



Funding Ref. No. (UFOPLAN) 206 22 300

Environmental Research Plan of the
Federal Ministry for the Environment,
Nature Conservation and Nuclear Safety

Strategies for implementing the requirements of
Article 11 (3) I of the Water Framework Directive
aimed at preventing and minimising the
consequences of unexpected water pollution
arising from technical installations

Part II – Action Concept
Proposed measures for implementing Article 11 (3) I WFD

by

Hamburg Institute for Hygiene and Environment

and the

University of Leipzig
Institute for Infrastructure and Resource Management

COMMISSIONED BY THE

FEDERAL ENVIRONMENT AGENCY

**Umwelt
Bundes
Amt** 
Für Mensch und Umwelt

Hamburg/Leipzig September 2009



Institut für Hygiene und Umwelt
Hamburger Landesinstitut für Lebensmittelsicherheit,
Gesundheitsschutz und Umweltuntersuchungen

UNIVERSITÄT LEIPZIG
IIRM  umwelttechnik
umweltmanagement

**Strategies for implementing
the requirements of Article 11 (3) I of the Water Framework Directive
aimed at preventing and minimising the consequences of unexpected wa-
ter pollution arising from technical installations**

Part II

Action concept

Proposed measures for implementing Article 11 (3) I WFD

Imprint

Published by: Federal Environment Agency (UBA)
Wörlitzer Platz 1
D-06844 Dessau-Roßlau
Tel.: +49 340 2103-0

Client: Federal Ministry for the Environment,
Nature Conservation and Nuclear Safety (BMU),
represented by the Federal Environment Agency (UBA)

Project Coordinator: Dipl. Ing. Gerhard Winkelmann-Oei, UBA

Authors: Hamburg Institute for Hygiene and Environment (HU)
Environmental Studies Division
Water Studies Department
Marckmannstraße 129b, D-20539 Hamburg

University of Leipzig (Uni Leipzig)
Faculty of Economics and Management
Institute for Infrastructure and Resource Management
Chair of Environmental Technology/Environmental Management
Grimmaische Str. 12, D-04109 Leipzig

Contributions: Dr. Udo Rohweder (HU, Project Manager)
Dipl. Ing. Stephan Anke (HU, Executive Manager)
Dipl.-Wirt.-Ing. Marcel Fälsch (Uni Leipzig)
Prof. Dr. Robert Holländer (Uni Leipzig)
Dipl. Ing. Michael Lechelt (HU)
Dipl. Ing. Werner Blohm (HU)

Edited by: Dr. Udo Rohweder (HU)
Dipl. Ing. Stephan Anke (HU)
Tel.: +49 40 42845-3875 /-3774
E-mail: alert-wfd@hu.hamburg.de

Acknowledgements:

Dr. Peter Diehl (Rhine Quality Station Worms) for his dedicated support for the workshops, with grateful thanks.

Part II – Action Concept

Proposed measures for implementing Article 11 (3) I WFD

Contents

1	OCCASION	4
2	INTRODUCTION	5
3	CONCEPT	7
4	HAZARD PRECAUTION MANAGEMENT MEASURES	12
4.1	BASIC PREPARATIONS (PRO ACTION)	13
4.2	PREVENTION	15
5	CRISIS MANAGEMENT	17
5.1	CRISIS MANAGEMENT INSTRUMENTS (PREPAREDNESS)	17
5.2	RESPONSE MEASURES	21
6	AFTER CARE	22
7	PUBLIC INVOLVEMENT	25

Figure 1	“Safety Chain” in risk management (in the following schemes: █ authority tasks, █ operator tasks)	8
Figure 2	Hazard Precaution Management – Basic Preparations (█ Authority tasks, █ Operator tasks)	13
Figure 3	Hazard Precaution Management – Preventive measures (Prevention) (█ Authority Tasks, █ Operator Tasks)	15
Figure 4	Crisis Management – Instruments (█ Authority tasks, █ Operator tasks)	18
Figure 5	Crisis Management – Response Measures (█ Authority tasks, █ Operator tasks)	21
Figure 6	After Care – Damage Review (█ Authority tasks, █ Operator tasks)	22
Figure 7	After Care – Follow-up Measures (█ Authority tasks, █ Operator tasks)	23

1 Occasion

With a view to ensuring integrated protection of water and sustainable use of water resources, “*Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy*” (Water Framework Directive, WFD)¹ initiated a reorganisation of the entire EU water legislation. As a “framework directive”, the WFD seeks to bring together all individual acts of legislation and international conventions relating to water utilisation and water conservation.

The objectives are to be achieved by means of programmes of measures which are to be drawn up by the end of 2009 and incorporated in the river basin management plans. Article 11 (3) names the basic measures, i.e. the minimum measures to be implemented. Paragraph 31 requires measures to prevent significant losses of pollutants from technical installations, in order to prevent and reduce the impact of accidental pollution incidents including unforeseeable accidents. Such measures are also to make use of systems to detect or give warning of such events.

The action concept to be prepared for the Federal Environment Agency by the Hamburg Institute for Hygiene and Environment and the University of Leipzig is to take the form of a guide with suggested solutions for the implementation of Article 11 (3) I WFD and is to explain and illustrate the consequences of the WFD for the international river basin commissions with regard to incident problems. The action concept is based on an inventory of past and planned activities in the international river basin commissions for the Elbe, Oder, Rhine and Danube, and on an assessment of the technical and organisational aspects of compliance with the requirements of Article 11 (3) I WFD. It is addressed to the member states of the EU, but is also to serve as a recommendation for EU candidate states and UN/ECE members.

¹ OJ L327, 22.12.2000, p. 1.

This Part II of the Final Report on R+D Project 20622300 is a summary of the guide containing management proposals for the implementation of Article 11 (3) I WFD. Detailed explanations can be found in the separate Part III of the Final Report.²

2 Introduction

Management plans under the WFD are drawn up for the entire river basin district in advance for a six-year management period; implementation of the first plan is to start in 2010. The measures to be included in them serve to realise the environmental objectives of Art. 4 WFD. For surface waters this means bringing about good chemical and ecological status (or good ecological potential), having strict regard to the ban on impairing water status³. What is or is not “good” is defined on an *immission oriented* basis. For “*pollution parameters*” (chemical parameters), this means that the status of the individual body of water is characterised by means of concentration levels for the body of water in question, and achievement of the objective is tied to compliance with a (concentration) quality standard. This part and the description of status determination are the most concrete components of the WFD. Other requirements, such as precautions against incidents, are described in relatively abstract terms and their contribution to achieving the objectives needs to be specified in greater detail. Table 1 contains the original wording of the basic measures under Article 11 (3) a and Article 11 (3) I WFD.

² published on www.alert-wfd.net.

³ Furthermore, pollution by priority substances is to be gradually reduced and inputs of priority hazardous substances are gradually to be discontinued.

Table 1 Article 11 (3) a and I WFD

Article 11 WFD	Article 11 WFD
Maßnahmenprogramm	Programme of measures
(3) "Grundlegende Maßnahmen" sind die zu erfüllenden Mindestanforderungen und beinhalten	3. "Basic measures" are the minimum requirements to be complied with and shall consist of:
<p>a) Maßnahmen zur Umsetzung gemeinschaftlicher Wasserschutzvorschriften einschließlich der Maßnahmen gemäß den Rechtsvorschriften nach Artikel 10 und Anhang VI Teil A;</p> <p>I) alle erforderlichen Maßnahmen, um Freisetzungen von signifikanten Mengen an Schadstoffen aus technischen Anlagen zu verhindern und den Folgen unerwarteter Verschmutzungen, wie etwa bei Überschwemmungen, vorzubeugen und/oder diese zu mindern, auch mit Hilfe von Systemen zur frühzeitigen Entdeckung derartiger Vorkommnisse oder zur Frühwarnung und, im Falle von Unfällen, die nach vernünftiger Einschätzung nicht vorhersehbar waren, unter Einschluss aller geeigneter Maßnahmen zur Verringerung des Risikos für die aquatischen Ökosysteme.</p>	<p>(a) those measures required to implement Community legislation for the protection of water, including measures required under the legislation specified in Article 10 and in part A of Annex VI;</p> <p>(I) any measures required to prevent significant losses of pollutants from technical installations, and to prevent and/or to reduce the impact of accidental pollution incidents for example as a result of floods, including through systems to detect or give warning of such events</p> <p>including, in the case of accidents which could not reasonably have been foreseen, all appropriate measures to reduce the risk to aquatic ecosystems.</p>

Measures pursuant to paragraph (3)a are of significance for all other measures mentioned in Article 11, because to a certain extent they imply (as in the past) a request to implement all other Community provisions relating to water conservation, i.e. also those incident precaution provisions that have already been in force for many years, such as the Seveso II Directive⁴, the IPPC Directive⁵ or the UNECE Accident⁶ and UNECE Wa-

⁴ Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances; OJ L 010 of 14.01.1997, p. 13 (Seveso II Directive).

ter Conventions⁷. Measures pursuant to these and other provisions that have already been implemented by obligation or on a voluntary basis would not require any additional regulatory action in the river basin management plan to satisfy Article 11 (3) I WFD and would therefore not have to be stated in it. To this extent Article 11 (3) I WFD is to be understood as a “review assignment” to detect and fill any remaining “legal loopholes that need closing” in a field of law that is already fairly extensively regulated. The intended purpose of this action concept is not to redefine or create new definitions for all conceivable and necessary measures for a functioning risk management system under the umbrella of a single paragraph of the Water Framework Directive, but merely to specify *additional* measures that, *solely on the grounds of Article 11 (3) I*, need to be incorporated in the programmes of measures for the management plans, though certain delimitation problems are unavoidable here.

3 Concept

Chapter 3 is intended to serve as a brief outline of the structure of the concept and the selection of proposed measures. It is inevitable that a number of questions will remain open. Further explanations can be found in Chapters 4 to 7. For more detailed discussion the reader is referred to the project report².

Proposed measures were drawn up on the basis of a risk management flow chart for the surface waters path (“Safety Chain”)⁸. The safety chain is based on a time schedule in 3 main categories, each with 2 sub-categories (Figure 1), from strategic preparation for the event through damage containment to after care. Figure 2 to Figure 7 show

> Continued from previous page <

⁵ Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control, OJ L 257, 10.10.1996, p. 26ff, codified: Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (codified version), OJ L 24, 29.01.2008, p. 8.

⁶ COUNCIL DECISION of 23 March 1998 on the conclusion of the Convention on the Transboundary Effects of Industrial Accidents (98/685/EC), OJ L 326, 03.12.1998.

⁷ COUNCIL DECISION of 24 July 1995 on the conclusion, on behalf of the Community, of the Convention on the protection and use of transboundary watercourses and international lakes (95/308/EC), OJ L 186 of 5.8.1995, p. 42.

⁸ The safety chain is not a rigidly defined concept. However, Figure 1 can be derived in this or similar form, e.g. from the structure of the UNECE Accidents Convention or the OECD Guidelines for Chemical Accident Prevention and Response. The further differentiation (Figure 2 - Figure 7) is an interpretation which the authors believe makes sense for work on this project, but which could be structured differently for addressing other problems.

the further differentiation of the “links in the chain” into more specific action levels with the aim of identifying individual measures of relevance to Article 11 (3) I WFD (Chapter 4 to 6). These suggested measures are allocated in tabular form to the categories of the safety chain (Table 2 - Table 5).



Figure 1 “Safety Chain” in risk management
(in the following schemes: █ authority tasks, █ operator tasks)

Whereas in principle – albeit in varying degrees of detail – the differentiated scheme of the safety chain claims to cover all essential risk management action fields in the surface waters path, this is expressly not true of the suggested measures. These should only name measures that can be deduced (solely) from Article 11 (3) I WFD. Measures that have been or ought to have been implemented under other Community water conservation provisions, such as the IPPC or Seveso II Directives, do not fall within the purview of Article 11 (3) I WFD and do not need to be mentioned in the management plan at this point.

Definition problems arise where the wording of Article 11 (3) I WFD can be interpreted as imposing different or more far-reaching requirements than those derived from established legislation already implemented. This applies, for example, to the phrase (“*significant losses of pollutants*”) in connection with “technical installations”. The WFD remains unspecific here. There are however indications that in addition to “Seveso installations and IPPC installations” there are other installations with significant risk potential with regard to the objectives of the WFD, though it may be the case that these are already covered by national provisions in the member states. Thus the tables of measures may also contain proposed measures which in principle have been or should have been implemented under other Community water provisions, but which should at least be scrutinised to identify any need for an extension of relevance to Article 11 (3) I WFD.

A further restriction with regard to the proposed measures is their basic suitability for inclusion in management plans. Here are two examples:

1. The safety chain model is a time-based causal flow chart that takes in all types of measures, from strategic preparation through disaster response to technical restoration of the original state. Of these, only those which can be planned in advance with an implementation horizon in the management period are suitable for inclusion in management plans.⁹
2. Since management plans are prepared by state administrations, they can impose obligations on such bodies only, i.e. they can only specify measures in which the actors are primarily the state or the authorities. The result of the measure may for instance be that a plant operator has to meet certain conditions under statutory provisions or individual orders, but the initiator of the measure can only be the authority.

⁹ Although such immediate response measures to an accident cannot in themselves be part of the management plan, the plan can include all preparatory measures that put the actors in a position to react appropriately and to learn the lessons from such reaction by improving the preparations. An emergency sortie by the disaster control force would not be a measure under the WFD management plan, but such measures would for example include the design and implementation of the emergency plans, or at least a review to see whether existing emergency plans took adequate account of incidents pursuant to Article 11 (3) I WFD.

Similarly, the measures to be stated under Article 11 (3) I WFD do not, for example, include the longer-term tasks in the action field shown in the safety chain as “After Care”, such as restoring the original (good) status after an accident, especially since the occurrence of this accident could not have been foreseen when the programmes of measures were drawn up. However, the general need to perform after-care measures can be deduced from the objectives of the WFD (Art. 1, Art. 4, and especially paragraph 6). If restoration measures become necessary after the occurrence of an actual accident, these would form part of the programme of measures as “supplementary measures” (Article 11 (4) WFD), but not under Article 11 (3) I WFD.

The proposed catalogue of measures is not a list of measures to be worked through as a matter of routine, but should rather be seen as a check list for determining the need to include measures in the management plan for the relevant river basin pursuant to Article 11 (3) I WFD. Whether such a need exists and which of the measures may be involved depends on the results of the individual check. It may vary considerably between the different river basin districts, member states and administrative units. However, all measures pursuant to Article 11 (3) WFD are “basic” and represent “minimum requirements”. Thus if the scrutiny of the catalogue of measures reveals a need for action, measures must follow.

Fields of action for measures to be implemented if appropriate would include in particular:

- ⇒ Ensuring compliance with the legal and organisational requirements for the implementation of concrete measures in the field of crisis management (legal basis, assessment criteria, safety requirements etc.)
- ⇒ Analysing the potential risks (inventory of risk sources and potentially affected objects of protection, and assessment of risks)
- ⇒ Inclusion of Article 11 (3) I WFD requirements in regional-policy and land-use planning
- ⇒ Ensuring official inspection and monitoring of plants with regard to implementation of and compliance with technical requirements resulting from Art. 11 (3) I WFD
- ⇒ Design and implementation of emission-oriented and immission-oriented early warning systems for entire river basins
- ⇒ Design and implementation of warning and emergency plans for the entire river basin
- ⇒ Ensuring river basin emergency plans (provision of technical facilities and equipment and creation of responsibility structures)
- ⇒ Implementing structures for event accounting and for assessing the scale of damage

- ⇒ Implementing structures for ensuring that assessment findings are incorporated in future hazard and crisis management (“lessons learnt”)

The tables of measures (Table 2 - Table 5) show examples for each of the proposed measures. The examples are based on a review of past and planned activities in the international river basin commissions of the Elbe, Oder, Rhine and Danube. Where there are no examples available in this field, other examples are used, largely from German law. The implementation examples may take the form of measures actually put into practice, but may also relate to laws, guidelines, implementation recommendations, technical rules, safety recommendations etc. In most cases they are not a “complete package” for the measure in question, but only cover part of it. The examples are only intended as a guide, i.e. they make no claim to present a complete picture of completed implementations in the EU region. Neither do they claim to offer the best solution for the individual measure proposed.

Since the wording of Article 11 (3) I of the Water Framework Directive provides considerable creative freedom of choice regarding the type of implementation, there may be a need for consultation at river basin level or at EU level about the necessary depth of regulation. In areas that require technical solutions, e.g. “systems to detect or give early warning of such events”, it may be possible, by developing graded modular intelligent equipment concepts, to design new measurement networks for installation in river basin subsections in a way that allows them to be different but are nevertheless compatible with the system used by the river basin association as a whole. This approach could be used to tackle differences in basic conditions, for example in non-member states belonging to river basin districts extending beyond the EU. This topic will be taken up again in the final report.

The Commission will report on the implementation of the Water Framework Directive not later than 2012 (and every 6 years thereafter, Art. 18 (1)). It may if appropriate draw up its own “*strategies against pollution of water by any other pollutants or groups of pollutants, including any pollution which occurs as a result of accidents*” (Art. 16 (9) WFD). This will largely depend on the Commission’s assessment of the individual national measures relating to the topic.

Experience gained during the WFD implementation work to date, and also from the discussions during the project work and, not least, the two project workshops, has shown that integrated coordination of all administrative sectors concerned is indispen-

sable for successful implementation of the proposed measures relating to Article 11 (3) I WFD. These are not only the “classic” water management administrations, which as a rule see to national implementation of the WFD with its primarily immission-oriented objectives, but also the emission-oriented authorities that are responsible for plant licensing/monitoring and accident prevention, plus the services that can be summed up under the heading of “disaster control”.

4 Hazard Precaution Management Measures

Hazard precaution management measures include all *strategic* measures

- ◆ to prevent and minimise the release of significant quantities of pollutants from technical installations and other potential sources, and
- ◆ to protect humans, animals, the environment, property and any other objects of protection in the event of accidents which could not reasonably have been foreseen.

The core of hazard precaution management consists of preparatory measures in the form of a specific analysis of requirements and risks, and measures to create necessary legal, planning and organisation structures (Pro Action).

On the basis of the structures created, the results of the analysis of requirements can then be used to implement strategic measures tailored to the specific river basin district to ensure a functioning crisis management system (prevention).

4.1 Basic Preparations (Pro Action)

For the purpose of implementing specific measures in the field of crisis management, it is necessary to identify and assess the possible hazards and to create the legal and organisational requirements for enforcing risk minimisation and crisis management measures at authority and plant operator level.

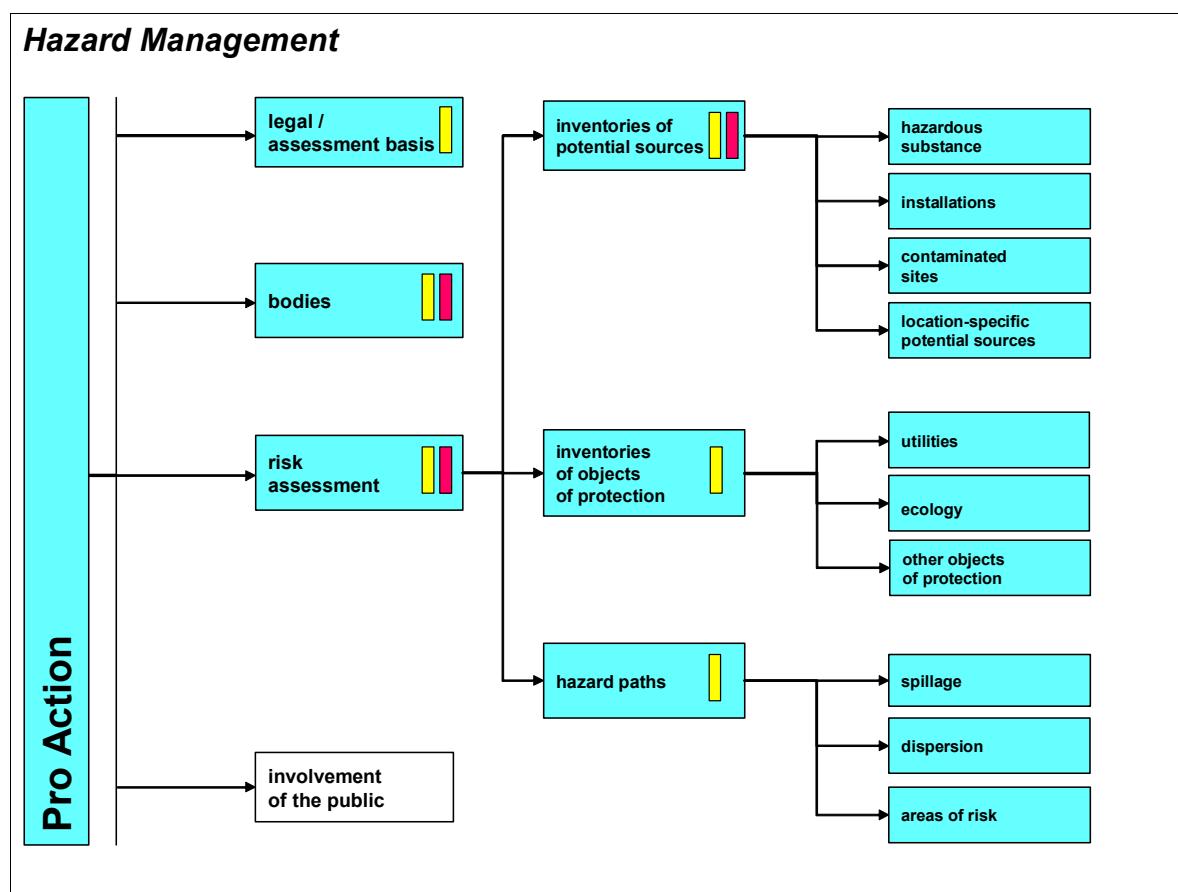


Figure 2 Hazard Precaution Management – Basic Preparations
(█ Authority tasks, █ Operator tasks)

Table 2

Hazard Precaution Management – Basic Preparations (Pro Action)	
Measure	Implementation examples
Reviewing/creating the necessary legal basis	Seveso Directive, IPPC Directive, Water Hazard Classes, Facilities Ordinance (VAwS)
Creating the necessary assessment criteria	WFD, 2006/11/EG, Seveso Directive, REACH, GHS, Water Hazard Classes, EASE
Reviewing/creating basic technical safety requirements	Recommendations of river basin commissions, BREF, Technical Rules (DVGW, VDI)
Establishing/engaging competent institutions and bodies	Expert groups (river basin commissions, national, international), industry associations, JRC
Analysis of potential hazards <ul style="list-style-type: none"> • Making inventory of safety hazards for <ul style="list-style-type: none"> ◦ Substances ◦ Plant location ◦ Contaminated site location ◦ Local safety hazards • Inventory of potentially affected objects of protection with regard to <ul style="list-style-type: none"> ◦ Human use ◦ Ecology ◦ Other objects of protection • Assessment of risks with regard to hazard paths <ul style="list-style-type: none"> ◦ Release of substances ◦ Dispersion ◦ Areas of risk 	ICPER – list of potentially hazardous plants ICPDR – potential accident risk spots ICPDR - old contaminated sites Flood maps / Earthquake maps Land use maps, CORINE Protected area maps (water, nature) Implementation of Art. 6 WFD: List of protected areas GIS-based damage forecasting / modelling

4.2 Prevention

Prevention measures should, on the basis of the assessment of “basic preparations”, comprise those measures which ensure that crisis management is tailored to the specific conditions of the individual river basin district. A distinction is made here between district-related and plant-related measures. Crisis management must have at its disposal both technical (planning) instruments and precautionary measures of an organisational, constructional or plant-specific nature.

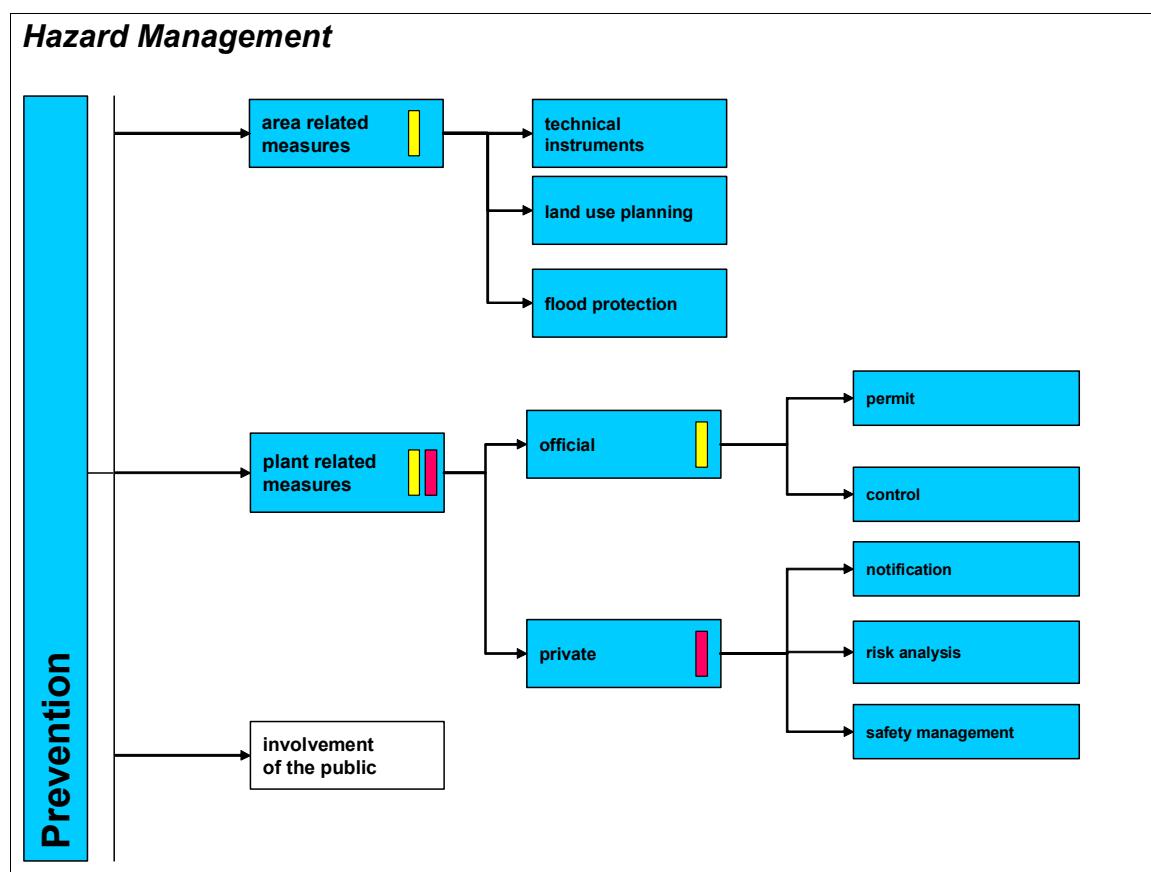


Figure 3

Hazard Precaution Management – Preventive measures (Prevention)
(█ Authority Tasks, █ Operator Tasks)

Table 3

Hazard Precaution Management – Preventive Measures (Prevention)	
Measure	Implementation examples
Provision of technical (planning) instruments	Precautionary planning software (VPS), pollutant spread models (ALAMO, data from UNDINE, for example)
Obligation to include the requirements of Article 11 (3) I WFD in regional-policy and land-use planning District-related check for sensitivities and deficits, see Article 11 (3) I WFD	Land use planning (Seveso Directive) Implementation of Directive 2007/60/EC (EC Flood Directive) Flood action plans, UBA F+E 20348362
Obligation on licensing authorities to include the requirements of Article 11 (3) I WFD in plant approval procedures	Approvals/conditions/prohibitions
Inspection and monitoring of plants with regard to implementation of and compliance with technical requirements resulting from Art. 11 (3) I WFD (inspection intervals)	Safety requirements of ICPER and ICPR, Checklist method – Federal Environment Agency, On-site checks Reporting requirements Reports by independent experts Manual on performing in-plant water conservation inspections (Hesse)
Encouraging/promoting voluntary measures at plant and higher levels (“responsible care”)	Transport accident and assistance system (TUIS), VDI cooling water concept

5 Crisis Management

This section on “crisis management” covers the range of measures from “preparedness” to “immediate response”, and is subdivided primarily into the sections on “Instruments for preparedness” and the actual “Response to a specific event”. Crisis management will only function efficiently if hazard precaution management has created a viable structural foundation.

5.1 Crisis management instruments (Preparedness)

To ensure “preparedness” it is necessary to create both a technological and an organisational basis.

The starting point of global environmental law is the ban on transboundary environmental damage under Principle 21 of the Stockholm Declaration of 1972¹⁰, which obliges (initially western) states to ensure that no damage is caused to the environment in other states or regions outside their national territory by activities within their national jurisdiction. This in itself can be construed to represent an obligation to give warning, at least in the case of serious transboundary accidents. At the 1992 conference in Rio, this principle was confirmed in Principle 2, and the obligation to provide information and warning was explicitly incorporated (Principles 18 and 19).¹¹ As a result of the new aspect of the WFD that bodies of water are no longer managed within the boundaries of administrative regions, but at the level of river basin districts, the “transboundary character” (e.g. of water pollution due to accidents), which is otherwise so important in in-

¹⁰ http://www.unep.org/Law/PDF/Stockholm_Declaration.pdf

¹¹ http://www.unep.org/Law/PDF/Rio_Declaration.pdf

Principle 18: “States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.”

Principle 19: “States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.”

ternational law, is relegated to no more than secondary importance, at least within the Community of the EU Member States.

All EU provisions^{4, 5, 6, 7} on accident prevention mentioned in the introduction (Chapter 2), and also a large number of conventions of the river basin commissions, lay down information and warning requirements. This resulted in the compilation of *warning and emergency plans* in many river basins long before the entry into force of the WFD. One frequent deficit is that only the emission-oriented path, namely notification by the polluter, is regulated.

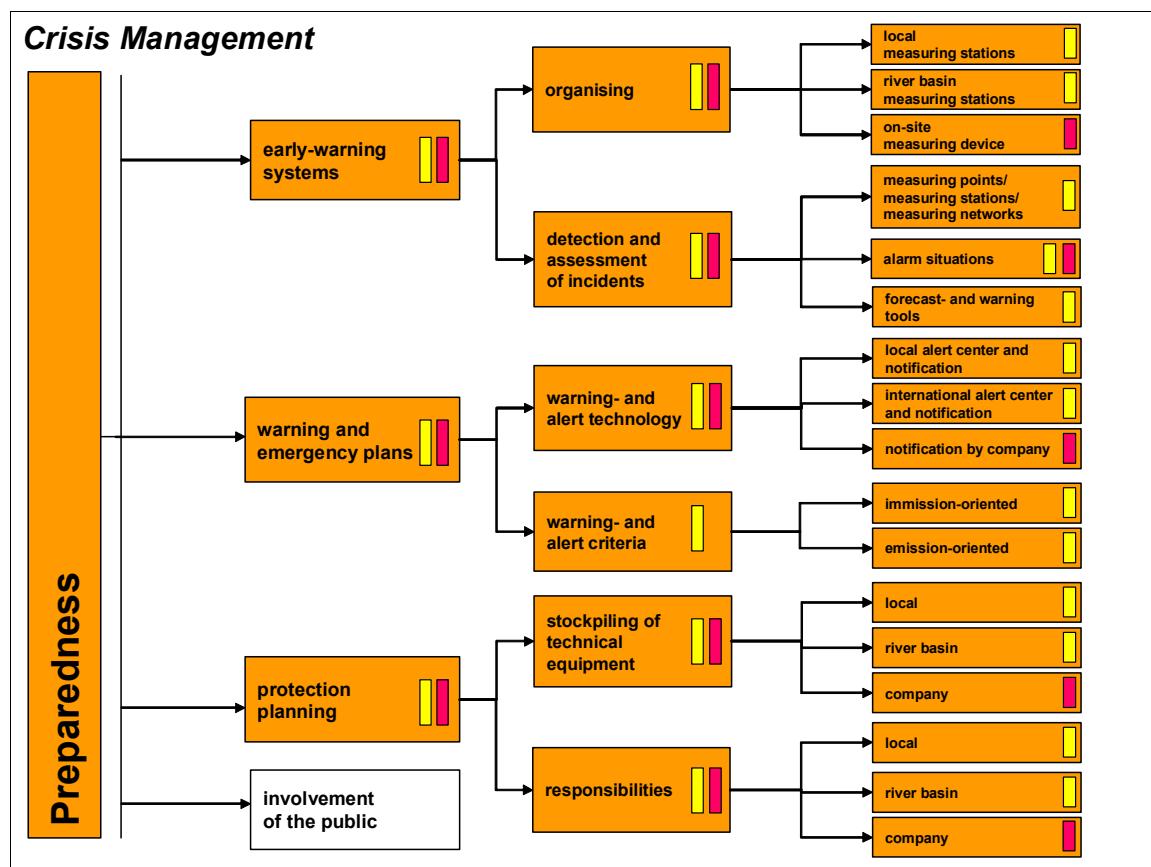


Figure 4 Crisis Management – Instruments (■ Authority tasks, ■ Operator tasks)

The requirement in Article 11 (3) I WFD to use (technical) *systems for timely detection and early warning* is new to international law-making in this explicit wording, although it is virtually indispensable where warning and emergency plans take account of the immission path, and could therefore have been justified on the basis of older provisions.

The field of *protective planning* has existed in various forms and organisations since people in their habitats have been afflicted by “extraneous disasters” (not only via the water path) and have tried to prepare for such events. Certainly no essentially new principles for this have to be deduced from Article 11 (3) I WFD. However, the preparation of programmes of measures is good reason to review the suitability of the existing structures.

Table 4

Crisis management – Crisis management instruments	
Measure	Implementation examples
Design and establishment of immission-related (river-related) early warning systems <ul style="list-style-type: none"> • Establishment of continuously operating monitoring stations • Establishment of monitoring and communication networks for entire river basin district • Development/implementation of event detection technology, evaluation and forecast instruments 	EASE, Water Surveillance System Hamburg (WGMN Hamburg), Early warning system Netherlands (Rhine/Maas), UNDINE, VPS, ALAMO Aqualarm (NL), Guidance for Chemical Monitoring under the WFD (EU Draft)
Design and establishment of emission-related (plant-specific) early warning facilities linked to the monitoring and communication network for the river basin	Seveso-II plants, e.g. Bayer, BASF
Design and implementation of warning and emergency plans for the entire river basin <ul style="list-style-type: none"> • Establishment of warning and emergency centres • Definition and technical realisation of warning and emergency paths • Definition of emission-related and immission-related warning and emergency thresholds 	Infra-web (NL) International warning and emergency plans of the ICPER (Elbe), ICPDR (Danube), ICPR (Rhine) EASE
Design and implementation of disaster control plans, accident management plans etc.	Regional disaster control plans, □Hamburg oil pollution control rules
Provision of technical facilities and equipment for protective measures and damage containment <ul style="list-style-type: none"> • at public level • at plant level 	Police, plant fire brigade, THW (Federal Agency for Technical Relief), oil barriers, “Central provision, mutual assistance”
Ensuring readiness and functioning of crisis management instruments <ul style="list-style-type: none"> • at public level • at plant level • crisis communication (across all levels) 	QM, training, exercises for entire river basin district BMI Guidelines on “Crisis Communications”

5.2 Response measures

This link in the safety chain is concerned with the measures that are implemented or have to be implemented in the event of a specific incident. These measures include the process of giving the alert, plus the immediate responses such as damage containment, measures to protect uses and other objects of protection, and also immediate damage remediation.

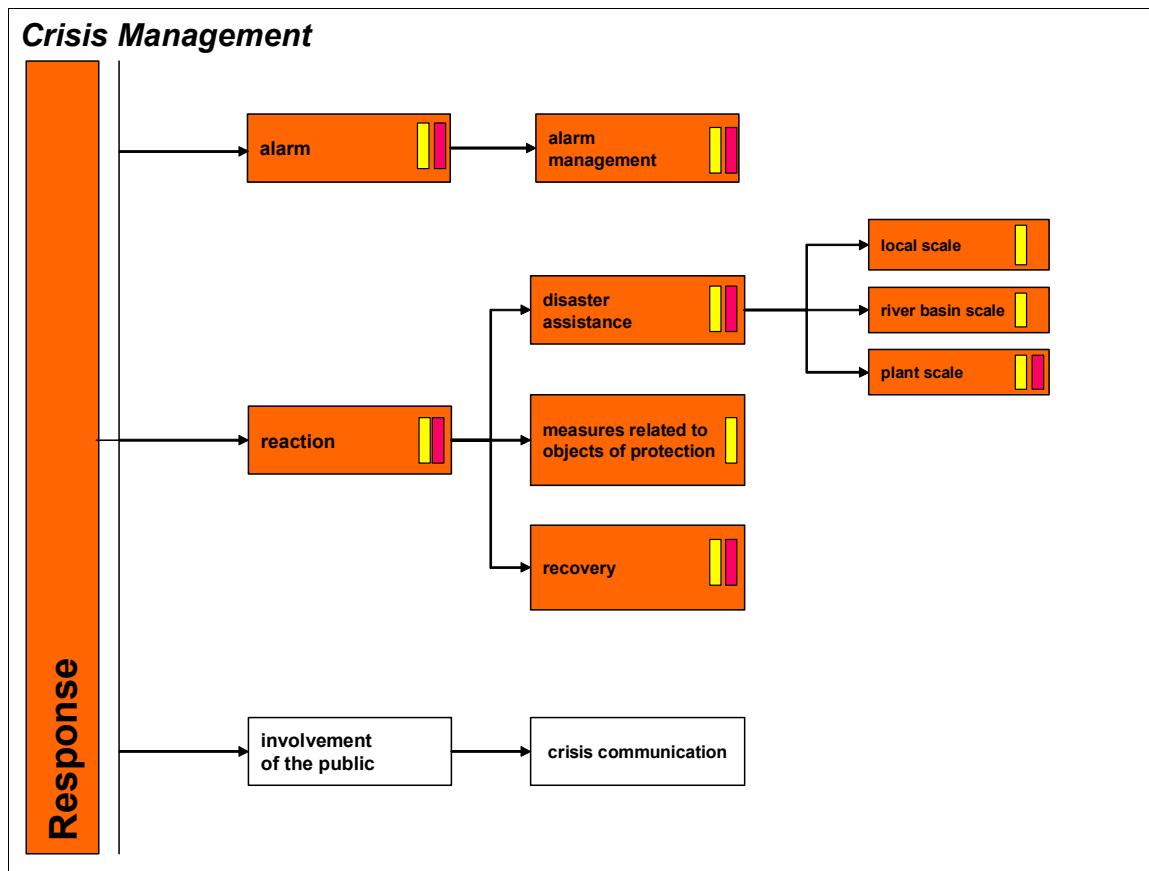


Figure 5 Crisis Management – Response Measures (Yellow Authority tasks, Pink Operator tasks)

The measures that have to be set in motion for a specific incident may involve the mobilisation of massive human and material resources in the individual case. In the strict sense, they are not management planning measures. Their prospects of success do however depend to a very large extent on the quality of the design and implementation of the preceding packages of “hazard management” and “preparedness” measures.

6 After Care

The field of after care covers all measures that follow immediate damage remediation. A distinction is made between “Damage review” and “Follow-up measures”.

The purpose of the analytical “damage review” is

- ◆ to help the authorities and the plant operator to prevent future incidents of the same kind or at least mitigate the consequences, and
- ◆ to estimate and assess the extent of the damage.

The field of “follow-up measures” is concerned with the measures that need to be deduced from the results of the review.

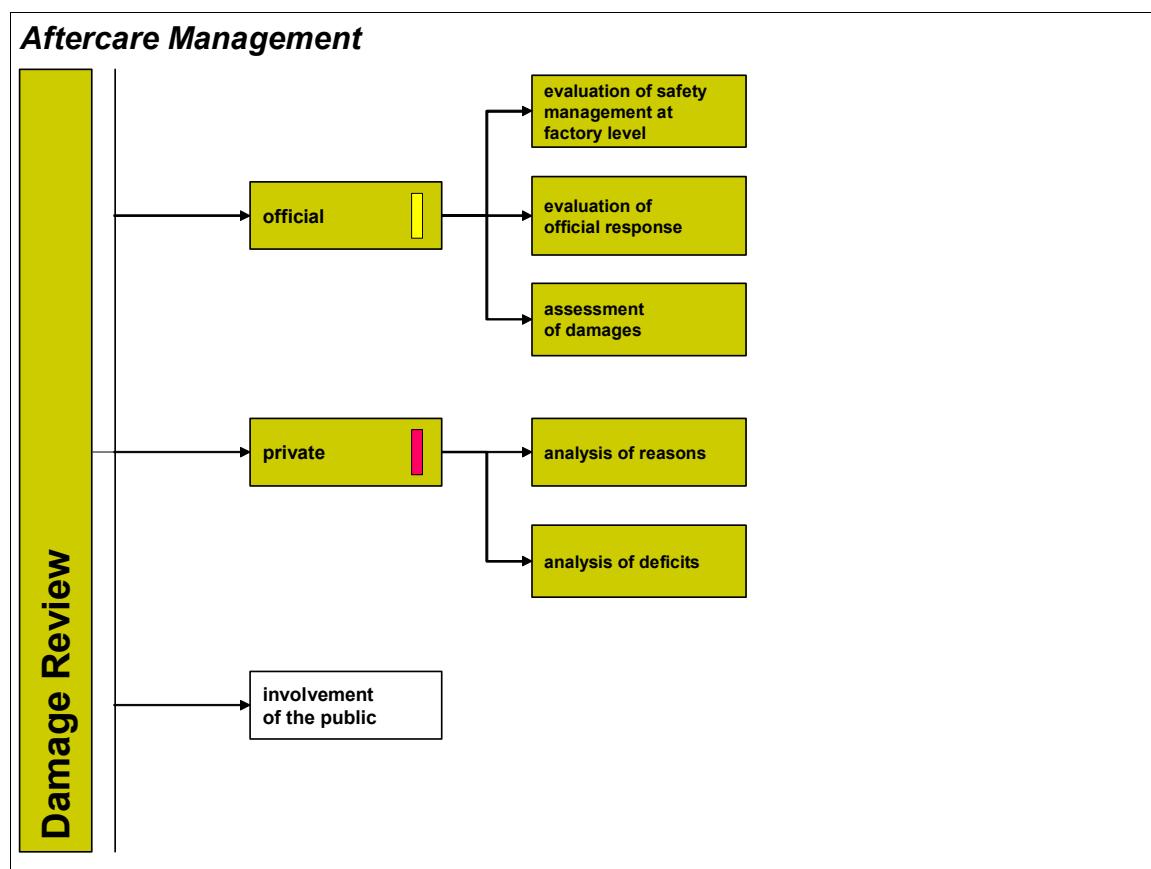


Figure 6 After Care – Damage Review (█ Authority tasks, █ Operator tasks)

This handling is also of importance with regard to “*accidents which could not reasonably have been foreseen*”, which are mentioned in Article 11 (3) I WFD. Following occurrence and control of such an event it is important to check whether the classification of

“unforeseeability” can be sustained with regard to future events of the same type. If not, suitable measures must be taken. In the event of confirmation the WFD, in connection with possible failure to achieve the environmental objectives, allows the exceptional situation of a temporary deterioration of status as a result of “circumstances ... which are exceptional or could not reasonably have been foreseen, in particular extreme floods and prolonged droughts and ... accidents” (Art. 4 (6)). However, the barriers to claiming exceptional situations are high. Extensive justifications are required in the management plan, and steps must be taken to prevent further deterioration and to restore the original state. It is also necessary to establish the conditions under which one can claim circumstances which are exceptional or which cannot reasonably be foreseen, and the indicators that are to be used for this purpose. The impacts must be reviewed regularly (annually).

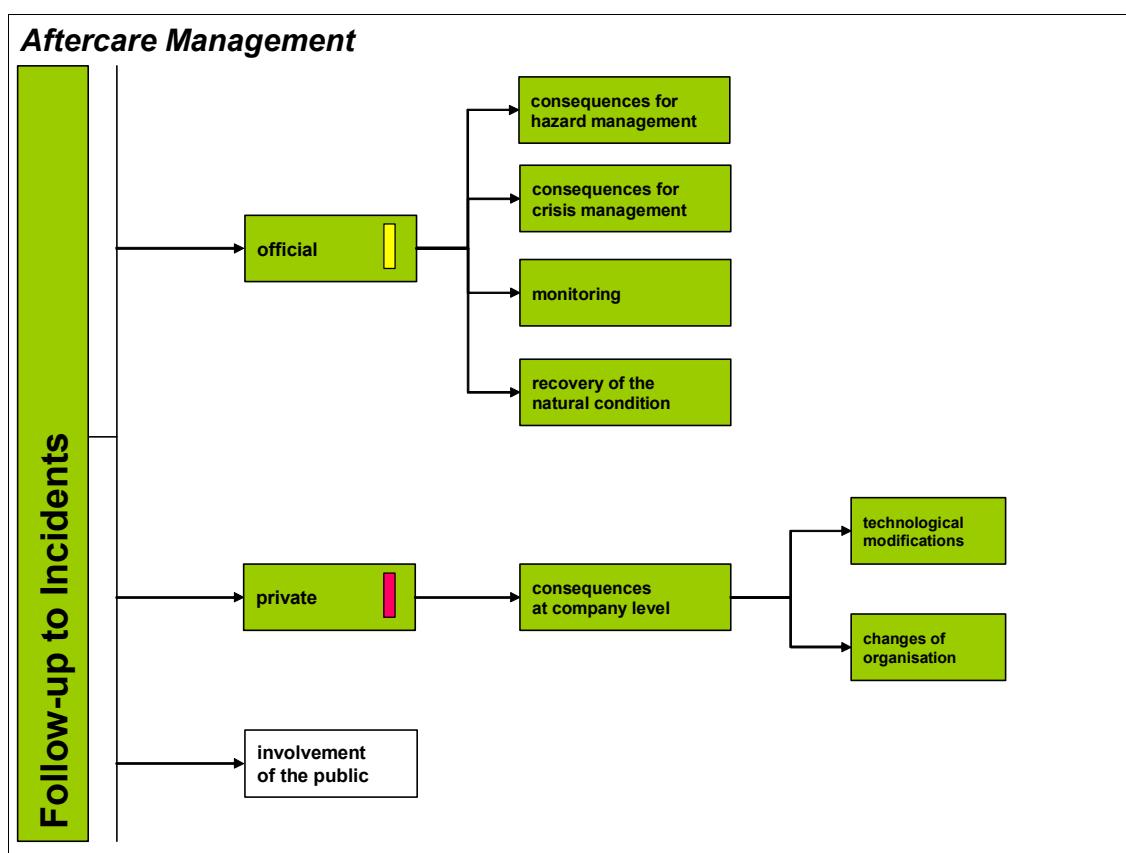


Figure 7 After Care – Follow-up Measures (█ Authority tasks, █ Operator tasks)

The “material” after-care measures in the safety chain, such as repairing damage (e.g. to buildings and dykes), restoring the original state (e.g. in contaminated protected ar-

eas) etc., are not covered by the precautionary provisions of Article 11 (3) I WFD. The focus here is on damage review in the sense of checking the quality of the Pro Action measures up to the response, and ensuring that any deficits identified are remedied in future (lessons learned).

Table 5

After Care – Damage Review + Follow-up Measures	
Measure	Implementation examples
Creation of structures that ensure the following after an incident: <ul style="list-style-type: none">• Official evaluation of plant-related safety management• Evaluation of official crisis management• Evaluation of impacts suffered• Analysis of plant-related causes and deficits	Guideline for registration, clarification and analysis of major accidents and disturbances of normal operation within the meaning of the Major Accidents Ordinance (LAI 2002), Concept for registration and analysis of safety-relevant incidents (KAS/SFK 1998)
Creation of structures that ensure incorporation of the analytical results ("lessons learned") in the fields of <ul style="list-style-type: none">• Hazard prevention• Crisis management	Incident working groups in the international river basin commissions
Database creation	(<u>Zentrale Melde- und Auswertestelle</u> (ZEMA/UBA) (Registration and analysis centre) <u>Major Accident Reporting System</u> (MARS/EU))

7 Public involvement

Public involvement is basically an important concern of the WFD (Recital 46 and Article 14). In relation to Article 11 (3) I WFD, public involvement is required in three intertwined fields of action:

1. In the preparation of management plans,
2. in the strategic environmental assessment,
3. in risk communication and crisis communication.

Management plans

Management plans contain a summary of the programmes of measures including information on how they are to permit achievement of the objectives in Article 4 (Annex VII WFD A 7.). Annex VII also draws explicit attention to the measures for preventing the consequences of unintentional pollution (Annex VII WFD A 7.8.).

Management plans and, on request, background documents must be made available at an early stage, i.e. at the start of planning (periods of 1-3 years in the different stages of specification) and periods of 6 months must be granted for written comments on the documents.

This requirement, however, does not arise specifically from Article 11 (3) I WFD, but from the WFD as a whole. In other words, public involvement in the programmes of measures pursuant to Article 11 (3) I WFD does not differ either substantively or from a timing point of view from public involvement in other programmes of measures stated in the management plan.

Strategic Environmental Assessment (SEA)

Under Directive 2001/42/EC, plans and programmes that could potentially have environmental impacts must be subjected to a strategic environmental assessment (SEA)¹², which also prescribes formal information of the public and opportunities for comment by the public. This applies to all programmes of measures pursuant to Article 11 WFD, in other words including, but not confined to Article 11 (3) I WFD.

Risk communication and crisis communication

Successful risk management requires a functioning risk communication system along the entire length of the safety chain, i.e. the sharing of opinions and information on risks between the persons responsible for risk assessment and risk management, industry, the workforce, scientific circles, the public, the media and other groups affected. Involvement of the public in the event of a specific crisis (crisis communication) is one of several aspects. While the term “risk communication” does not usually occur as such in past legislation, such legislation frequently contains individual provisions that can be classified under this heading. In the field of containment of accident-induced hazards involving dangerous substances, the requirement can be deduced from the Seveso II Directive, for example, and also from the UNECE Accidents Convention, and it has been implemented in the member states in – sometimes differing – individual provisions. To this extent Article 11 (3) I WFD is directly concerned, but it cannot be regarded as the root source of the call for implementation of risk communication mechanisms. Thus Article 11 (3) I WFD does not give rise to any additional basic requirements in this respect than other areas of law. The preparation of management plans should however include a check for the existence of a functioning risk and crisis communication system. The inventory did not reveal any comprehensive concrete communications concepts at river basin level (apart from such items as notification forms for passing on damage notifications to administrative bodies in the warning and emergency plans).

¹² DIRECTIVE 2001/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, OJ L 197 of 27.06.2001, p. 30ff.

The foundations for the introduction of the SEA were laid, among other things, by the entry into force of the Aarhus Convention and the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991).

As an example of risk communication guidelines, the reader's attention is drawn to "Bericht Risikokommunikation – Anforderungen nach Störfallverordnung, Praxis und Empfehlungen"¹³ and to the report "Risikokommunikation im Anwendungsbereich der Störfall-Verordnung"¹⁴, which also look at practices in other countries. One important guide to communication in emergencies and preparing for such communication was recently published by the German Federal Ministry of the Interior: "Krisenkommunikation - Leitfaden für Behörden und Unternehmen".¹⁵

¹³ AK Risikokommunikation "Bericht Risikokommunikation – Anforderungen nach Störfallverordnung, Praxis und Empfehlungen", Kommission für Anlagensicherheit beim BMU (KAS), June 2008, KAS-5, http://www.kas-bmu.de/publikationen/kas_pub.htm

¹⁴ Anton; Claus; Bouteiller; Schrader; Kroll; Wiedemann; Eitzinger "Risikokommunikation im Anwendungsbereich der Störfall-Verordnung", Bericht zum F+E-Vorhaben 205 48 329 des Umweltbundesamtes, UBA-Text 31/2006, Dessau 2006, <http://www.umweltbundesamt.de>

¹⁵ Bundesministerium des Innern, Referat KM 1, Alt-Moabit 101 D, 10559 Berlin, Krisenkommunikation - Leitfaden für Behörden und Unternehmen., www.bmi.bund.de, Berlin 2008.