QUALITY CRITERIA FOR INTERNATIONAL POPs MANAGEMENT II: MONITORING DESIGN AND DOCUMENTATION REQUIREMENTS

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Introduction

Besides numerous national or regional agreements concerning control or minimization of persistent organic pollutants (POPs), a global POPs convention was developed during the last years under the mandate of UNEP[1]. Not least as consequence of such agreements various POPs management activities have been started and will be started in future including (among others) monitoring and control activities. Considering transboundary dimension of the POPs problem and POPs management activities the need for harmonized quality criteria in order to evaluate and compare POPs related activities, results etc. have been illustrated[2]. An expert forum has been initiated to discuss and define such quality criteria in order to develop a quality criteria document for POPs management at first focusing on the byproducts PCDD/PCDF, PCDBs and Hexachlorobenze[2]. This document should be addressed to all who are concerned in practice with POPs related questions to enable and guarantee fulfillment of quality criteria and thus guarantee comparability and evaluation of management activities. First results of this process have been presented for POPs analysis[2,3], evaluation of exposure pathways of dioxins to humans[3] and collection of inventories[4]. As a further step in this process following it will be focused on minimum standards for documentation especially concerning POPs monitoring activities.

Monitoring Design and Concept for Minimum Standards

Monitoring programs differ in objective, extent and requirements concerning data quality and documentation requirements. However, it should be objective of the quality criteria initiative to define minimum standards for documentation in order to reach as far as possible comparability of data from different programs or – at least – to allow evaluation of data quality. Individual quality criteria will be defined for monitoring in selected media such as air, water, soil, foodstuff, waste, human monitoring or industrial and consumer products. Focusing on monitoring activities this quality criteria will be arranged according to the following individual monitoring steps:

- basic monitoring design/concept
- sampling
- analysis
- quality assurance/quality control documentation (QA/QC)
- comparable evaluation of results

Table 1 presents a short survey of basic items to be considered during POPs monitoring of water and for definition of quality criteria.

Table 1: Basic items for monitoring: example water

WATER	
1. BASIC MONITORING DESIGN:	- objective of the program: distribution, trends, exposure, intake, ... - selection of compounds: general information on compound specification, background information, *decision criteria (e.g. which PCB isomers ?)* ..... - sampling concept: individual sampling / mixed samples, solids/particles (included/excluded) ... - analysis extent: screening √ total amounts √ individual congeners ... - extent of QA/QC documentation: ISO 17025, GLP, ...
2. SAMPLING	- site and sampling description: sample type (tap water...), sampling apparatus, sampling method, depth, volume, sample vessels, transport conditions ..... - criteria for representative sampling - information on possible contamination sources: - extent sampling report:
3. ANALYSIS	- method description/characterization: pretreatment, extraction, clean-up, identification, quantification - validation/calibration extent: - analytical limits: - accuracy and specifity: - quantification and calculation specifications: - extent analysis report
4. QA/QC	- listing of QA/QC measures: - calibration tests and control/reference samples: intra-/inter-laboratory calibration tests, blank tests, reference material ....
5. COMPARATIVE EVALUATION	- evaluation of extent of documentation of individual steps and summary of general data quality of the program

For each of the underlined items a variety of detailed information can be given. It is objective of the quality criteria initiative to list possible information and to evaluate which information are necessary as minimum requirements for evaluation of data. To this point a four level scale was developed representing individual levels of data quality:

LEVEL I:	"Screening"	=	low documentation/quality , only for rough comparison of data, exceptional case
LEVEL II:	"Routine"	=	minimum standard to allow comparability, recommended to be routinely used as minimum requirement

LEVEL III:	"Improved"	=	Additional information to level II significantly improving evaluation of data quality
LEVEL IV:	"High End"	=	full / almost full documentation

Table 2 lists an example from the analysis item to illustrate this concept.

Table 2: Examples for quality levels for PCDD/PCDF analysis in water:

ANALYSIS		Level I	Level II	Level III	Level IV
extent analysis report (documentation)	- only TEQ, no congener specific data	λ			
	- TEQ, congener specific		λ	λ	λ
	- report according to ISO 17025*)		λ	λ	λ
	- recovery rate for cleanup standard			λ	λ
	- report of linearity plots			λ	λ
	- detailed documentation of calculation				λ
	- report according to GLP*)				λ
	- method validation data				λ
	-				

*) specified in detail in quality criteria document

Conclusion

Concerning the progress in international management activities on POPs comparability of management activities has to be demanded world-wide. The discussion on harmonized quality criteria within an expert forum has made further progress and is now on the way to a quite detailed definition/evaluation of minimum standards first for the monitoring sector. Further efforts will be made for further POPs management sectors in future to complete q quality criteria guideline for POPs management.

References

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