low Concentrations (LCs) and Background Assessment Concentrations (BACs) set in the attached table are assessment tools to be used in the QSR 2010 assessment to allow assessment of monitoring data in relation to the ultimate aim of the OSPAR Hazardous Substances Strategy of achieving concentrations in the marine environment near background values for naturally occurring substances and close to zero for man-made substances.

Background Concentrations in sediment and biota

10. “Background concentrations” (BCs) are assessment tools intended to represent the concentrations of certain hazardous substances that would be expected in the North-East Atlantic if certain industrial developments had not happened. They represent the concentrations of those substances at “remote” sites, or in “pristine” conditions based on contemporary or historical data respectively, in the absence of significant mineralisation and/or oceanographic influences. In this way, they relate to the background values referred to

in the OSPAR Hazardous Substances Strategy. BCs for artificial, man-made substances should be regarded as zero.

11. The BCs in the attached table have been recommended for use throughout the OSPAR maritime area. It is recognised that natural processes such as geological variability or upwelling of oceanic waters near the coast may lead to significant variations in background concentrations of contaminants, for example trace metals. The natural variability of background concentrations should be taken into account in the interpretation of CEMP data, and local conditions should be taken into account when assessing the significance of any excedence. This will need to be explained in assessment reports where it is a relevant factor.

Low concentrations in sediment and biota

12. Low concentrations (LCs) are values used to assist the derivation of BACs where there have been difficulties in assembling a dataset on concentrations in remote or pristine areas from which to derive background concentrations. Low Concentrations have been prepared by ICES 2008 on the basis of datasets from areas that could generally be considered remote but which could not be guaranteed to be free from influence from long range atmospheric transport of contaminants. Low concentrations have also been used to assess concentrations in sediments from Spain due to the specific bulk composition of sediments from the coasts of the Iberian Peninsula. It is recognised that natural background concentrations may be lower than the LCs and that they may not be directly applicable across the entire Convention area.

Background assessment concentrations in sediment and biota

13. “Background assessment concentrations” (BACs) are statistical tools defined in relation to the background concentrations (BCs) or Low Concentrations (LCs), which enable statistical testing of whether observed concentrations can be considered to be near background concentrations.

14. BACs are calculated according to the method set out in Section 4 of the CEMP Assessment Manual (OSPAR Publication 2008/379). The outcome of this method is that, on the basis of what is known about variability in observations, there is a 90% probability that the observed mean concentration will be below the BAC when the true mean concentration is at the BC. Where this is the case, the true concentrations can be regarded as “near background” (for naturally occurring substances) or “close to zero” (for man-made substances).

15. The BACs set out in the accompanying tables have been calculated on the basis of variability within the CEMP dataset currently available through databases held by the ICES Data Centre and will be refined at the working level by the relevant assessment group as further data CEMP monitoring data are collected.

Further development of assessment criteria

16. In agreeing to use of the criteria set out in the attached tables the following further development needs for assessment criteria are recognised, where necessary taking into account relevant developments under the EC MSFD:

a. finalisation of effects level criteria for PAHs and metals in sediments;

b. finalisation of effects level criteria for metals in mussels and oysters;

c. finalisation of effects level criteria for metals in fish;

d. development of effects level criteria for the polybrominated diphenyl ethers monitored under the CEMP

e. development of effects level criteria for determinands included in the pre-CEMP i.e. planar CBs, alkylated PAHs, TBT in biota, PFOS, dioxins and furans,

f. finalisation of BCs for alkylated PAHs;

g. development of EACs without normalisation for contaminants in sediments of the Iberian area.

17. The criteria set out in this agreement should be used in future CEMP assessment only until ASMO agrees on the adoption of improved assessment criteria and subject to the conditions set out in this agreement.

Table 1. Assessment criteria for heavy metals, PCBs and PAHs in sediment

(a) Sediment

PAHs (µg/kg dry weight, BC and BAC normalised to 2.5% TOC)			
Assessment	**BC**	**Blue < BAC (T_0)**	**Green < ERL (T_1)**
Naphthalene	5	8	160
Phenanthrene	17	32	240
Anthracene	3	5	85
Dibenzothiophene	0.6	---	190
Fluoranthene	20	39	600
Pyrene	13	24	665
Benz[*a*]anthracene	9	16	261
Chrysene/ Triphenylene	11	20	384
Benzo[*a*]pyrene	15	30	430
Benzo[*ghi*]perylene	45	80	85
Indeno[*1,2,3-cd*]pyrene	50	103	240
CBs (µg/kg dry weight, normalised to 2.5% TOC)			
Assessment	**BC/LC**	**Blue < BAC (T_0)**	**Green < EAC (T_1)**
CB28	0.0/0.05	0.22	1.7
CB52	0.0/0.05	0.12	2.7
CB101	0.0/0.05	0.14	3.0
CB118	0.0/0.05	0.17	0.6
CB138	0.0/0.05	0.15	7.9
CB153	0.0/0.05	0.19	40
CB180	0.0/0.05	0.10	12

Trace Metals (µg/kg dry weight, BC and BAC normalised to 5% Al)			
Assessment	**BC**	**Blue < BAC (T_0)**	**Green < ERL (T_1)**
Hg	50	70	150
Cd	200	310	1200
Pb	25 000	38 000	47 000

(b) Low concentrations in sediment from Spain

Concentrations (µg/kg dry weight)		
Assessment	**BC/LC**	**BAC**
Hg	53	91
Cd	86	129
Pb	15 500	22 400
Phenanthrene	4.0	7.3
Anthracene	1.0	1.8
Fluoranthene	7.5	14.4
Pyrene	6.0	11.3
Benz[*a*]anthracene	3.5	7.1
Chrysene	4.0	8.0
Triphenylene		
Benzo[*a*]pyrene	4.0	8.2
Benzo[*ghi*]perylene	3.5	6.9
Indeno[*1,2,3-cd*]pyrene	4.0	8.3

Table 2. Assessment criteria used for heavy metals, PCBs and PAHs in mussels and oysters

PAHs (µg/kg dry weight)			
Assessment	**LC**	**Blue < BAC (T_0)**	**Green < EAC (T_1)**
Naphthalene			340
Phenanthrene	4.0	11.0	1700
Anthracene			290
Fluoranthene	5.5	12.2	110
Pyrene	4.0	9.0	100
Benz[*a*]anthracene	1.0	2.5	80
Chrysene/ Triphenylene	4.0	8.1	
Benzo[*a*]pyrene	0.5	1.4	600
Benzo[*ghi*]perylene	1.5	2.5	110
Indeno[*1,2,3-cd*]pyrene	1.0	2.4	
CBs (µg/kg dry weight)			
Assessment	**BC/LC**	**Blue < BAC (T_0)**	**Green < EAC (T_1)**
CB28	0.0/0.25	0.75	3.2
CB52	0.0/0.25	0.75	5.4
CB101	0.0/0.25	0.70	6.0
CB105	0.0/0.25	0.75	---
CB118	0.0/0.25	0.60	1.2
CB138	0.0/0.25	0.60	15.8
CB153	0.0/0.25	0.60	80
CB156	0.0/0.25	0.60	
CB180	0.0/0.25	0.60	24
TBT (µg/kg dry weight)			
TBT	1.0	5.0	12.0
Trace Metals (µg/kg dry weight) – mussels			
Assessment	**LC**	**Blue < BAC (T_0)**	**Amber< EC maximum food level (T_1)**
Hg	50	90	2500
Cd	600	960	5000
Pb	800	1300	7500
Trace Metals (µg/kg dry weight) – oysters			
Hg	100	180	2500
Cd	1800	3000	5000
Pb	800	1300	7500

Table 3. Assessment criteria used for heavy metals and PCBs in fish

CBs (µg/kg wet weight)			
Assessment	**BC/LC**	**Blue < BAC (T_0)**	**Green < EAC^{passive} (µg/kg lipid weight) (T_1)**
CB28	0.0/0.05	0.10	64[a]
CB52	0.0/0.05	0.08	108 [a]
CB101	0.0/0.05	0.08	120 [a]
CB105	0.0/0.05	0.08	---
CB118	0.0/0.05	0.10	24 [a]
CB138	0.0/0.05	0.09	316 [a]
CB153	0.0/0.05	0.10	1600[a]
CB156	0.0/0.05	0.08	---
CB180	0.0/0.05	0.11	480 [a]
Trace Metals (µg/kg wet weight)			
Assessment	**BC**	**Blue < BAC (T_0)**	**Amber < EC maximum food level (T_1)**
Hg (muscle)	[b]	35	500
Cd (liver)	[b]	26	1000 (bivalve tissue)
Pb (liver)	[b]	26	1500 (bivalve tissue)

[a] lipid weight basis

[b] datasets too limited to recommend BCs for metals in fish

Table 4 Summary of transition points for assessing contaminants in sediment and biota for the OSPAR CEMP Assessment. T_0 = blue/green transition; T_1 = green/red or amber/red transition.

Contaminant	Transition Point	Sediment	Biota
PAH	T_0	BAC	BAC
	T_1	ERL	EAC
CB	T_0	BAC	BAC
	T_1	EAC	EAC^{passive}
Metal	T_0	BAC	BAC
	T_1	ERL	EC

Where suitable assessment criteria are not available, values will default to the lower status class.