European Union Network for the Implementation and Enforcement of Environmental Law

IMPEL Project:

LINKING THE WATER FRAMEWORK DIRECTIVE AND IPPC DIRECTIVE

Final Report

August 2010

Institute for European Environmental Policy

Introduction to IMPEL

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an international non-profit association of the environmental authorities of the EU Member States, acceding and candidate countries of the European Union and EEA countries. The association is registered in Belgium and its legal seat is in Bruxelles, Belgium.

IMPEL was set up in 1992 as an informal Network of European regulators and authorities concerned with the implementation and enforcement of environmental law. The Network's objective is to create the necessary impetus in the European Community to make progress on ensuring a more effective application of environmental legislation. The core of the IMPEL activities concerns awareness raising, capacity building and exchange of information and experiences on implementation, enforcement and international enforcement collaboration as well as promoting and supporting the practicability and enforceability of European environmental legislation.

During the previous years IMPEL has developed into a considerable, widely known organisation, being mentioned in a number of EU legislative and policy documents, e.g. the 6th Environment Action Programme and the Recommendation on Minimum Criteria for Environmental Inspections.

The expertise and experience of the participants within IMPEL make the network uniquely qualified to work on both technical and regulatory aspects of EU environmental legislation.

Information on the IMPEL Network is also available through its websites at:
http://europa.eu.int/comm/environment/impel
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Title report: Linking the Water Framework Directive and the IPPC Directive	**Number report:** 2010/08
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Project participants: Representatives of 5 IMPEL member countries	

Executive summary:

The IPPC Directive 2008/1/EC and Water Framework Directive 2000/60/EC are two of the most wide-reaching items of EU environmental law. They have presented many challenges to the Member States and continue to do so. These challenges have included interpretation of the provisions of the Directives and the enormous practicalities of implementation. These challenges are supplemented by other Directives and Regulations designed to be integrated into the implementation frameworks of these two Directives.

Installations regulated under IPPC may impact on the water environment, such as through direct or indirect discharges of pollutants, water abstraction, etc. IPPC requires installations to operate to conditions in permits compliant with Best Available Techniques (BAT). They are also required to respect environmental quality standards established in EU law, including those derived under EU water law. However, the relationship between the two sets of obligations is often far from simple, such as different tests of disproportionate costs in the Directives, the presence of multiple pressures on water bodies affecting standards, different implementation timetables, etc. Therefore, ensuring integration of the implementation of the Directives is a challenge and this report seeks to analyse the different elements underlying this challenge.

This IMPEL project was established to examine these issues. The objectives of the project are:

- To define the relationship (complementary and competition) between IPPC implementation and WFD implementation from the scope of permitting, enforcement and data collection.
- An inventory of problems and best practices in the Member States, with regard to permitting, enforcement, data collection and data collection systems.
- Provide recommendations for competent authorities to contribute to better implementation and enforcement of the WFD requirements and the (reviewed) IPPC directive, to contribute to better performance of environmental inspections and permits in the Member States.

This report contributes to these objectives by providing an analysis of the interactions between the Directives. It will be followed by a questionnaire to IMPEL members seeking views on the questions raised in this report and Member State practice and best practice in

addressing interactions. The report is focused on the following key questions:

- How to ensure that current and future licensing and enforcement activities are both WFD and IPPC proof?
- How can permits contribute to achieving both IPPC and WFD goals?

This report examines some general issues concerning the interaction between the Directives. It considers the interactions from the perspective of the IPPC regulatory cycle and from the perspective of the WFD river basin planning cycle. It provides separate analyses of interactions with the EQS Directive, Groundwater Directive, Urban Waste Water Treatment Directive, E-PRTR Regulation and REACH Regulation. The report examines issues of interaction between the Directives set out in the WFD CIS Guidance Documents and in the IPPC BREF Notes. The report concludes with an examination of the challenges that the interactions pose to the competent authorities of the Member States and how these might be addressed. These include:

- Legal uncertainty, e.g. due to inconsistencies between Directives and Regulations. In most cases there is consistency, but there may be different national interpretations of obligations which may result in unintended barriers to integration of the implementation of the Directives.
- The scope of interpretation of IPPC – that there different approaches to this which affect the nature of the challenge differently across Member States. Deciding what is included within IPPC regulation can assist in helping to deliver water objectives.
- Spatial scale – that the Directives 'management units' are at different scales with challenges for integration between them. In particular the spatial, landscape approach to river basin management can be a different thought process to site-based analysis under IPPC.
- Defining obligations on installations – how to translate understanding of pressures on water objectives to discharge requirements for permits. This is the concept of permits being IPPC and WFD 'proof'. There are analytical challenges to determining the permit conditions necessary to meet water objectives and to take account of economic and cost issues in the permit determinations.
- Cost issues – how to address the issues of disproportionate costs in the different Directives in an integrated way. The tests for disproportionate costs under each Directive are different.
- Inspection and enforcement – how to take forward the new Industrial Emissions Directive (IED) obligation to consider environmental issues in enforcement activity. This is a new obligation that will require inspectorates not only to consider whether permits are complied with, but also to examine impacts on the local environment, providing a greater link to examining relationships between IPPC installations and water objectives.
- Timetabling – e.g. how to address the problem of the fact that the Directives have been implemented over non-complimentary timetables. IPPC permits may have been issued before water objectives are defined. Revisiting them may impose costs, but there are concerns over whether some are IPPC complaint. The WFD may provide added impetus to address any implementation deficiencies.
- Monitoring and information – the Directives have their own monitoring obligations and integrating these with the need for information transfer between different authorities. This requires close collaboration between authorities and systems to be in place to ensure full information transfer in ways that are sufficient to support implementation of the relevant legislation.
- The opportunities and limitations of current and revised BREFs. The BREFs are currently being revised and their status is changing under the new IED. Currently they provide little guidance in relation to water objectives.
- The opportunities and limitations of the WFD CIS Guidance documents. This guidance provides a large amount of information to support the WFD, but consideration of the

relationship with IPPC is often limited. This may be an issue to be addressed as guidance is revised in the future.

Disclaimer:
This report is the result of a project within the IMPEL-Network. The content does not necessarily represent the view of the national administrations or the Commission.

Contents

ABBREVIATIONS

BAT	Best Available Techniques
BAT AEL	BAT associated emission level
BREF	BAT Reference Document
CIS	Common Implementation Strategy
DSD	Dangerous Substances Directive
ECHA	European Chemicals Agency
ECJ	European Court of Justice
ELV	Emission limit value
ENAP	Exploring New Approaches
E-PRTR	European Pollutant Release and Transfer Register
EQS	Environmental quality standard
EU	European Union
GES	Good Ecological Status
GBR	General Binding Rule
GWD	Groundwater Directive
IED	Industrial Emissions Directive
IPPC	Integrated Pollution Prevention and Control
IPPCD	Integrated Pollution Prevention and Control Directive
LCPD	Large Combustion Plant Directive
NECD	National Emission Ceilings Directive
NVZ	Nitrate Vulnerable Zone
POM	Programme of Measures
REACH	Registration, Evaluation, Authorisation and Restriction of Chemical substances
RBMP	River Basin Management Plan
UWWTD	Urban Waste Water Treatment Directive
WFD	Water Framework Directive
WWTP	Waste water treatment plant

1. INTRODUCTION

The IPPC Directive 2008/1/EC and Water Framework Directive 2000/60/EC are two of the most wide-reaching items of EU environmental law. They have presented many challenges to the Member States and continue to do so. These challenges have included interpretation of the provisions of the Directives and the enormous practicalities of implementation. Each of these Directives is also supported by other EU law, such as E-PRTR, the EQS Directive, GWD and others. Each of these has their own implementation challenges.

The IPPC and Water Framework Directives strongly interact. IPPC requires the permitting process to consider environmental objectives (such as those derived from the WFD) and the WFD requires action to be taken on pressures on water bodies (which may include provisions for IPPC installations). The nature, timing, scope and limitations of these interactions (and more specific interactions with the 'supporting' Directives) are not always clear and they present a major challenge for competent authorities in the Member States to address.

This IMPEL project was established to examine these issues. The objectives of the project are:

- To define the relationship (complementary and competition) between IPPC implementation and WFD implementation from the scope of permitting, enforcement and data collection. Also the following Directives were to be taken into account: EQS Directive (2008/106/EC) and urban waste water treatment Directive (91/271/EC).
- An inventory of problems and best practices in the member states, with regard to permitting, enforcement, data collection and data collection systems.
- Provide recommendations for competent authorities to contribute to better implementation and enforcement of the WFD requirements and the (reviewed) IPPC directive, to contribute to better performance of environmental inspections and permits in the Member States.

This report contributes to these objectives by providing an analysis of the interactions between the Directives. It is focused on the following key questions:

- How to ensure that current and future licensing and enforcement activities are both WFD and IPPC proof?
- How can permits contribute to achieving both IPPC and WFD goals?

This report explores these questions in different ways and from different perspectives. The report focuses on:

- The legal requirements for permitting and enforcement, including the background and spirit of the legislation.
- The challenges based on these requirements and opportunities and possible solutions to the challenges.

The Terms of Reference of the project, therefore, addressed the interactions between the IPPC Directive, WFD, EQS Directive and UWWTD. At the request of the Project Board this

list was expanded to include the REACH and E-PRTR Regulations and the Groundwater Directive.

This report is the first part of the IMPEL project. It will be followed by a questionnaire to IMPEL members seeking views on the questions raised in this report and Member State practice and best practice in addressing interactions. Interpretation and practice in the Member States forms, therefore, the focus of Part 2 of this project and is not addressed in this report. This examination of practice in Member States in Part 2 of the project, subsequently, be followed by a workshop and concluding report bringing together the analysis and IMPEL member's experience to make recommendations on how best to address the interactions between the Directives.

This report begins by examining some general issues concerning the interaction between the Directives. It then considers the interactions from the perspective of the IPPC regulatory cycle and then from the perspective of the WFD river basin planning cycle. The report then provides separate analyses of interactions with the EQS Directive, Groundwater Directive, Urban Waste Water Treatment Directive, E-PRTR Regulation and REACH Regulation. Guidance has been developed to support implementation of the Directives, and the report continues by examining issues of interaction between the Directives set out in the WFD CIS Guidance Documents and in the IPPC BREF Notes. Legislation does not stand still and the IPPC Directive is to be replaced with a new Industrial Emissions Directive. Therefore, a short section considers whether this new Directive will affect the nature of the interactions identified between IPPC and the WFD. The main part of the report concludes with an examination of the challenges that the interactions pose to the competent authorities of the Member States and how these might be addressed.

2. INTERACTION: GENERAL ISSUES

2.1 Introduction

The main interactions of the Directives addressed by this report (and those of most interest to competent authorities) concern those relating to the practical implementation processes of the respective Directives – IPPC permitting and inspection, river basin planning, etc. These core management frameworks and their interactions form the focus of the following Chapters of this report. However, there are interactions and issues which do not fit into this management framework analysis. This Chapter addresses these and it focuses on the issue of definitions in the Directives, the issue of scale in implementing the Directives and public participation. The issue of economic analysis (which might also be thought to be included here) is addressed in Chapter X on IPPC.

2.2 Definitions

The definitions in Directives are critical in determining the extent of regulatory and/or management action to be taken in implementing a Directive. In examining the interaction between Directives, there is the potential for definitions to aid in the coherence of the interaction or to introduce inconsistency of approach. Indeed, the need for coherence and consistency between Directives is a central objective of IMPEL's Better Regulation work (Cluster 3) – a prerequisite for ensuring that authorities that address more than one Directive are able to do so in clear, practicable and enforceable ways.

The EQS Directive does not introduce separate definitions, but it states (Article 2) that those of the WFD apply. Therefore, the issue of consistency of definitions with respect to this report concerns the IPPC Directive and WFD. The two Directives, however, have little overlap with respect to definitions.

Both Directives define 'pollution'. The IPPC Directive defines it as 'the direct or indirect introduction, as a result of human activity, of substances, vibrations, heat or noise into the air, water or land which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment'. The WFD defines it as 'the direct or indirect introduction, as a result of human activity, of substances or heat into the air, water or land which may be harmful to human health or the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems, which result in damage to material property, or which impair or interfere with amenities and other legitimate uses of the environment'.

It can be seen that the WFD definition has drawn explicitly on the IPPC definition. The WFD definition only concerns issues relating to water (the scope of the Directive) and it excludes vibrations and noise within the definition. Noise is a local issue for some IPPC installations, but whether IPPC installations cause noise problems in water is uncertain. It is worth noting that the Marine Strategy Framework Directive introduces noise as an issue to be addressed in

coastal waters covered by the WFD. Overall, however, for almost all purposes the two Directives have the same definition of 'pollution'.

Both Directives also define 'environmental quality standard'. The IPPC Directive defines it as 'the set of requirements which must be fulfilled at a given time by a given environment or particular part thereof, as set out in Community legislation', while the WFD defines it as 'the concentration of a particular pollutant or group of pollutants in water, sediment or biota which should not be exceeded in order to protect human health and the environment'. These two definitions are quite different. The WFD definition is, effectively, an objective definition about the nature and purpose of an EQS and, indeed, forms the basis of what is adopted within the EQS Directive. In contrast, the IPPC Directive simply states that an EQS is whatever is set out in other Community law. Thus, while the two definitions are quite different, they are entirely consistent, as the EQS as defined by the WFD (and related Directives) forms exactly an EQS as defined by the IPPC Directive.

Other definitions are not provided in both Directives, but terms may be used in the WFD that are not defined in that Directive, but which are defined in the IPPC Directive. These include terms such as 'Best Available Techniques' and 'Permit'. The WFD does not explicitly cross-refer to IPPC with regard to the definition. Indeed, with regard to 'permit', the WFD would require a wider understanding of the term, as the IPPC Directive definition integrates the concept of ensuring compliance with the IPPC Directive, which is unnecessary for much permitting or licensing under the WFD.

BAT is more interesting in that it is a complex concept within IPPC (subject to much debate), yet it is used in the WFD without cross-reference or further explanation. Of course, it has no practical consequence for IPPC installations themselves (which are already required to implement BAT), but it is a case of conceptual interaction which remains unclear.

2.3 Scaling of issues

It is important to recognise that in considering the interactions between the Directives, there are important differences of scale between the Directives which affect the practical nature of interactions.

The WFD effective units of scale are the river basin and the water body. Although much of the expression of implementation of the WFD is seen at river basin level (most notably the RBMP), the unit for most analysis is the water body. Characterisation takes place at water body level, as does objective setting. Measures should be directed to achieving water body objectives, but these may be river basin scale.

The EQS Directive incorporates two scales – standards are viewed at the same scales as in the WFD – they form part of the objective setting. However, in tackling point sources, these are viewed at the installation scale, for example with regard to mixing zones (although multiple sources with overlapping mixing zones require a large scale of perception).

In contrast, the IPPC Directive is focused on the scale of the installation. In a few cases an installation may have impacts beyond the local environment, but for many the focus is on the operation of the facility and its impacts on the immediate surrounding environment.

Therefore, in considering the interactions to be described in the following Chapters of this report, it is important to recognise these scaling issues. Analyses at one scale need to be interpreted at another scale in order for effective implementation transfer to take place. It is also important to note that perceptions of scale present a challenge to staff in competent authorities used to operating within their own regulatory/management frameworks. Thus a water manager needs to be able to translate the objectives of a water body into information that is useable by the IPPC permitting authority. This ought to be something addressed routinely by water managers in developing practical programmes of measures.

2.4 Public participation

Both the IPPC Directive and WFD have been strongly influenced by the Aarhus Convention with regard to public participation. Following signature to the Convention, the IPPC Directive was amended to ensure consistency with its provisions and the proposal for the WFD was, as stated in the Explanatory Memorandum, designed to address the Convention provisions.

Public participation has received considerably more attention in the implementation of the WFD than is readily seen with implementation of IPPC. Specific CIS guidance addressed participatory processes, for example. At one level the WFD obligations are relatively simple, in that there should be public consultation on draft RBMPs and access to information in other cases (e.g. monitoring data). However, the WFD also promotes active participation without prescribing how this is to be done and Member States have explored a variety of ways to achieve this.

Under IPPC public participation is focused on commenting on permit applications and having access to information on applications, reasons for decisions, the permit and monitoring information. This is, effectively, a more 'mechanical' participatory process.

There is clearly an overlap in who are the 'public' with regard to IPPC installations and a RBMP. However, the participatory focus is quite different. Under IPPC the public would need to demonstrate new concerns over impacts seriously to alter permit decisions based on BAT. Participation under the WFD has the opportunity for greater dialogue, examining public aspirations for water bodies together with informing the public about objectives and what can and cannot be done to achieve these.

3. IPPC DIRECTIVE

3.1 Introduction

The purpose of this section is to examine the interaction between IPPC and the Water Directives (WFD and EQS Directive) from the perspective of the IPPC regulator(s) – those responsible for defining the scope of IPPC, issuing permits and undertaking compliance assessment and enforcement. Annex II provides an Article by Article (for relevant Articles) consideration of the interaction between IPPC and the Water Directives.

Figure 1 provides an overview of the IPPC regulatory cycle, beginning with the identification of what is an installation, followed by permit application, permit determination, operation, monitoring and reporting, inspection and enforcement and concluding with permit review. Each of these stages is constrained or informed by a range of different elements set out in the IPPC Directive and a number of these are set out in the diagram below which, as will be discussed below, are relevant to the interaction with the Water Directives. This section, therefore, follows the logic of the regulatory cycle.

3.2 Overview

The IPPC Directive applies to six categories of industry: energy; production and processing of metals; minerals; chemicals; waste management; and 'other'. The 'other' group includes facilities operating in the areas of pulp and paper production, textile treatment, tanning, food production, and the intensive rearing of poultry and pigs.

Each facility covered by the Directive must be made subject to authorization through permitting. A 'permit' is defined as that part of the whole of a written decision (or several such decisions) granting authorization to operate all or part of an installation, subject to certain conditions which guarantee that the installation complies with the requirements of the Directive. It is clear from this definition that Member States need not operate a system which grants a single permit for each site covered by the IPPC regime. The key requirement to be reflected in IPPC permits is 'Best Available Techniques' (BAT). Within the definition of BAT, 'available' is specified as meaning economically and technically viable, taking into consideration costs and advantages. In determining BAT, special consideration must be given to certain factors listed in an Annex. Member States may prescribe some requirements for certain types of installations in general binding rules instead of including them in individual permits, provided equivalent levels of environmental protection are achieved.

Emission limit values or equivalent parameters imposed in permits are to be based on BAT but may not specify the actual equipment to be used. However, determination of BAT is to take account of the technical characteristics of the installation, its geographical location and local environmental conditions. These factors will vary throughout Europe, as will the consideration of economic factors in the determination of BAT, so it is to be expected that significant differences will emerge in the emission limits applied by the Member States. The Directive recognizes this fact, and sets out a procedure for the exchange of information on national assessments of BAT and emission limits. This provides the basis for the possible establishment of Community emission limit values for the priority substances listed. In the

absence of any Community emission limits established through the specific IPPC procedure, the Directive provides that the standards specified in various existing Community instruments are to serve as minimum emission limit values.

The Directive includes certain requirements aimed to ensure that the system of IPPC is applied and enforced in practice. Member States must ensure that permit conditions are complied with, and that operators regularly provide competent authorities with results of release monitoring. Operators must inform authorities of any significant accidents without delay. Operators additionally must provide the authorities with the necessary access and assistance to enable inspections and other monitoring functions to be carried out.

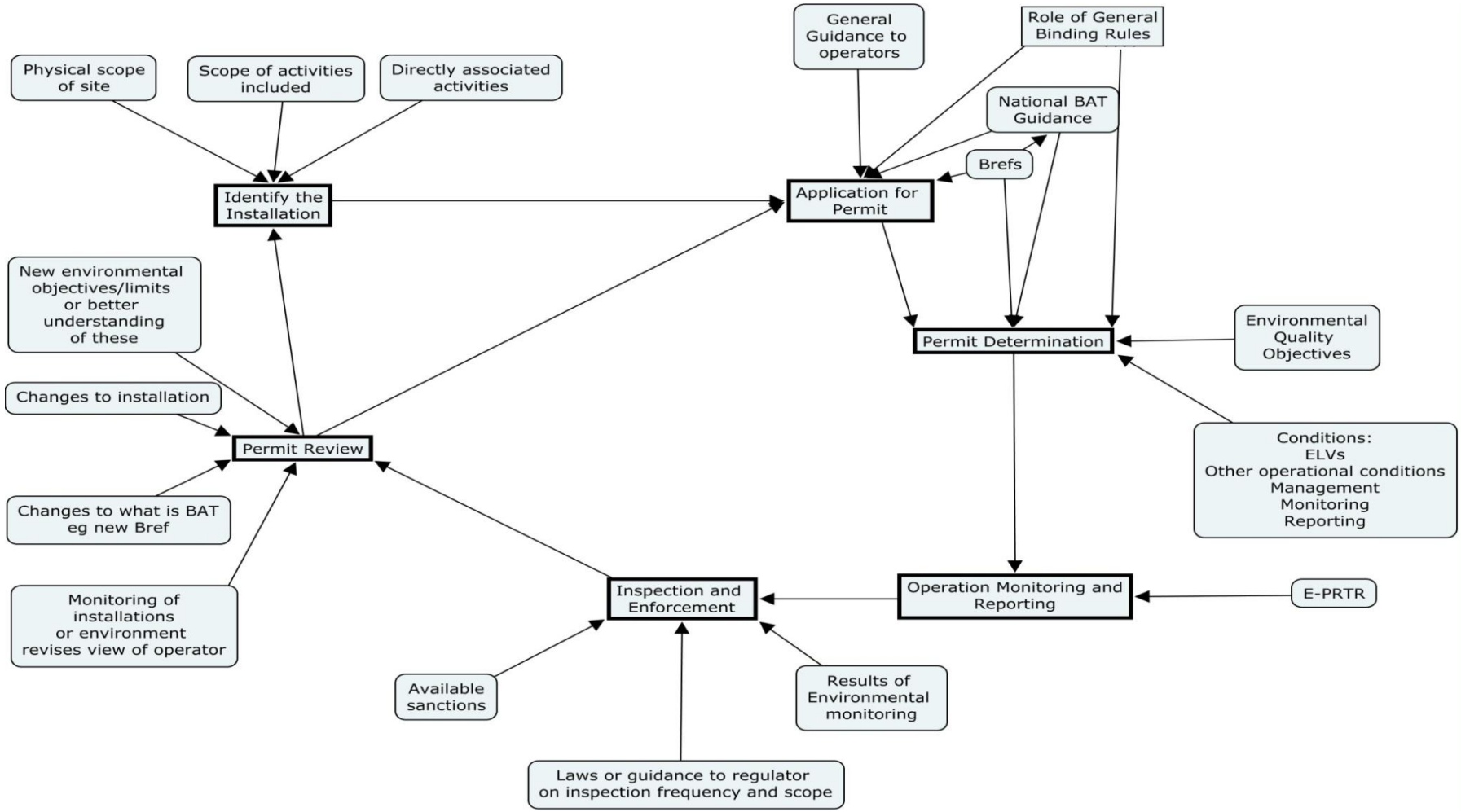
3.3 Identifying the 'installation'

Under IPPC, installations receive permits. What is included (or not included) in the scope of the 'installation' is, therefore, important in thinking about the interaction with the Water Directives.

It is important to note that earlier studies (ENAP, IMPEL Pig study, etc., DG ENV IPPC review) have shown that different approaches are taken between Member States and within Member States. The IPPC Directive requires that 'directly associated activities' are included within the scope of an 'installation'. However, there are debates on what should be included and what could be included. For example, is waste water treatment off site included, or is manure spreading off site included? It is not the purpose of this report to analyse these issues, rather to note that differences of interpretation and practice exist.

However, clearly the regulatory 'boundary' of the IPPC installation will affect the range of interactions with the Water Directives. If certain aspects are included within the IPPC permit, then the objectives of the Water Directives need to be taken into account in the IPPC regulatory context. If those aspects are not included in the IPPC permit, then the objectives of the Water Directives still apply to those issues, but alternative regulatory approaches will need to be used to address these issues. In some cases alternative regulatory systems may be in place, while in others new approaches may be needed (e.g. as defined as supplementary measures in the WFD). Where Member States take a pragmatic approach to the scope of an installation, it will be important for water managers to communicate concerns and opportunities for integrated regulation of activities to IPPC regulators so that options for optimising regulation of activities potentially affecting waters can be considered.

Figure 1. Schematic overview of the IPPC regulatory cycle and influences on each stage



Where certain activities are excluded from the scope of IPPC, the objectives of the Water Directives may still affect the IPPC installation itself via these activities. For example, although waste water treated off site might be excluded from the permit, it may be appropriate for the IPPC permit to set conditions to address the quality of that waste water (e.g. presence of certain priority substances) in order to meet objectives of the EQS Directive.

In examining the interactions between IPPC and the Water Directives, it is, therefore, important at the outset to note variations between Member States in their application of IPPC and, therefore, that views on (and experience of) the interactions will vary and that two Member States with different views may both be right, depending on their regulatory approaches.

3.4 Applying for a permit

There is a strong overlap, with regard to interaction with the Water Directives, between the stage of the operator applying for a permit and the regulator determining permit conditions.

Permit applications (Article 6) need to include descriptions of the installation, emission sources and quantities of emissions, proposed techniques for reducing emissions and proposals for monitoring. The permit application is the point at which operators must be expected to address their interaction with the objectives of the Water Directives. While operators may combine guidance on BAT to propose techniques and emissions consistent with BAT, in order to propose actual future emissions they need to consider whether local environmental objectives are at risk. This will be addressed in the following section on permit determination.

Operators do not produce permit applications in isolation. Often they draw upon guidance in producing applications (regional, national and/or BREFs). This guidance will contain administrative information on completing applications and guidance on technical aspects of the particular type of installation or process. Operators also should have guidance on whether and, if so how, to assess local environmental impacts. Such guidance ought to include specific guidance on addressing the issues arising from the Water Directives.

They may be subject to general binding rules (GBR). GBRs set standard conditions on operators and are more commonly used in some Member States than others. While setting standard conditions is a useful approach to ensuring a common approach and level playing field (and regulatory certainty), it does not remove the obligation to ensure EQS in the local environment are met. Whether there are occasions when GBRs do not deliver the obligations under the Water Directives is not known. However, regulators and operators need to be aware of the possibility and to produce bespoke permits as a result.

3.5 Permit determination

In considering the issue of determining permits, it is useful to divide the process into identifying the environmental performance objectives of an installation and identifying the process and administrative objectives within a permit.

Timetable for issuing a permit

It is also important to note that most Member States regulators have obligatory time periods within which they must issue a permit. This is done to ensure that business is not exposed to unnecessary uncertainty (and costs). It should be noted that the more issues that need to be considered in permitting (e.g. in relation to water objectives), the more challenging will be the task of meeting the obligatory timetable for issuing the permit. If IPPC permitting authorities seek input from water management authorities, it will be important for the latter to understand the 'urgency' of the need for information provision. This problem can be ameliorated to some extent by:

- Ensuring operators address potential interactions with water objectives in their permit applications, so reducing the need for permitting authorities to gather much of the information and undertake assessments.
- Permitting and water management authorities should initiate proactive communication on pressures on water bodies so that there is already a prior indication of potential problems from installations before permit applications are received.

Environmental objectives

The IPPC Directive sets out a broad environmental objective of preventing or minimising emissions to the environment as a whole, with subsidiary objectives relating to energy use, resource use, waste generation, etc. However, this broad objective is tempered by the fact that installations should apply BAT and, therefore, this forms a sufficient contribution to this environmental objective.

However, the application of BAT alone may not be sufficient. Article 10 states that 'where an environmental quality standard requires stricter conditions than those achievable by the use of the best available techniques, additional measures shall in particular be required in the permit, without prejudice to other measures which might be taken to comply with environmental quality standards'. The EQS referred to here are those set out in EU law and include those in the Water Directives (e.g. good ecological status).

Therefore, if the application of BAT is not sufficient to meet the EQS, additional measures shall be required. Depending upon the issue, this may require techniques stricter than BAT or some additional measure that addresses the pressure on the water environment.

Operators and regulators have, therefore, to be clear about the EQS established by the Water Directives and how the installation interacts with these so that permits can be adjusted accordingly.

The issue of interaction is more complicated if there is more than one source of, for example, a pollutant causing a breach of an EQS. Firstly, it is important to understand the relative contribution of the sources to the breach of the EQS. This may not be a simple comparison of

total discharges, but require a detailed assessment of the hydrological behaviour of the pollutant. Such analysis ought to form part of the assessment of pressures under the WFD, for example. Secondly, if the different sources are regulated under IPPC, then the IPPC regulator may need to decide which installation needs to adopt which additional measures and address the fact that costs may not be evenly borne by each operator. However, if one source is not regulated under IPPC, then this adds to the local regulatory complexity, although it ought to be addressed in the programme of measures under the WFD.

It is also very important to stress that the environmental objectives set out in the Water Directives not only establish what is required in the environment but WHEN that objective is required. The latter point is critical in understanding the practical interaction with IPPC. When EQS in the EQS Directive and GES under the WFD have to be met strongly affect upgrade programmes that might be set out in a permit.

In conclusion, the interaction between IPPC and the EQSD and WFD is straightforward in concept, but potentially complex in practice. These challenges for authorities are explored in more detail in Chapter 13.

Emission limit values

The IPPC Directive is clear that ELVs in permits must, as a minimum, be compliant with those set out in EU law. There are a number of such ELVs in EU law (e.g. titanium dioxide, waste incineration, urban waste water treatment). The IPPC Directive is clear that ELVs in EU law are without prejudice to the obligation to establish permit conditions based on the determination of BAT.

This interaction is, therefore, relatively straightforward – ELVs in Directives establish minimum potential permit conditions, but permits have to establish stricter conditions if this is the conclusion arising from BAT assessment.

Delaying action: disproportionate costs

Disproportionate cost is an issue to be taken account of in determining BAT for installations under IPPC. Cost issues have formed a critical part of the analysis and debate in the preparation of BREFs (as well as decision making in many Member States). Having said this, it is important to stress that none of the decisions relating to cost have been tested in the ECJ, i.e. that the provisions of the IPPC Directive has been correctly interpreted.

3.6 Monitoring and reporting

Monitoring and reporting obligations on the operator should be set out in permits. They form an important ongoing aspect of installation operation. Monitoring obligations generally include the monitoring of concentrations of specified pollutants emitted from the installation and a range of other aspects of installation operation (e.g. safety reporting, waste arisings, etc). In some cases (e.g. for large installations or those of concern), there may also be a requirement to monitor the surrounding environment.

Monitoring of emissions will confirm that ELVs are complied with. Thus the monitoring and reporting is important to ensure that discharges remain within limits that have been

determined to meet the obligations of the Water Directives. The emission information is also important specifically for meeting the obligations under the EQS Directive for an inventory of emissions and for determining mixing zones. The information also informs the assessment of pressures under the WFD. The monitoring obligations on operators are established by the IPPC Directive, not the Water Directives. However, it is possible that analysis under the Water Directives could identify an additional substance that should be subject to operational monitoring, but which is not specified in the permit conditions.

Monitoring of the ambient environment has an obvious overlap with the obligations of the Water Directives. The EQS Directive requires monitoring (water, sediment and/or biota) of concentrations of specific substances and the WFD has very wide ranging monitoring obligations to examine pressures on water and trends in the various determinands of water. Monitoring undertaken by operators under IPPC would contribute to these objectives and reduce costs on monitoring by public authorities.

The monitoring obligations under the EQS Directive are expressed in a way consistent with IPPC, e.g. taking inventory information from reporting under the E-PRTR. However, the practical monitoring needed for operational and surveillance monitoring under the WFD might require different monitoring frequencies or presentation of collated data than compliance monitoring and E-PRTR reporting require.

3.7 Inspection and enforcement

Member States are required to ensure that permit conditions are complied with (Article 14). In the strict view of the obligation, the only interaction with the Water Directives is that ensuring compliance is critical in ensuring water objectives are met.

However, for many inspectorates, enforcement activity is more than simply checking permit obligations. Discussions with operators allow for consideration of potential operational changes. They also allow inspectors to raise any concerns that water managers may have identified. This may set the foundation for later permit review. This presents a number of challenges to the inspectorate.

3.8 Permit review

The IPPC Directive requires the periodic review of permits. There is no prescription as to how frequently permits should be reviewed, but the Directive highlights a number of circumstances when permit review (and possible revision) is required. These include issues relating to the installation processes (that there is a change in understanding of what is BAT, new ELVs are introduced in EU law or that improved safety measures are needed) and issues relating to the impact of the installation on the environment (that pollution impacts are significant so requiring changed ELVs or that there are new obligations, such as EQS, in EU law).

With regard to the interaction between IPPC and the Water Directives, it is the latter interaction which is most important. Clearly, the EQS Directive has introduced new EQS in EU law and, for existing IPPC permits, review may be needed if discharges from installations

risk breaching an EQS (taking account of the flexibility available from using the mixing zone concept).

The WFD has a more complex relationship with IPPC permit reviews. Clearly if achieving good ecological status is easily interpreted as an EQS with regard to the performance of IPPC installations, then the interaction is similar to the EQS Directive. However, in most cases the interaction is likely to be more complex. Understanding the impact of discharges in relation to water status may become apparent or improve as monitoring programmes within RBMPs are implemented and reviews of RBMPs are undertaken.

The interaction regarding permit reviews is also complicated by the issue of timetabling of the obligations arising from the respective Directives. As noted above the IPPC Directive has not set timetable for permit review. However, the Water Directives do have timetables for meeting environmental objectives. However, for the WFD the timetable is potentially long-term (meeting Good Status by the end of the third river basin planning period in 2027 subject to the potential for other derogations, etc). Thus simply identifying what changes to discharges are required of an installation is only the first stage – the timetable for meeting these objectives would strongly affect decisions for when any changes to the installation may be required.

3.9 Transboundary issues

The IPPC Directive (Article 9(4)) requires that permits shall contain provisions on the minimization of long-distance or transboundary pollution and ensure a high level of protection for the environment as a whole. Such transboundary impacts may be local (e.g. emissions causing an impact on a local water body that is transboundary) or distant, such as deposition of air pollutants at a long distance from the installation. IPPC operators and permitting authorities should already address these issues in decision making. However, the nature of the impact of such transboundary effects is made more complex with the objectives established by the WFD and the measures to be adopted under them. This transboundary relationship is, therefore, explore further in this report in the Chapter on the WFD.

3.10 Conclusions

Interactions between the IPPC and Water Directives arise throughout the IPPC regulatory cycle. The objectives and processes of the Water Directives may affect the operational and monitoring conditions to be applied in permits and inform enforcement activity and permit review. The decisions made in implementing IPPC are also critical in a number of aspects of the implementation of the Water Directives, such as the nature of programmes of measures, monitoring, inventories, etc. The key interactions are illustrated by Figure 2.

These interactions raise a number of challenges for IPPC permitting and inspection authorities and these challenges, and what might be done to address these, are discussed in Chapter 13.

It is useful to view IPPC as a regulatory cycle:

- Permit determination
- Inspection planning
- Inspection and supervision
- Enforcement
- Permit review

The following practical conclusions, therefore, following this cycle. For the IPPC regulator/s (permitting, inspection, enforcement, etc.), it is, therefore, important to consider the following issues arising from the interactions:

1. That any flexibility in deciding what is, or is not, included in the scope of an IPPC permit (whether in national guidance or on a case by case basis) includes a consideration of the potential benefits of including particular aspects of a process for meeting WFD and other water Directives' objectives. For example, would including manure spreading enable greater controls for water pollution? Note that answers will vary between Member States depending on the availability and effectiveness of other regulatory regimes to meet the same objectives.

2. In applying for a permit, are operators given guidance to ensure that they adequately consider the consequences of their operations with regard to the specific objectives of the Water Directives? Is there information available to operators on local water objectives in a form that they can use to assess the impact of their installations?

3. IPPC permitting authorities need to understand the environmental objectives arising from the Water Directives (locally and regionally, e.g. transboundary). Ideally water managers should be proactive in communicating this, but if this is not the case, permitting authorities should seek out this information. It is also likely that discussion will be needed with water managers to consider whether particular installations, types of discharge, individual pollutants, etc., are a potential risk and what might be appropriate to address these in permit conditions.

4. Permitting authorities need to ensure that operators have taken sufficient care in assessing the impacts of their installations with regard to the objectives of Water Directives.

5. Where permit conditions may be required to meet the objectives of Water Directives that are 'beyond' BAT, consideration needs to be given to:
    a. How well such permit conditions have been assessed in relation to meeting the water objectives.
    b. Whether there is flexibility in the objectives, such as with regard to timetabling.
    c. Whether other activities also threaten those objectives and, therefore, whether water managers might consider action on these issues as more cost effective.
    d. The outcomes of tests of disproportionate costs for stricter permit conditions.

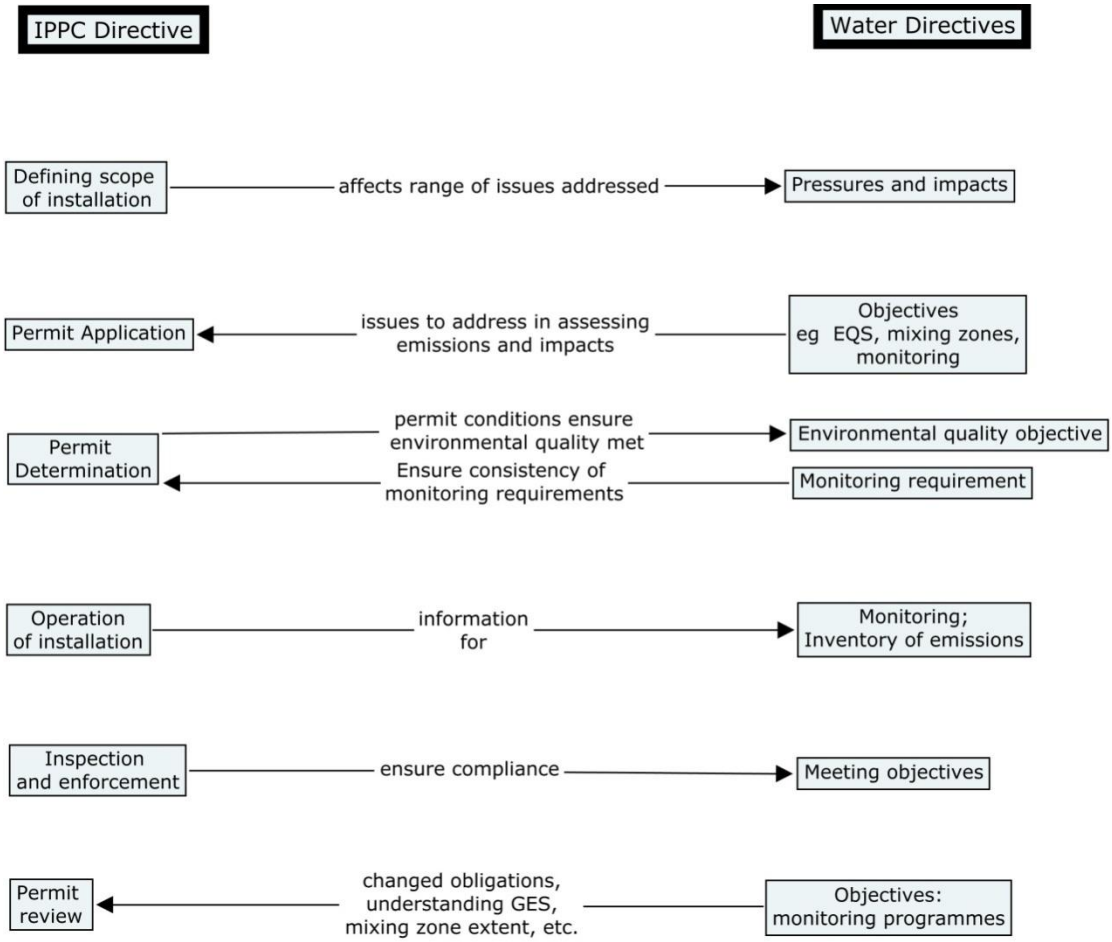
6. Permitting authorities should identify relevant emission and ambient monitoring requirements in permit conditions. Such monitoring may simply be to ensure compliance, but may also allow for better understanding of the relationship between the installation and specific water objectives. Water managers could usefully be consulted on appropriate monitoring.

7. Monitoring information from operators and general monitoring from water authorities should be shared to maximise the utility of each.

8. Supervision and inspection processes should ensure not only that specific permit conditions are complied with (basic inspection), but also examine if the predicted consequences for water objectives are being met. Inspection authorities should consult with water managers for any concerns over incidents of non-compliance.

9. Inspection authorities should report findings on the appropriateness of permit conditions in meeting water objectives to permitting authorities in order to stimulate a permit review if necessary.

Figure 2. Overview of the key interactions between the Water Directives and the stages of IPPC regulation.



4. WATER FRAMEWORK DIRECTIVE

4.1 Introduction

The purpose of this section is to examine the interaction between the WFD and the IPPC Directive from the perspective of the water manager – those responsible for defining characterisation, river basin planning, etc. Annex III provides an Article by Article (for relevant Articles) consideration of the interaction between the WFD and the IPPC Directive.

Figure 3 provides an overview of the WFD river basin planning cycle, beginning with characterisation, assessment of pressures, determining programmes of measures, production of plans, monitoring, review and revision. Each of these stages is informed by a range of different elements set out in the WFD Directive and a number of these are set out in the diagram which, as will be discussed below, are relevant to the interaction with the IPPC Directive. This section, therefore, follows the logic of the river basin planning cycle.

4.2 Overview

The EU Directive establishing a framework for Community action in the field of water policy, commonly known as the Water Framework Directive, was adopted in December 2000. The Directive arose out of a long debate on the nature of EU water law and the recognition of the need for a comprehensive ecosystem-based approach that delivered integrated catchment management. Thus the Directive requires Member States to identify ecological objectives, adopt integrated administrative arrangements and is broad in the types of instruments that can be used to deliver its objectives. Importantly, the Directive recognises the inter-relation of surface fresh waters, ground waters and marine waters.

The Directive applies to surface freshwaters, groundwaters and coastal marine waters. The purpose of the WFD (Article 1) is to establish a framework for the protection of surface and ground waters which, inter alia:

- prevents further deterioration and protects and enhances the status of aquatic ecosystems;
- aims at enhanced protection and improvement of the aquatic environment, inter alia, through specific measures for the progressive reduction of discharges; and
- ensures the progressive reduction of pollution of groundwater and prevents its further pollution.

This is further elaborated in Article 4, which requires Member States to prevent deterioration of ecological quality and pollution of surface waters and restore polluted waters, in order to achieve good ecological status in all surface waters by 31 December 2015 (subject to potential delays for two further River Basin planning cycles – 2021 and 2027). Good ecological status is defined according to detailed criteria.

It is important to be clear as to the definitions of the general objectives of the WFD. Surface waters (lakes, rivers, transitional and coastal waters) are (subject to certain exemptions) to reach Good Ecological Status (GES). For artificial and heavily modified water bodies, the objective is Good Ecological Potential. These are each a combination of good chemical

status, hydromorphological status and biological status. For groundwaters the objective is Good Status – a combination of good chemical status and quantitative status.

These elements are important to distinguish in relation to other Directives. The EQS Directive, for example, sets standards contributing to the definition of good chemical status. The Groundwater Directive sets in place standards and approaches to threshold values to contribute to good chemical status of groundwaters. IPPC discharges may affect chemical status (of surface or groundwaters), or directly affect biological status (e.g. via thermal discharges). Thus an IPPC installation might affect the achievement of GES through affecting different elements that comprise GES, or Good Status for groundwaters.

Article 4 sets out the key environmental objectives, which, for surface waters are that Member States shall implement the necessary measures to prevent deterioration of the status of all surface water bodies, taking account of the necessary timescales, natural conditions, technical feasibility, etc. The requirement to meet the WFD Article 4 objectives, e.g. GES, is not an absolute obligation on Member States. In particular Article 4(4) states:

'The deadlines established […] may be extended for the purposes of phased achievement of the objectives for bodies of water, provided that no further deterioration occurs in the status of the affected body of water when **all of the following conditions** [*emphasis added*] are met:

(a) Member States determine that all necessary improvements in the status of bodies of water cannot reasonably be achieved within the timescales [..] for at least one of the following reasons:

> (i) the scale of improvements required can only be achieved in phases exceeding the timescale, for reasons of technical feasibility;
> (ii) completing the improvements within the timescale would be disproportionately expensive;
> (iii) natural conditions do not allow timely improvement in the status of the body of water.

(b) Extension of the deadline, and the reasons for it, are specifically set out and explained in the river basin management plan [..].
(c) Extensions shall be limited to a maximum of two further updates of the river basin management plan except in cases where the natural conditions are such that the objectives cannot be achieved within this period.
(d) A summary of the measures required under Article 11 which are envisaged as necessary to bring the bodies of water progressively to the required status by the extended deadline, the reasons for any significant delay in making these measures operational, and the expected timetable for their implementation are set out in the river basin management plan. A review of the implementation of these measures and a summary of any additional measures shall be included in updates of the river basin management plan.'

The first issue to emphasise is that the WFD does not allow an indefinite delay in taking action for reasons of cost. Delay is limited to 2027 (unless natural conditions prevent achievement of objectives). Also not only should any justification of disproportionate cost be given in a RBMP, this should be accompanied by a timetable for when action will be taken (in a future RBMP).

The Directive allows for less strict objectives to be met under certain conditions and/or for deadlines to be extended. The reasons for derogations from meeting the environmental objectives include:

- heavily modified water bodies;
- technical feasibility to achieve objectives requires an extension to the deadline;
- cost implications to achieve objectives requires an extension to the deadline;
- natural conditions require additional time to meet the objectives.

Member States are also allowed to fail to meet the requirements of the Directive when this is due to new modifications of the physical characteristics of a surface water body or alterations to the levels of groundwater or where water status declines from high to good due to 'new sustainable human development activities'. In such cases the following conditions must be met:

- to take all practical mitigating steps;
- the reasons for the changes are of over-riding public interest and/or the benefits to the environment and society are outweighed by the benefits to the new modifications to human health, safety or to 'sustainable development';
- the benefits cannot be achieved by other means due to technical or cost issues.

Some of these exemptions are not clear. For example, there is no definition of a 'sustainable human development activity'. Guidance has been published on this issue (CIS Guidance No. 20 – see below), which acknowledges limitations in the text of the WFD. This is a limitation in implementing the Directive and, ultimately, interpretation may require the involvement of the European Court of Justice (ECJ). Importantly, the Guidance addresses the issue of where disproportionate costs may be used as a justification for a failure to meet a WFD objective. This is examined in more detailed below and in comparison to IPPC.

Member States are required (Article 5) to analyse the characteristics of each river basin district with reference to ‘type specific conditions’, review the environmental impact of human activity and assess the economic analysis of water use, according to criteria set out in Annexes II and III. They are also required to establish a register of protected areas (Article 6), which includes nitrate vulnerable zones designated under the nitrates Directive. Member States are required to establish monitoring programmes to assess surface water status (Article 8), with specifications set out in Annex V.

In tackling pollution, Member States are required to adopt the combined approach (Article 10). This can include emission limit values, etc, though the Directive stresses the use of ‘best environmental practices’ for diffuse sources, including those set out in the nitrates Directive. Importantly, the Directive stresses that where a quality objective or quality standard requires stricter conditions than those which would result from the application of existing Community law, more stringent emission controls shall be set accordingly.

Within each River Basin Management Plan Member States are required to establish programmes of measures (Article 11) to meet the environmental objectives of the water bodies. The Directive divides such measures into ‘basic’ and ‘supplementary’. Basic measures include, inter alia, those that are required already under Community law (such as the requirement of the nitrates Directive. For diffuse pollution sources, this also includes

measures to prevent or control the input of pollutants. 'Controls may take the form of a requirement for prior regulation, such as a prohibition on the entry of pollutants into water, prior authorisation or registration based on general binding rules where such a requirement is not otherwise provided for under Community legislation. These controls shall be periodically reviewed and, where necessary, updated'. 'Supplementary' measures are those measures designed and implemented in addition to the basic measures, with the aim of achieving the objectives. The Directive provides a non-exhaustive list of such measures. Many of these measures could be used in one or another way to tackle nutrient pollution from agriculture and, indeed, a number of these have been used in the Member States (such as taxation and education).

Compulsory measures for water bodies which do not meet the environmental objectives of Article 4 include:

- monitoring to be reviewed and adjusted as appropriate;
- establishment of stricter environmental quality standards for pollutants if necessary;
- investigation of sources of pollution
- review of all relevant authorisations and discharge permits.

Where monitoring or other data indicate that the objectives set under Article 4 for the body of water are unlikely to be achieved, the Member State shall ensure that:

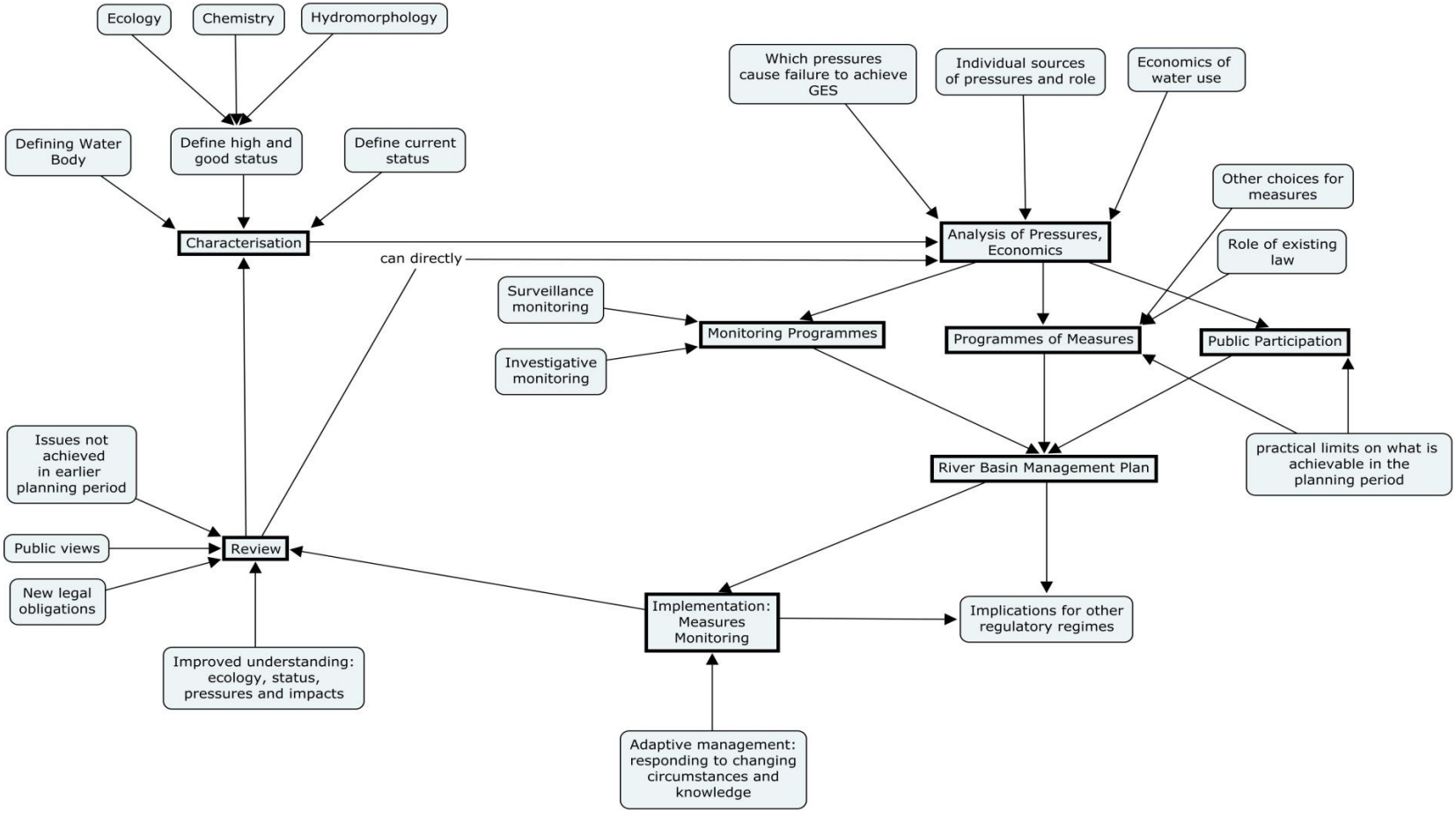
- the causes of the possible failure are investigated,
- relevant permits and authorisations are examined and reviewed as appropriate,
- the monitoring programmes are reviewed and adjusted as appropriate, and
- additional measures as may be necessary in order to achieve those objectives are established, including, as appropriate, the establishment of stricter environmental quality standards following the procedures laid down in Annex V.

The principle administrative tool of the Directive is the River Basin Management Plan which Member States are required to produce for each river basin district lying entirely within their territory (Article 13). For international river basin district falling entirely within the Community, Member States shall ensure coordination with the aim of producing a single international river basin management plan. Where such an international river basin management plan is not produced, Member States shall produce river basin management plans covering at least those parts of the international river basin district falling within their territory to achieve the objectives of this Directive. The plans had to be published by December 2009, but it is clear that there is delay from a number of Member States.

River Basin Management Plans must be reviewed by competent authorities on a regular cycle. Importantly, authorities are required to monitor the status of water bodies and the effects of the programmes of measures on the changing status. This, therefore, provides an assessment of effectiveness which should inform the review and revision of the plan. The draft plan, monitoring results and drafts of revised plans must be made public, so stakeholders will have an active role in the review process. Public involvement processes are not prescribed, but can involve publication of drafts, consultation groups, etc. The River Basin Management Plans are also a key reporting mechanism to the European Commission, so it can also comment on effectiveness issues and influence plan revision if it does so in a timely manner.

The Water Framework Directive, therefore, provides a comprehensive framework for tackling pressures of water (including those derived from IPPC installations). However, it is also complex in its practical implementation, requiring a large number of obligations to be interpreted by the Member States. Clarify these is essential to understand what is required of IPPC installations in the programmes of measures.

Figure 3. Overview of the WFD planning process and factors affecting each stage



4.3 River Basin Planning Cycle and interaction with IPPC

Introduction

As described above, the WFD sets out broad, wide-ranging objectives for all water bodies and sets these in a comprehensive management process. This Chapter focuses on the main elements of the river basin planning process. In broad terms the key elements of the WFD are:

- Assessing the state of water bodies and setting objectives. This process involves characterisation (determining what is meant by 'good ecological status' and identifying current status), assessing pressures affecting status, economic analysis of water use, etc., and identifying objectives.
- Developing programmes of measures (POM). This involves identifying what actions need to be undertaken in order to reach objectives.
- Monitoring and review. This involves monitoring of the key elements of water status and pressures on this, improving understanding and reviewing progress towards targets, etc.

Each of these elements is set out in the River Basin Management Plan. The RBMP has a prescribed planning cycle. The first RBMP was to be published in December 2009, setting out actions (POM, monitoring) until 2015. The WFD sets an initial objective to achieve Good Status by December 2015, but this can be extended by Member States for two further six-year planning cycles.

Other supporting elements in the WFD include issues such as delivering cost recovery for water services (which may contribute towards achieving objectives).

These broad elements of the WFD form the basis for considering the interaction with the IPPC Directive. The EQS Directive sets specific chemical objectives to be delivered within the context of the WFD. The interactions of this Directive are described in Chapter 5.

Assessing the state of water bodies and setting objectives

The requirements in the WFD to determine what is good/high status for each water body and the determination of current water status are independent of any interaction with the IPPC Directive. However, in the assessment of pressures, there is a clear interaction. Emissions from IPPC installations may impact on water bodies and prevent good status being achieved. It is important to note that there is a variety of ways that the activity of installations may affect water status:

- Direct discharges into water, e.g. toxic substances, nutrients, organic matter, heat.
- Diffuse pollution (e.g., from landspreading activities)
- Emissions to air which are deposited into water, e.g. acid gases and ammonia depositing as acid deposition and nitrogen deposition.

- Impacts on water bodies from accidents. However, although an issue to be addressed in IPPC, this cannot be a routine pressure on a water body (although the legacy of a historical accident may be a WFD issue).
- Resource use and waste generation. This most likely would involve water use, but waste management on site would also need effective management to prevent impacts on water.

It is important to stress that pollutants identified as of concern within River Basin Management Plans may be determined through a number of routes. The following Chapters address the EQS Directive and the GWD, each of which specify standards for selected pollutants. However, in implementing the WFD, Member States need to consider all pollutants which have the potential to lead to a failure to achieve the objectives of the WFD. These may be identified nationally, but most likely for individual water bodies and will need to be highlighted in each RBMP. Obvious examples are nutrients which are not included in the EQS Directive, but which have widespread impact and represent a threat to achieving Good Status across may European water bodies. Therefore, IPPC authorities need to consider not only the pollutants specified in EU law, but also those identified as important on a case by case basis through the implementation of the WFD. As will also be seen below, this also applies to pollutants for which threshold values are established by Member States under the GWD.

With regard to emissions to air, it is important to note that this can be a local phenomenon. This is illustrated by the European Court of Justice Case C-231/97, of 29/09/1999 - A.M.L. van Rooij v Dagelijks bestuur van het waterschap de Dommel. This Case concerned the interpretation of the term ‘discharge’ in Directive 76/464/EEC (Dangerous Substances Directive). This case concerned a business that treated wood by a method of steam fixation of a preservative solution called 'superwolman‘. During the wood impregnation process, steam was released which was then precipitated directly or indirectly onto nearby surface water. A local resident claimed that the steam contained substances of Annex II of the Directive 76/464/EEC, and that it was polluting the nearby surface water. The question was whether the term discharge was to be understood as steam and if the distance of the nearby surface water was to be taken into account in the interpretation of whether it was a discharge. The Court decided that polluted steam emissions were to be understood as falling under the scope of the Directive, the distance being useful only in the determination of the predictability of the pollution and in establishing the liability of the producer. Although the Case does not concern the definition of pollution under either the WFD or IPPC Directive, it illustrates the fact that deposition of atmospheric discharges to water is not only a practical management issue, it has also attracted the attention of the Court.

Under the WFD pressures need to assess firstly to identify what factors may be preventing the achievement of good status and secondly to identify activities that might place a water body at risk of not achieving good status. Thus it is important to know about the potential for activities within catchments to affect water bodies.

Water managers need, therefore, to be able to know about the potential for IPPC installations to impact on water bodies. Information on direct discharges is the most obvious source for water managers, as is information relating to abstraction. However, diffuse pollution information may be less readily available and indirect impacts, e.g. via aerial deposition even less clear. It is, therefore, important for water managers to examine pressures and potential

pressures in detail and work with IPPC permitting and inspection authorities to help to understand the nature of installation activity.

For chemical discharges from IPPC installations, these may affect the chemical status of surface or groundwaters. The EQS Directive sets specific standards which contribute to chemical status and these are described, with their interactions with IPPC in Chapter 5. Similarly the interactions with standards and threshold values arising from or developed under the Groundwater Directive and their interaction with IPPC are addressed in Chapter 6. However, the chemical pressures on water bodies are not all addressed by substances included in these two Directives. Other substances may be identified as important for individual water bodies and objectives set for these, to which measures may need to be taken. Tackling discharges from IPPC installations may be important in meeting these chemical objectives. It is also important to note that even where there are specific standards arising from, fopr example, the EQS Directive, the presence of multiple pollutants will require more complex assessment both of likely impacts (e.g. a cocktail effect) and of appropriate controls to be taken for individual sources. Therefore, it is necessary that water managers are clear in communicating all chemical objectives to IPPC operators and regulators.

For discharges such as thermal discharges, the interaction may not be simple to determine. Where the impact of concern within GES is biological in character, the nature of the impact from an individual discharge might be complex, e.g. affecting different life cycle stages, interactions with climate, interactions with other species, etc. Therefore, water managers may need to undertake significant analysis to identify the precise nature of a pressure in preventing GES being achieved.

It was stated above that determining what is good status is independent of IPPC implementation. However, while good status is the objective of the WFD, the objective also requires a timetable. Member States have, effectively, three river basin planning periods to meet good status (2027) and could then ask the Commission for further time. The importance of the timetable is that setting objectives will depend on the nature of the pressures preventing good status and the difficulties in tackling these. In this context, the WFD introduces the concept of disproportionate cost. Such costs may apply to IPPC installations. Therefore, the timing of measures for IPPC installations will be an important factor. The issue of disproportionate costs is discussed further in Chapter 3.

Developing programmes of measures (POM)

Article 11 sets out the requirement to develop the POM. The POM has to take account of the analyses (Article 5) and objectives (Article 4) for each water body. Article 11 divides the types of measure that may be taken into basic and supplementary measures. Measures with regard to IPPC are basic measures in that basic measures include those already required by EU law.

The IPPC Directive (see Chapter 3) requires permit conditions for installations to be sufficient to meet the obligations set out in other EU legislation. Therefore, measures that should be taken with regard to IPPC installations within the POM (as long as these are justified according to the analysis undertaken with regard to Articles 4 and 5) are basic measures.

Therefore, there is, at one level, a simple interaction with the IPPC Directive – the operating conditions of installations (as set out in permit conditions) may form part of the WFD POM. However, this simple statement begs a number of questions.

The first is whether the POM requires action beyond what is already required under the IPPC Directive. The list of basic measures in Article 11 (and Annex VI) includes measures in EU law which are not altered by the WFD, for example the ELVs under the Dangerous Substances Directive which, although to be repealed in 2012, ought to be taken account of in IPPC permits already issued. However, the IPPC Directive has, within its provisions, the obligation to meet environmental objectives in other EU legislation. Therefore, the fundamental measure of IPPC (setting ELVs based on the application of BAT) may not be sufficient. Also there may be alternatives in determining BAT and one or other of these might be more appropriate in meeting WFD objectives. Therefore, implementation of the POM may require IPPC permits to consider issues beyond the core assessment of BAT.

Taking this issue forward, therefore, requires the assessment under Articles 4 and 5 to be clear (see above) and in a form that can be translated into specific obligations on an installation. It is not sufficient simply to know that there is too much of a substance being discharged, for example. Permitting authorities need to know what emission reduction is needed to meet WFD objectives so that this can be translated into options for installation operation (e.g. material use, process operation, pollution control). Obligations on installations may also affect other process or management actions, e.g. in relation to diffuse pollution or water use.

For deposition of pollutants from the atmosphere, where these are localised, the same interaction applies as for direct discharge to water. For long-range deposition the interaction is more complex. Certainly a number of water bodies remain below good status due to continuing acidic and nitrogen deposition. Much of the deposition arises from emissions from IPPC installations (although there are important other sources). How far these pressures can be interpreted as measures for individual installations is difficult to determine, but is certainly an area worthy of discussion between water managers and permitting authorities and this may be transboundary in nature.

The WFD also includes other actions to be taken. These include seeking the full cost recovery of water services. Indeed the WFD specifies industry as a sector to which this principle should apply and be assessed. The cost of water supply is not an issue to be directly considered by IPPC permitting. However, future changes to water charging might (probably in rare cases) affect the relative cost of process alternatives for IPPC operation and water use is part of the overall consideration that should be given to resource use within IPPC. Thus water pricing has an indirect interaction, but is of a different character to other WFD/IPPC interactions.

Disproportionate costs

The CIS Guidance on exemptions addresses the interpretation of disproportionate cost. It clearly states that the argument for a disproportionate cost cannot be used to reduce any obligation arising from other EU law. This would include the obligations arising from IPPCD, UWWTD, etc. Of course, as noted earlier, disproportionate costs are an element within the implementation of IPPC. However, these would need to be assessed and justified within the legal boundaries of the IPPC Directive, not those of the WFD.

Cost issues in determining BAT under IPPC consider a number of issues. For example, for a new installation, analysis may compare alternative techniques and compare relative costs to environmental outcomes. For an existing installation, analysis may include the appropriate timetabling for upgrading (introducing a new technique) with regard to business cycles or the lifespan of existing equipment. For the WFD costs are compared to the specific objective of achieving the particular objectives set out in Article 4. It is likely that in many cases the analysis of costs compared to benefits concerning individual techniques may be the same. However, for IPPC such analysis generally compares alternatives for individual installations (or that class of installation). For the WFD, where there are multiple pressures affecting water status in a water body, determining whether a particular action is disproportionately expensive has to involve a comparison of alternative actions regarding these different pressures – a comparative judgement within the POM. Thus it is possible that assessments of disproportionate cost may not always be equivalent between the two Directives.

Cost issues are, therefore, an area where further analysis will be desirable. They will become an area of increased scrutiny. The Commission is already concerned over the nature of some permit determinations and the recent published RBMPs indicate that many water bodies will not be at Good Status in 2015. How far cost is used to justify decisions in these cases is not clear, but the justification for such a reason will likely be examined in detail. This will also raise the question of the inter-relationship between the concept in the two Directives. It is, therefore, important to gather IMPEL members' views on this in Part 2 of this project.

Monitoring and review

The WFD sets out a range of monitoring obligations – surveillance, operational and investigative monitoring. These are detailed in Annex III to this report. However, essentially there is a need for routine monitoring to assess the critical elements of water status, focusing on any factors that might be of concern (e.g. a toxic substance or nutrient), and the need to monitor/investigate particular pressures either to increase understanding of their nature and impact or to monitor progress in tackling the pressure.

The IPPC Directive also requires monitoring to be undertaken. This most commonly involves monitoring and reporting on the operation of the installation, including specified emissions. It may also include monitoring of the surrounding environment to ensure that there is no unacceptable impact. Clearly, information from IPPC monitoring will contribute to the overall requirements for WFD monitoring. Monitoring of individual discharges is of most obvious use. However, other types of monitoring (e.g. quantities of manure produced from intensive animal units) may also help to improve the water manager's understanding of pressures. Also any local environmental monitoring required in IPPC permits may help the water manager, not least that this would be undertaken by the operator (at their cost).

It is important for the water manager not to view monitoring information as a one way process. Monitoring of water bodies may provide important information to assist operators, inspectors and permitting authorities better to understand the impacts of installations. Of course such information could form part of revised measures in a POM, but it ought also to help inform permit reviews within the IPPC Directive's own regulatory cycle.

The WFD includes a full review cycle in its RBMPs – monitoring of state and pressures to assess progress towards objectives and development of revised plans. Each element described

above continues in its interaction with the IPPC Directive. It is important to stress that implementation of the WFD will result in improved understanding. The development of the first RBMPs was a significant challenge to the Member States, as much was new to many. Thus implementation will raise new understanding of status, pressures, etc., as research and monitoring is undertaken. This could result in the identification of problems arising from the activity of IPPC installations not identified in the first RBMP. IPPC operators and permitting authorities need to be aware of this – that an activity that is currently acceptable, might not be so in the future.

It is also important for water managers not to view the RBMP review process in isolation from other processes – as an end in itself. Water managers will gather information relating to the review almost from the start of RBMP implementation. Where relevant, this information should be made available to other regulators to assist in their decision making – including those reviewing IPPC permits. IPPC permitting authorities should consult with water managers when reviewing relevant permits. However, water managers should also proactively provide information to avoid the situation where the RBMP review identifies the need for new action on an IPPC installation which has, through a separate process, just had a review of its permit. This would impose unjustified costs on the operator.

The spatial context of the WFD

It is important to note that the WFD is more than a management process designed to set a water objective and adopt measures to meet that objective. It also has a strong spatial planning aspect which is different to the thinking underlying IPPC, which deals with specific activities within that spatial framework. River basin planning involves a consideration of the whole character of a river catchment or coastal area. Apart from the immediate understanding of the character of the surface and ground water bodies, it requires an understanding of how these characters are linked across the catchment (e.g. hydrological links from upstream to downstream, links between surface and ground waters, etc). It also requires an understanding of land-use in the catchment and how this is changing as well as specific activities (including IPPC installations) and goals (e.g. protected areas) in that landscape.

This spatial approach to river basin management means that meeting water objectives requires a consideration of how pressures are changing across the landscape. In many cases, therefore, it may not be appropriate to view individual pressures in isolation (this would, however, be the case for a pollutant of concern with only one source). Rather in developing measures to meet objectives, action may be required at some distance from where a problem is observed and may require actions on a number of different pressures across the landscape.

This spatial approach to addressing objectives and pressures may mean that different options for different measures in different locations may need to be compared and contrasted (e.g. for cost-effectiveness). This presents a challenge for working with IPPC authorities which may view the relationship of an installation with the water environment as being more immediate.

Transboundary issues

Water bodies do not respect national boundaries – many cross frontiers or are used as frontiers. The WFD recognises this and encourages co-ordination of all aspects of WFD implementation across frontiers – from setting objectives to developing programmes of measures.

Effectively, the analytical issues raised above for the relationship between WFD objectives and planning processes and their interaction with IPPC installations apply equally in a transboundary context. Clearly, the impact of an IPPC installation may spread across a frontier. However, it is also possible that the impact may, for example, only be observed across a frontier. An example of the latter is acid deposition which may affect the status of waters at a long distance from the source of emission. The challenge for water managers is to ensure that in assessing pressures transfrontier impacts are identified. This should involve discussions with water managers and IPPC authorities from the neighbouring Member State and specific mechanisms for such bilateral discussions should be established.

While the identification of pressures may be relatively straightforward in a transboundary context, setting objectives and developing programmes of measures is more problematic. Member States receiving the pressure across a frontier may be more likely to wish to meet objectives sooner than the Member State producing the pressure. The specific measures required and their timing will, therefore, be subject to political interests and, in cases of disagreement, the Commission may need to be involved.

4.4 Conclusions

The WFD has introduced a complex and comprehensive approach to assessing water bodies, setting objectives and determining measures to meet objectives. Once water bodies have been characterised, there are potential points of interaction with the IPPC Directive throughout the entire process. In some cases this interaction will be obvious, e.g. for serious point sources of pollution. However, in many cases the nature of the interaction requires considerable analysis. The implementation of the first RBMPs will provide an important framework for improving understanding. Figure 4 provides an overview of the interactions between the WFD planning process and the IPPC Directive. These interactions present a number of challenges for both water managers and IPPC regulators. These are explored in Chapter 13.

For the water manager, it is, therefore, important to consider the following issues arising from the interactions with IPPC (note that these points are presented as within the development of a RBMP – they are equally applicable to the stages in the cycle of revision of a BRMP):

1. IPPC installations may cause pressures on water bodies – through direct point discharges to water (pollutants, heat, etc.), diffuse pollution and indirect discharges (e.g. via soil contamination, deposition of air pollutants, etc) and abstraction of water, etc. The inventory of pressures in a RBMP should include all pressures arising from IPPC installations. Water managers, therefore, need to understand clearly the performance of each relevant IPPC installation – including current performance, future predicted performance (e.g. as it upgrades to BAT) and consequences of non-compliance (e.g. history of non-compliant discharges). This requires close liaison with IPPC permitting and enforcement authorities – drawing on the pollution inventory (E-PRTR) and routine monitoring results, etc.

2. Water managers need to understand the consequences of the pressures from IPPC installations on the status of the water bodies. Where there are concerns over water status (surface and ground waters) which may derive from the activity of such installations, analysis of pollutant behaviour, consequences of abstraction, etc., may

be needed. This may require in situ monitoring and analysis, or draw on modelling analysis. Water managers should work with IPPC permitting and enforcement authorities to benefit from any analysis undertaken during IPPC permitting and ensure the full range of installation performance is included in any analysis. Where such analyses show a potential for negative consequences arising from IPPC installation activity, this should be communicated to the IPPC permitting and enforcement authorities.

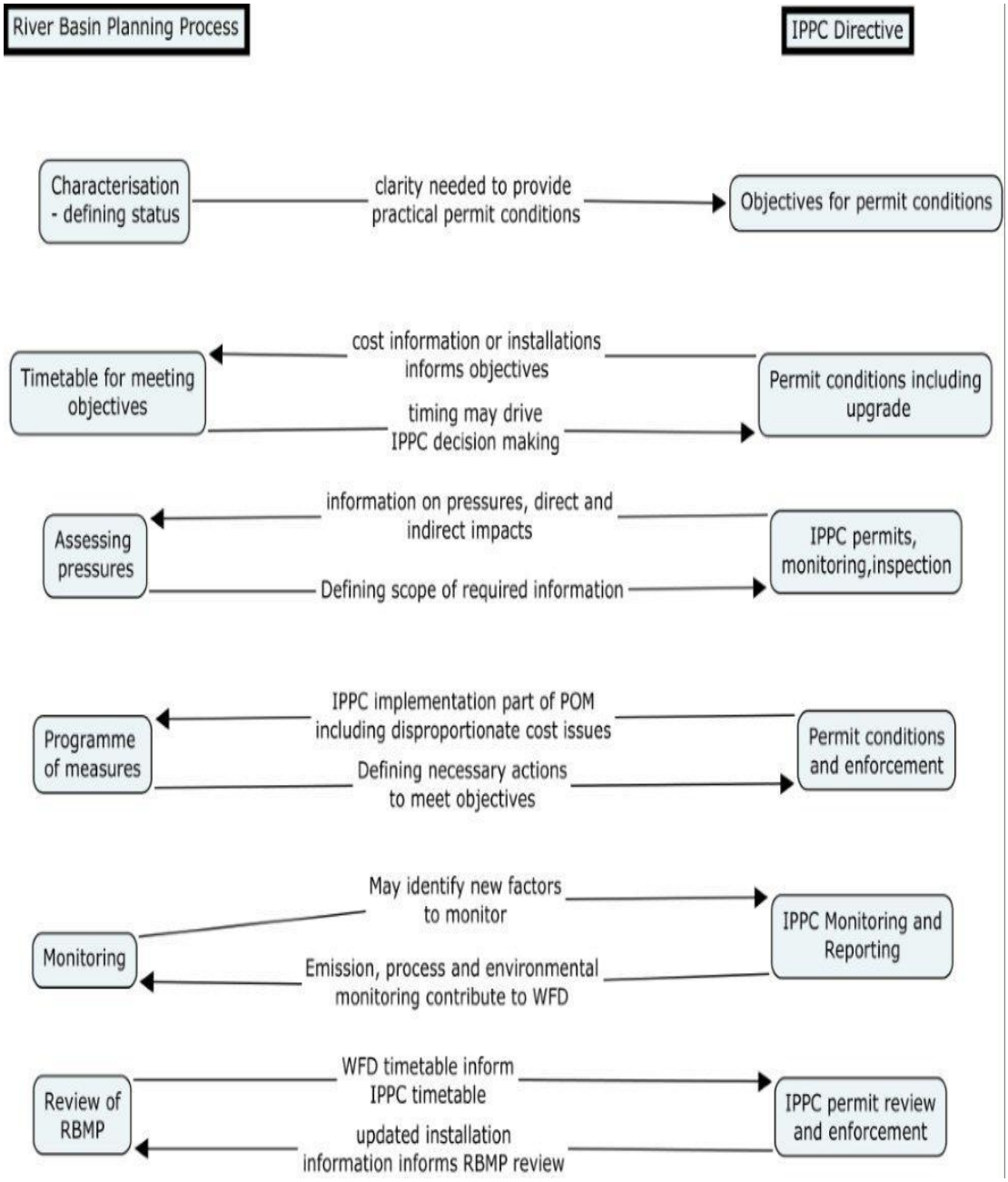
3. Where the activity of IPPC installations is demonstrated to have a negative impact on water status, water managers should consider measures to address these in the programmes of measures. However, any such measures need to be discussed with IPPC permitting authorities and, probably, operators in order to determine whether such measures would go beyond BAT and whether they would be considered as having a disproportionate cost under IPPC. Also, in any case, the practical timing of the implementation of measures would need to be discussed with the permitting authorities/operator to harmonise industrial investment, permit upgrading and river basin planning cycles.

4. In developing monitoring programmes for water bodies, water managers should seek to draw on other appropriate monitoring as necessary. Monitoring of IPPC installations will provide important information on pressures on water bodies and water managers should seek early and frequent access to the results of such monitoring. In some cases, such as where there is significant concern over the activity of an IPPC installation, the water manager could discuss with the IPPC permitting authority the possibility for the installation operator to fund and undertake monitoring on the local environment to investigate impacts of the installation.

5. In examining the results of monitoring (routine or investigative), water managers should be ready to communicate to IPPC enforcement authorities any cases where the outputs of an IPPC installation are having an unexpected consequence for water bodies. This may be due to non-compliant behaviour (which requires inspection) or due to unforeseen behaviour of pollutants, etc., which might require a re-examination of operations and permit conditions.

6. In undertaking reviews of RBMPs, water managers will need to examine progress towards targets (e.g. Good Status) over progressive RBMPs. It is, therefore, important to communicate such progress (in relation to pressures from IPPC installations) to IPPC permitting authorities to demonstrate either that expectations are being met or that operating conditions might need to be revisited.

Figure 4. An overview of the interactions between the WFD planning process and the IPPC Directive



5. ENVIRONMENTAL QUALITY STANDARDS DIRECTIVE

5.1 Overview of the Directive

In 2008 a daughter Directive[1] to the Water Framework Directive (WFD) setting water quality standards was adopted. A 'daughter' Directive provides specific obligations to contribute to the objectives of its 'parent' Directive. The WFD requires that all EU waters should achieve 'good status' by 2015 and, to assist this, it establishes a regime for the prevention and control of chemical pollution of water.

The new Directive takes this forward by setting harmonised environmental quality standards (EQS) for surface waters regarding 33 'priority substances' and eight other pollutants and by including a requirement to phase out discharges, emission and losses of 13 'priority hazardous substances' within 20 years. Priority hazardous substances are defined as 'substances or groups of substances that are toxic, persistent and liable to bio-accumulate'. The 33 priority substances include existing chemicals, plant protection products, biocides, metals (such as mercury and cadmium) and other groups like Polyaromatic Hydrocarbons (PAH) (mainly incineration by-products) and Polybrominated Biphenylethers (PBDE) (used as flame retardants).

The Directive sets two types of EQS: annual average concentrations and maximum allowable concentrations. The former are for protection against long-term and chronic effects, the latter for short-term, direct and acute eco-toxic effects. Furthermore, the EQS are differentiated for inland surface waters (rivers and lakes) and other surface waters (transitional, coastal and territorial waters).

By 2009, Member States were required to set up an inventory of discharges of pollutants for river basins on their territory. These inventories are to be published in their updated river basin management plans. The Commission is to report on progress towards compliance with the reduction or cessation objectives in 2018.

Although Article 16 of the Water Framework Directive states that Council and Parliament shall also adopt specific measures against pollution of water next to EQS for priority substances, this daughter Directive only lays down harmonised standards, for water quality. The European Parliament made some efforts to include specific control measures in the Directive, but its amendments were rejected by the Council and the Commission. The Commission already stated in 2006 that existing control measures and planned new legislation on chemicals, pesticides and industrial pollution control made separate proposals superfluous.

The Directive allows for the fact that it may not be possible to meet EQS close to discharge points and, therefore, the concept of mixing zones is introduced. Member States may designate such mixing zones in which concentrations of the priority substances may exceed the relevant EQS if they do not affect the compliance of the rest of the surface water with the EQS. Member States need to include in their River Basin Management Plans a description of

[1] Directive 2008/105/EC of the European Parliament and the Council en environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/419/EEC, 86/280/EEC and amending Directive 2000/60/EC

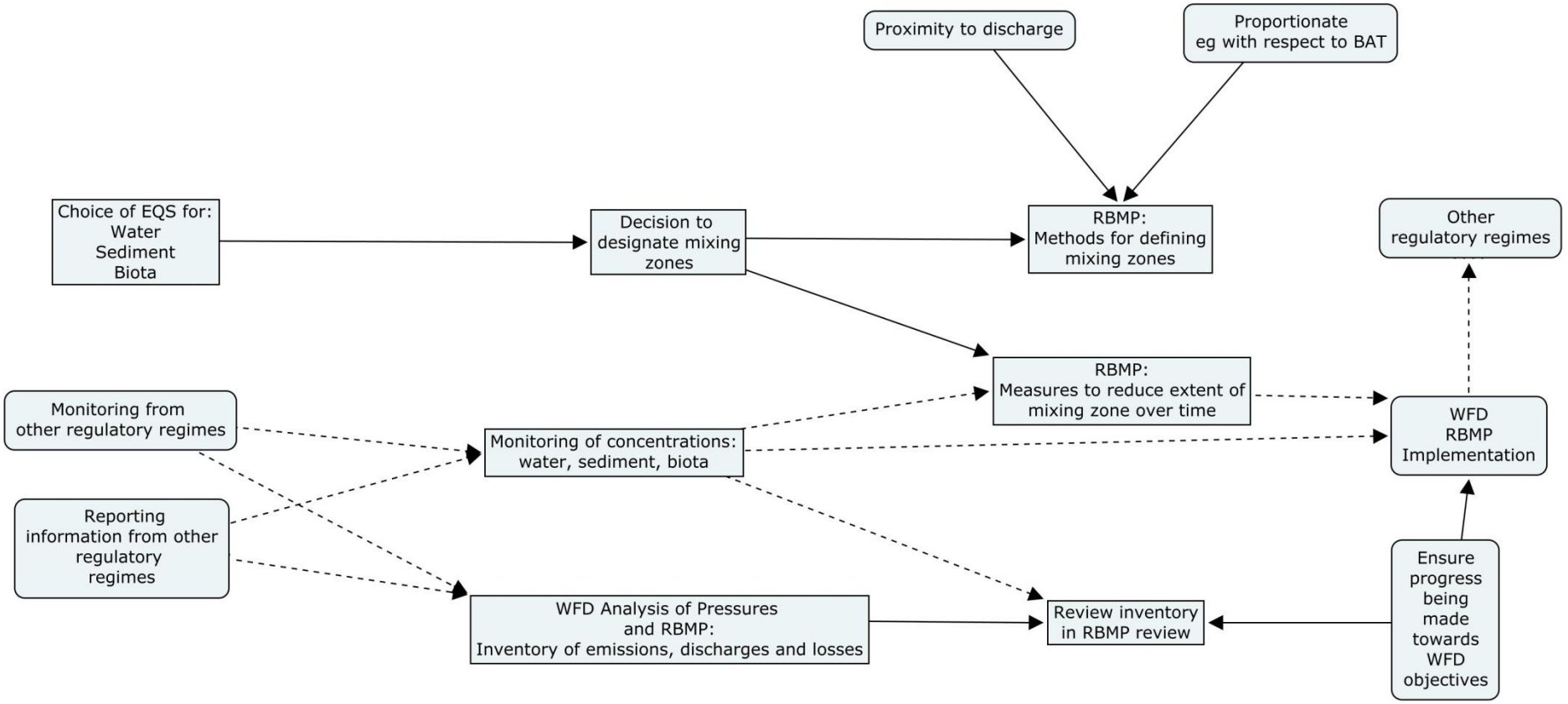
the approaches and methodologies applied to derive mixing zones and the measures taken with the aim to reduce the extent of the mixing zones in the future.

The EQS Directive is to be implemented fully within the framework of the WFD, which, as the Commission's Explanatory Memorandum, states 'provides for overall objectives, possibilities of exemptions (e.g. in the case of disproportionate costs), timetables, implementation tools, implementation cycles, reporting mechanisms, analysis and monitoring requirements, requirements to review the measures proposed in the present Directive, and a Regulatory Committee'.

The EQSs set out in this Directive set a more concrete (numerical) objective than might be the case with Good Ecological Status and, therefore, may be more easily related to permit requirements under IPPC. However, the nature of mixing zones is not clear and this poses a practical problem for interpretation of IPPC permitting.

Figure 5 provides a schematic overview of these elements of the Directive. The three key elements of setting the EQS and designating mixing zones, monitoring and inventory of emissions are self contained obligations, each contributing to the overall objective of controlling priority substances. Figure 5 also demonstrates how certain of the requirements are to be undertaken within the planning requirements of the WFD and how implementation informs, and is informed by, other regulatory regimes, including IPPC. Annex IV provides an Article by Article (for relevant Articles) consideration of the interaction between the EQS Directive and the IPPC Directive.

Figure 5. Overview of the key elements of the EQS Directive and immediate interactions



5.2 Interaction with IPPC

IPPC addressed in the Commission proposal

The Explanatory Memorandum of the Commission proposal for the EQS Directive addressed the issue of consistency with other policies and objectives of the EU. It noted that the adoption of a Directive was foreseen in the Sixth Environmental Action Programme. The Commission also viewed the proposal as ensuring 'the harmonisation of economic conditions in the internal market since existing national EQS vary considerably'. The Commission also stated that 'the proposal and accompanying Communication takes full account of the objectives and provisions of other Community legislation, in particular the chemicals policy including REACH and the Pesticides Directive, the IPPC Directive and the Thematic Strategies, namely those on marine policy and sustainable use of pesticides. All of these, and other, Community acts provide the emission controls in the sense of Article 16 (6) and 16 (8) WFD'.

The Impact Assessment[2] accompanying the proposal discussed the fact that (unlike daughter Directives of Directive 76/464/EEC), the proposal did not contain measures for controlling emissions. It stated that **'**the most cost-effective combinations of measures are best identified at Member State level'. The repeal of earlier legislation containing emission limit values was viewed as necessary because 'the emission limit values in them are outdated and have been surpassed by the more stringent requirements of Best Available Techniques set by the IPPC Directive'.

The WFD requires Member States to establish pollution control measures for priority substances in the programmes of measures, including those measures required to put a stop to discharges, emissions and losses of priority hazardous substances. In order to allow for the Commission to check compliance, the proposal included the requirement for an inventory of emissions and the IA stated that this should be achieved 'without any significant additional administrative burden, since the inventory can be built on the European Pollutant Release and Transfer Register (Regulation (EC) No. 166/2006)' and complimented by analyses under the WFD.

The IA also assessed the costs of implementation and noted, in particular, that some costs will already be required by Member States, 'in particular to the investments which will be necessary to comply with the IPPC Directive where existing plants will have to operate according to permit conditions based on BAT by October 2007. In addition, considerable investment will be necessary in those new Member States for which transitional periods have been agreed for the IPPC Directive'.

The Commission, therefore, in its proposal identified links between the EQS Directive and IPPC, but these were not explored in detail.

[2] Commission Staff Working Document. Impact Assessment. Proposal for a Directive of the European Parliament and of the Council on environmental quality standards in the field of water policy and amending Directive 2000/60/EC. SEC(2006) 947. Brussels, 17.7.2006.

Analysis of links with IPPC

There are a number of interactions between the EQS Directive and IPPC. Figure 6 provides an overview of these, each of which are discussed in detail below.

1. The IPPC permit conditions should not lead to a breach of an EQS established under the EQS Directive

The first point of interaction arises from establishing the EQS in a water body. If there is a risk that the EQS will not be met and that the cause of such a failure is a discharge from an IPPC installation, then a clear interaction will occur. However, it is important to note that operators need to determine in their permit applications whether a risk of failure to meet the EQS might arise. Thus even where there is no actual failure to comply with the EQS Directive, practical consequences for interaction may occur.

Determining the risk of breach of the EQS may be far from straightforward. Clearly, if the Member State has chosen to adopt an EQS for sediment or biota, then it is necessary to determine the link between aquatic discharges and sediment/biota concentrations. In any case, there is need to understand pollutant dispersion, behaviour in the water column (e.g. interaction with other substances present), the consequences of any historical pollution legacies (e.g. release from disturbed sediments), as well as the implications of other sources of those substances.

Any or all of such analyses may be required before an emission limit value can be determined that would ensure the water/sediment/biota is compliant with the EQS.

Monitoring conditions in the permit may, in addition to monitoring of discharge concentrations (compliance with the ELV), therefore, include monitoring of the following:

- Concentrations of pollutants in the water body to ensure compliance with the EQS.
- Concentrations of pollutants in sediments and biota to ensure compliance with the EQS.

With regard to enforcement activities, apart from usual inspection of monitoring records and operation of the installation to ensure compliance with the permit ELVs, supervision activity may need to examine compliance with the EQS and, if compliance is at risk, the relationship of this with the discharges from the installation.

2. Defining the mixing zone

The EQS Directive allows Member States to establish mixing zones within which concentrations of pollutants discharged from a source need not meet the EQS set out in the Directive. The Directive does not prescribe the extent of such zones or other obligations as to how they are to be determined. However, Member States must report on their extent and methods for how they have been established and actions taken regarding the reduction of the extent of such zones over time.

The key implication for IPPC is that ELVs in a permit do not need to ensure that an EQS in the EQS Directive is met at the point of discharge, but at the boundary of a mixing zone.

Thus the conditions in point 1 above are flexible. Effectively, this results in two key practical points for IPPC permitting:

- The defined mixing zone should be established to ensure compliance with the EQS Directive taking account of both changes in hydrology (e.g. flow rate) and operating conditions of the installation (e.g. peak activity and start-up conditions).
- Any reduction of the extent of the mixing zone over time would require discharges from the installation to reduce through improved process activity, raw material use, end-of-pipe techniques or reduced capacity.

Enforcement activity by regulators is effectively similar to that required under point 1 above, but addressing the extent of the mixing zone rather than the EQS itself. Draft guidance relating to these issues has been produced and is discussed further below.

3. Inventory of discharges

The EQS Directive requires an inventory of discharges to be established. The Directive states that such an inventory should build on the emissions recorded under the E-PRTR Regulation, which includes IPPC installations, as well as the assessments within RMBPs' analysis of pressures.

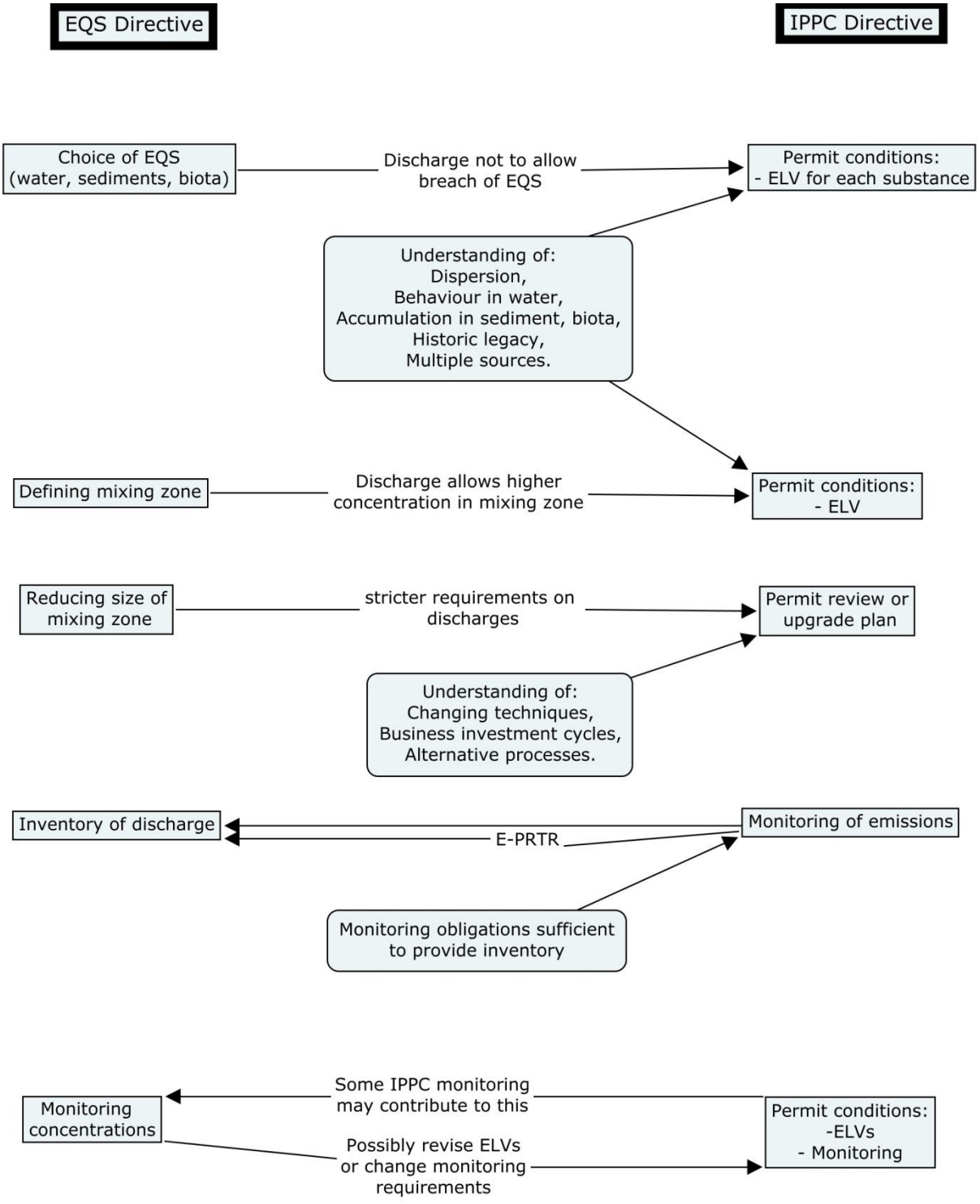
The EQS Directive requires an inventory of the discharges of those substances listed in the Directive. Effectively, the inventories and assessments established under IPPC, E-PRTR and the WFD should encompass these. However, there may be gaps in the existing scope of information collection and IPPC regulators should examine this and ensure monitoring and reporting of emissions accordingly.

However, while the requirement for an inventory is a major point of interaction between the IPPC and EQS Directives, this should not establish any major new obligations.

4. Monitoring of concentrations

The EQS Directive requires that Member States ensure that concentrations of relevant pollutants are monitored in the water column, sediment and/or biota. The Directive does not prescribe who should undertake such monitoring. Clearly, much of such general monitoring will be undertaken by relevant water authorities responsible for water management and assessment of chemical status under the WFD. However, as noted in point 1 above, IPPC regulators may establish conditions for monitoring of the ambient environment in IPPC permits. Monitoring of concentrations of pollutants (inside and outside mixing zones) may be a condition required in some permits. Ensuring such monitoring is undertaken would form part of enforcement activity as would examination of the results of such monitoring (whether undertaken by the operator or not) in relation to installation operation and meeting permit conditions.

Figure 6. Overview of the interactions between the EQS Directive and the IPPC Directive



5.3 Draft Guidance on Mixing Zones

The Water Directors in November 2008 agreed a Drafting Group for guidance on the application of the concept of mixing zones in Article 4 of the EQS Directive. A final draft of the guidance was distributed and discussed at the May 2010 meeting of the Strategic Co-ordination Group and a revision will be discussed at the 29 September 2010 Regulatory Committee meeting of the WFD, with the intention to vote on it. However, this would remain technical guidance and would not be legally binding. However, it is important to consider the text as presented in May as it elaborates on the mixing zone concept and discusses some relationships with the IPPC Directive.

The draft guidance notes that the EQS Directive does not provide definitions relating to mixing zones and, therefore, the draft guidance provides 'working definitions':

'A Mixing Zone is that part of a body of surface water restricted to the proximity of the point of discharge within which the Competent Authority is prepared to accept EQS exceedence, provided that it does not affect the compliance of the rest of the water body with the EQS.'

'A "Candidate" Mixing Zone is that part of a body of surface water in the proximity of the point of discharge within which there is EQS exceedence and which is under consideration for designation by the Competent Authority as a Mixing Zone.'

The draft guidance clearly states that 'Compliance with environmental quality standards (EQS) is an essential consideration, when deciding appropriate regimes for wastewater and effluent treatment. Discharge control regimes are normally designed to ensure that [a contaminant of concern – those in Annex 1A of the Directive] in the receiving water does not exceed the EQS, but if the concentration in the effluent is greater than the EQS value there will be a zone of EQS exceedence in the vicinity of the point of discharge'. The draft guidance places this in the context of the implementation of the combined approach of the WFD (Article 10) and the IPPC Directive – 'This means that measures, compliant with best available techniques (BAT), have to be taken. This is compulsory when BAT applies, regardless of whether or not mixing zones are designated. BAT for industry sector groups are described in the appropriate BREF-notes'. It stresses this with a highlighted point of guidance: 'For those point source discharges that must comply with IPPC, implementation of best available techniques (BAT) is a prerequisite for the designation of mixing zones'.

The application of BAT is not, however, a sole determinant of the size of a mixing zone. It is a pre-condition and wider water management decisions are needed. Also, in many cases there are likely to be multiple sources and more than one plume, so that there is further complexity.

The draft guidance also refers to the wider objectives of the WFD: 'The Competent Authority must be satisfied that the relevant Water Framework Directive objectives for the water body set out in the River Basin Management Plan will be met, when establishing the acceptability of the extent of a "candidate" mixing zone. This includes having due regard for possible effects on protected or sensitive areas. It must be recognised that, dependent upon water body type, these considerations must include the potential for flow reversal and the buoyancy of effluents.'

The draft guidance sets out a 'Tiered Approach' 'to document the policy decision tree that may be adopted by Member States when setting Mixing Zones'. In considering the

requirement to reduce the extent of mixing zones, the draft guidance has the following interesting point:

'Because BAT must be applied at all IPPC point sources, any reduction of the mixing zone for these point sources must involve measures beyond current BAT. This would trigger a disproportionate cost test as part of these considerations.'

Options for reducing the size of mixing zones is given in chapter 14 of the draft guidance. The reference in this statement is to the concept of disproportionate costs arising from interpretation of the IPPC Directive. Effectively, cost issues are part of the initial determination of what is BAT. To go beyond BAT would require some additional obligations on an installation (such as the requirement of Article 10 of the IPPC Directive on meeting EU EQS). The draft guidance, however, is unclear as to the implications of the initial determination of the extent of a mixing zone and its later reduction. For the initial determination (as stated above), the application of BAT has to be a precondition (it is already a condition of the IPPC Directive). Therefore, reducing the extent of the mixing zone would suggest that one or more of the following is undertaken at the installation:

1. It reduces its activity, so that lower concentrations of substances are discharged.

2. There is a development in what is considered as BAT (e.g. evidenced in a revision of a BREF), so that future installation upgrade would change permit conditions, but this is still BAT (with resulting reductions in discharges).

3. That measures are applied which go beyond standard BAT determination.

The draft guidance suggests that the extent of EQS exceedence may be reduced by:

- 'application of changing BAT (by the process operator or upstream within the 'catchment' of the discharge leading to reduced loads, flows or concentrations in the effluent, either by treatment or substitution)
- permit reductions of load, volume flux and/or concentration including timing constraints perhaps dependent on receiving water characteristics (flow, ambient quality, temporary presence of sensitive receptor) not associated with BAT revisions
- management of other emissions to water so as to reduce background concentrations
- revisions to outfall arrangements (including its location, both in plan and in the vertical, and its design (e.g. number and orientation of ports, effluent exit velocity etc) so as to modify initial mixing characteristics (e.g. through modifications to effluent velocity and outlet distribution) so changing the distribution of concentrations in the receiving waters. (This does not affect the far-field concentrations resulting from the discharge – it is important to consider all 3 dimensions in the region of the water body affected by the short-term plume)
- management of flow in receiving waters to create more flow or revised mixing arrangements.'

It can be seen that options are available in managing other discharges and other aspects of water management, not simply through changing IPPC permit conditions. Thus decisions

relating to IPPC permit revision need to be integrated into wider water management (WFD River Basin Management) planning and implementation.

The draft guidance provides extensive information on identifying potential impacts, plume extents, natural background concentrations, etc. These are important practical issues, with strong interactions with the WFD. However, it next examines raises the interaction with IPPC in considering the 'Establishment of Acceptability of EQS Exceedence Extent'. It states:

'The extent of EQS exceedence regarded as acceptable by the Regulator in a water body will depend upon:

- the spatial and temporal variation of the extent;
- the magnitude of increase of concentrations above EQS,
- and the resulting nature and scale of potential adverse effects associated with the exceedence.

If all anticipated impacts are deemed acceptable, the corresponding extent of exceedence of EQS concentrations may be accepted and the mixing zone designated.

In permitting the discharge the Competent Authority may choose (or be required) to set permit conditions to ensure that the discharge is operated in line with the range of emissions and ambient conditions assessed. In most cases it would be expected that the extent of the mixing zone would not be quantified in rigid spatial, temporal and statistical terms but rather implied through the restrictions imposed on the point discharge and their interplay with ambient conditions and processes.

[Directive] 2008/105/EC does not require Member States to record the extent of the designated mixing zones either individually or in combination – it requires Member States simply to describe the approaches and methodologies used to define such zones.

In some cases, it is possible that a Competent Authority may deem a discharge to be acceptable because of measures in place within a RBMP which would affect the extent of other mixing zones or ambient concentrations occurring and without which the candidate mixing zone in question would be unacceptable. Whilst the factors affecting such determination would include those discussed above, wider WFD RBMP considerations would also be influential.'

There is clearly a debate to be had on the application of BAT in reducing the extent of mixing zones. However, the draft guidance is clear in stressing the need for IPPC permits to consider the implications of discharges with respect to the obligations of the EQS Directive on mixing zones.

The draft guidance also considers monitoring and modelling actions that can be taken to support the decisions on mixing zones. This is discussed according to wider guidance on implementation of monitoring under the WFD and the specific monitoring programmes of the WFD, rather than monitoring under IPPC.

5.4 Conclusions

For the IPPC regulator/s (permitting, inspection, enforcement, etc.), it is, therefore, important to consider the following issues arising from the interaction with the EQS Directive:

1. It is important to have clear/precise information on any concerns over individual EQS (water, sediment and/or biota) in relevant water bodies to stimulate analysis by operators and/or permitting authorities. Water managers will need to provide this information.

2. Where there is concern over an EQS, operators/permitting authorities need to determine where monitoring information, modelling analysis, etc., is available to examine the relationship between installation activity and an EQS and where additional analysis needs to be developed/undertaken.

3. Where a mixing zone may need to be identified, permitting authorities need to identify clearly the discharge levels consistent with BAT and work with water managers to determine whether this requires designation of a mixing zone and, if so, the extent of the designation.

4. Permitting authorities need to determine clear monitoring requirements for discharges consistent with the needs of the EQS Directive in liaison with water managers and their own monitoring programmes.

5. In any future consideration of reduction of the extent of mixing zones permitting authorities need to ensure that tests of disproportionate cost under the IPPC Directive are adequately taken into account.

6. Supervision and inspection authorities should ensure not only that specific permit conditions are complied with (basic inspection), but also examine if the predicted consequences for EQS and extent of mixing zones are being met. Inspection authorities should consult with water managers for any concerns over incidents of non-compliance, unexpected pollutant behaviour, etc.
7. Results of inspections should be communicated to permitting authorities (for potential permit review) and water managers (e.g. for review of mixing zones).

6. GROUNDWATER DIRECTIVE

6.1 Overview of the Directive

Directive 2006/118/EC (GWD) is a daughter Directive of the WFD and, therefore, its requirements are integrated into the implementation tasks of the WFD. The Directive requires:

- Groundwater 'threshold values' to be established by the end of 2008. The pollutants to be addressed (nationally or within river basin districts) are those which are identified under the WFD as contributing to groundwater bodies being 'at risk'. These threshold values are to be set out in the River Basin Management Plans developed under the WFD.
- Pollution trend studies are to be carried out by using existing data and data which are required to be collected by WFD (referred to as "baseline level" data obtained in 2007-2008).
- Pollution trends are to be reversed where there is 'any significant and sustained upward trend' so that environmental objectives are achieved by 2015 by using the programmes of measures set out in WFD. Thus details of how Member States are to tackle such trends are to be set out in the River Basin Management Plans developed under the WFD.
- Measures to prevent or limit inputs of pollutants into groundwater are to be operational so that environmental objectives of the WFD can be achieved. This shall include the prevention of inputs of substances identified as hazardous under the WFD and action on other pollutants so as to prevent deterioration in quality. However, the GWD also provides exemptions to these requirements, such as in the event of technical limitations and of measures being 'disproportionately costly'.
- Reviews of technical provisions of the GWD are to be carried out in 2013 and every six years thereafter.

6.2 Interaction with IPPC

The WFD already establishes obligations relation to ground waters that may affect decisions relating to IPPC permitting. Importantly, the GWD is focused on chemical status of ground waters and, therefore, interactions relating to abstraction and quantitative status are driven directly by the WFD.

The GWD establishes groundwater quality standards (Annex I) and the requirement for Member States to develop threshold values 'applicable to good chemical status' (according to a specified procedure) for pollutants, groups of pollutants and indicators. Threshold values may be adopted at different scales (national to water body) and transboundary goundwaters will require Member States to co-ordinate the development of threshold values.

These values are the determinands of good chemical status and, therefore, act as Community standards to be assessed in relation to permit determination of IPPC installations. It is unlikely that many IPPC installations would discharge directly into ground waters. However,

indirect input of pollutants may occur from IPPC installations (e.g. diffuse pollution, aerial deposition, contamination from chemical stores, etc).

The WFD requires Member States to prevent or limit inputs of pollutants to groundwater. The GWD expands on this to the limitation of inputs of specified hazardous substances and the limitation (and no sustained upward trend) in specified non-hazardous substances. The limitation of inputs of the hazardous pollutants would need to be an objective, where relevant, in IPPC permits. For non-hazardous pollutants, the GWD states that limitation of inputs should take account of measures, including the application of BAT. The application of BAT is already an obligation on IPPC installations. However, if there is concern that installations may risk causing deterioration or significant and sustained upward trends in the pollutants in ground waters, then additional measures may be required, although it would be important to determine in such cases if BAT is actually being applied.

Some of the exemptions in the GWD are applicable to IPPC installations. For example, very small inputs of the pollutants may be ignored by competent authorities, which may be important for some IPPC installations where there is little input of substances to ground waters, but where all discharges cannot be ruled out.

Finally, the GWD requires Member States to undertake assessment and monitoring to determine the concentrations and trends of pollutants in ground waters and, where necessary, to assess the impact of existing pollutant plumes on the achievement of WFD Article 4 objectives. The results of such monitoring may result in new understandings of ground water chemical status (and how it is changing), which may affect IPPC permit revisions and such monitoring may need to take account of process and discharge monitoring undertaken by IPPC operators.

6.3 Conclusions

An overview of the interaction between the GWD and the IPPC Directive is shown in Figure 7.

For the IPPC regulator/s (permitting, inspection, enforcement, etc.), it is, therefore, important to consider the following issues arising from the interaction with the GWD:

1. Operators and permitting authorities need to ensure that they are fully aware of EQS in the GWD and threshold values developed by water authorities. It is, therefore, important for water authorities to communicate these.

2. Operators and permitting authorities should identify any substances potentially released from installations addressed by the EQS in the GWD and threshold values developed by water authorities and how far these are controlled by the application of BAT and whether any pollutants are at risk of showing a sustained upward trend.

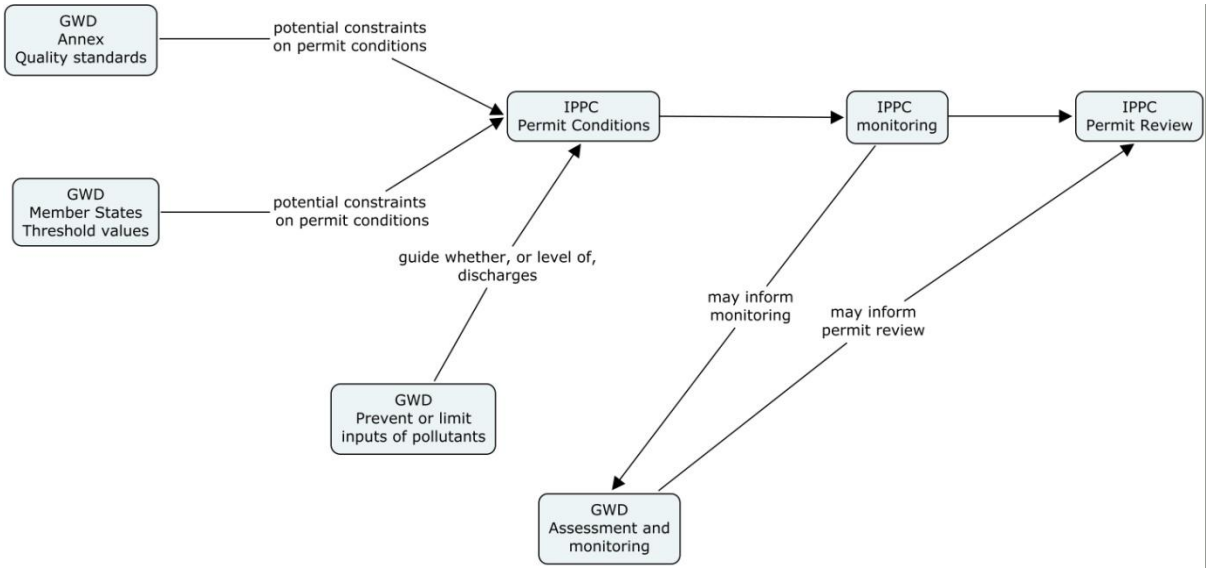
3. Permitting authorities should discuss with water managers which discharges are small enough to be exempted from consideration from the GWD.

4. Where pollution is of concern, permit determination should consider options to prevent or limit inputs of those pollutants to groundwater, both through direct discharge and indirect (e.g. via soil, air emissions, etc).

5. Permitting authorities should consider how monitoring obligations in permits can contribute to the monitoring requirements of the GWD and ensure reported monitoring data are communicated to water managers.

6. Inspectors should discuss with water managers any concerns over the levels and trends of pollutants in groundwater to determine whether these represent non-compliant activity by installations or the need to consider revision of permit conditions.

Figure 7. An overview of the interaction between the GWD and the IPPC Directive.



7. UWWT DIRECTIVE

7.1 Introduction

The Urban Waste Water Treatment Directive (UWWTD) 91/271/EEC seeks to reduce the pollution of freshwater, estuarial and coastal waters by domestic sewage, industrial waste water and rainwater run-off – collectively, 'urban waste water'. It sets minimum standards, and timetables for their achievement, for the collection, treatment and discharge of urban waste water.

The UWWTD stipulates that by the year 2000 or 2005 all towns and villages ('agglomerations') with a population equivalent (p.e.) greater than 2000 were required to have a collecting (sewerage) system. Urban waste water entering these collecting systems is to be subject to treatment requirements which generally become more stringent the larger the agglomeration. Waste water is normally to be subject to a minimum of secondary treatment, a process generally involving biological treatment with a secondary settlement. Higher, or tertiary, standards of treatment are required for discharges to particularly sensitive areas. Such areas are to be determined by Member States on the basis of criteria set out in an Annex II. They include waters subject to eutrophication (in which case significant reductions of nitrates and/or phosphates are required); surface waters with high nitrate levels intended for the abstraction of drinking water; and other waters where higher treatment standards are necessary to fulfil the requirements of other Community Directives. Those smaller towns or villages which are not obliged by the Directive to install secondary treatment systems are nevertheless required to provide 'appropriate' treatment sufficient to ensure compliance with quality objectives or the requirements of other relevant Community legislation.

7.2 Defining action based on the nature of receiving waters

The UWWTD includes the concept of setting objectives for the regulation of activities based on the nature of the environment into which they discharge. Article 5 states that Member States shall identify sensitive areas based on criteria set out in Annex II (nitrogen and phosphorus levels causing or likely to cause eutrophication or nitrogen levels affecting drinking water sources) and that 'Member States shall ensure that urban waste water entering collecting systems shall before discharge into sensitive areas be subject to more stringent treatment than that described in Article 4, by 31 December 1998 at the latest for all discharges from agglomerations of more than 10000p.e'. These more stringent requirements are set out in Annex IB.

Member States may also designate their whole territory as a sensitive area and they may also, alternatively not apply the requirements for specific WWTPs 'where it can be shown that the minimum percentage of reduction of the overall load entering all urban waste water treatment plants in that area is at least 75 % for total phosphorus and at least 75 % for total nitrogen'.

Therefore, Member States must take additional action with regard to phosphorus and nitrogen in defined circumstances, but there is flexibility in how this is to be achieved. In any case, the

conditions to be imposed on the activity are, in part, defined by the nature of the receiving environment.

The UWWTD also requires Member States to review the identification of sensitive areas every four years. This, therefore, introduces a requirement to examine the nature of the receiving waters for change and, if those conditions were to change, so would the obligations on the WWTPs discharging to them.

In a similar way Article 6 allows for the designation of less sensitive areas, with a consequent reduction of the stringency of the conditions to be applied to WWTPs.

7.3 Meeting statutory environmental objectives

The UWWTD also sets general conditions on discharges by reference to objectives set out in other EU law. This is addressed by the concept of 'appropriate treatment'. Article 2(9) defines 'appropriate treatment' to mean 'treatment of urban waste water by any process and/or disposal system which after discharge allows the receiving waters to meet the relevant quality objectives and the relevant provisions of this and other Community Directives'. Clearly quality objectives and relevant provisions can arise from any Community law and now includes the WFD and EQS Directive.

The use of 'appropriate treatment' is only raised in the UWWTD in Article 7, which states that Member States shall ensure that, by 31 December 2005, urban waste water entering collecting systems shall before discharge be subject to appropriate treatment as defined in Article 2 (9) in the following cases:

- for discharges to fresh-water and estuaries from agglomerations of less than 2,000 p.e.,
- for discharges to coastal waters from agglomerations of less than 10,000 p.e.

In other words, 'appropriate treatment' is a concept introduced to ensure that discharges from agglomerations generally below the threshold for the other provisions in the UWWTD are not allowed to be of such a nature as to prevent achievement of a Community EQS.

Effectively, this provision is unnecessary as Member States are obliged to meet the obligations of the 'other Community Directives' in any case. This, therefore, is an example of a 'belt and braces' approach in EU law.

The provision for 'appropriate treatment' is not made for discharges from larger agglomerations, although one of the criteria for defining a sensitive area (Annex II) is that additional treatment is needed to 'fulfil Council Directives'. This is curious given that the obligations of the 'other Community Directives' effectively mean that the provision would apply. These obligations have become more apparent with the adoption of the WFD setting broad quality objectives for all water bodies, so that simply meeting the obligations of the UWWTD (for normal and sensitive areas) may not be sufficient.

The obligations with respect to nutrients illustrate this. One option within a sensitive area (or, if chosen, the whole territory of a Member State) is to ensure a 75% reduction in both phosphorus and nitrogen discharges. While this allows flexibility (helping to make more cost-

effective investment choices), it does not ensure that all water bodies are free from the risk of not meeting GES due to nutrient inputs. Therefore, compliance with this provision of the UWWTD does not mean that further reduction in nutrient discharges is not needed. To examine this in another way, the objectives of the WFD could be identified as one of the Annex II criteria to 'fulfil Council Directives', but the specific obligations of the UWWTD with regard to the sensitive area may not be sufficient to 'fulfil' the obligations of this Directive.

7.4 Permits and emission limit values

Annex I of the Directive sets emission limit values and minimum percentage reductions that systems of secondary and tertiary treatment must meet, and sets out reference methods for monitoring and evaluating the results. It also sets emission limits for nitrogen and phosphorus discharges from treatment plants to designated sensitive areas. Directive 98/15/EC clarifies the discharge requirements for nitrogen and phosphates.

Article 11 requires that discharges of industrial waste water into collecting systems and urban waste water treatment plants are subject to 'prior regulations' and/or 'specific authorizations' by a competent authority. These regulations/authorisations need to meet the requirements of Annex IC. These include the provision that the resulting sludge can be disposed of safely in an environmentally acceptable manner. Bio-degradable industrial waste water from specified sectors of the food and drink industry which is discharged direct to receiving waters has been subject to prior regulation/authorization since 2000. This requirement suggests a mirroring of the alternative approaches in IPPC. Specific authorisations mirror the setting of conditions in permits, while 'prior regulations' could include standard conditions in law (similar to an IPPC GBR).

Article 13 requires that biodegradable industrial waste water from plants belonging to the industrial sectors listed in Annex III (11 categories of food processing plants) which does not enter urban waste water treatment plants before discharge to receiving waters shall before discharge respect conditions established in prior regulations and/or specific authorization by the competent authority or appropriate body, in respect of all discharges from plants representing 4000 p.e. or more.

Article 11 also states that 'regulations and/or authorization shall be reviewed and if necessary adapted at regular intervals'. The length of the interval is not specified and this requirement, therefore, also mirrors the IPPC obligations to review permits and/or GBRs, although the IPPC permit provides instances of where permit reviews are appropriate (e.g. a change in what is considered to be BAT).

7.5 Monitoring

Monitoring requirements are set out in Article 15. This states that competent authorities or appropriate bodies shall monitor:

- discharges from urban waste water treatment plants to verify compliance with the requirements of Annex I.B in accordance with the control procedures laid down in Annex I.D,

- amounts and composition of sludges disposed of to surface waters.
- waters subject to discharges from urban waste water treatment plants and direct discharges as described in Article 13, regarding biodegradable industrial waste water from industry, in cases where it can be expected that the receiving environment will be significantly affected.
- for a discharge subject to the provisions of Article 6 on less sensitive areas, and in the case of disposal of sludge to surface waters, Member States shall monitor and carry out any other relevant studies to verify that the discharge or disposal does not adversely affect the environment.

The monitoring obligations are, therefore, primarily focused on the monitoring of compliance – discharges meeting the limits imposed on the WWTPs. Interestingly, it is the competent authority 'or other appropriate body' that is to monitor, while compliance monitoring under IPPC would be the immediate responsibility of the operator. The UWWTD only makes limited requirements for monitoring of the environment and that is for less sensitive areas. For certain industrial discharges, discharge monitoring is required where there is concern over potential effects on receiving waters.

7.6 Exceptions

The Directive makes provision for possible exceptions and derogations to these general requirements. This should be 'in exceptional cases due to technical problems and for geographically defined population groups'. Moreover, under Article 8, Member States may apply to the Commission for derogations from the requirement to install secondary treatment for larger towns over 150,000 p.e. The request must be justified to the Commission setting out the technical difficulties experienced and must propose an action programme with an appropriate timetable to be undertaken to implement the objective of the Directive. Compliance in these circumstances should have been achieved by the end of 2005.

7.7 Interactions with IPPC and the WFD

The interactions between the UWWTD and the IPPCD and WFD are illustrated by Figure **8**. The main specific interactions with the IPPC Directive are conceptual in nature. The setting of specific conditions on an activity, together with the need for these to set in prior authorisations or regulations, monitoring compliance, etc. Specific obligations on industrial sectors, e.g. food processing, interact as some of these installations are included within Annex I of IPPC. However, the obligations regarding BAT on waste water discharges apply.

The interaction with the WFD is more complex. The UWWTD introduces the concept of varying conditions on the WWTPs depending on the nature of the receiving waters. The WFD starts by setting out objectives in water bodies, leading to obligations on the pressures affecting these objectives. It is important to note, however, that whether for normal or sensitive areas, the UWWTD sets obligations on WWTPs, not an objective in relation to their pressure on waters. Thus the 75% reduction approach for nutrients, for example, may be in response to waters being at risk of eutrophication, but there is no obligation with regard to nutrient levels in the waters.

It is important, therefore, to stress that the analysis of pressures under the WFD may identify that waste waters should receive treatment that is not required by the UWWTD. The UWWTD, therefore, is a minimum requirement to be applied in the POM.

7.8 Conclusions

Figure 8. An overview of the practical interactions between the UWWTD and the IPPCD and WFD.

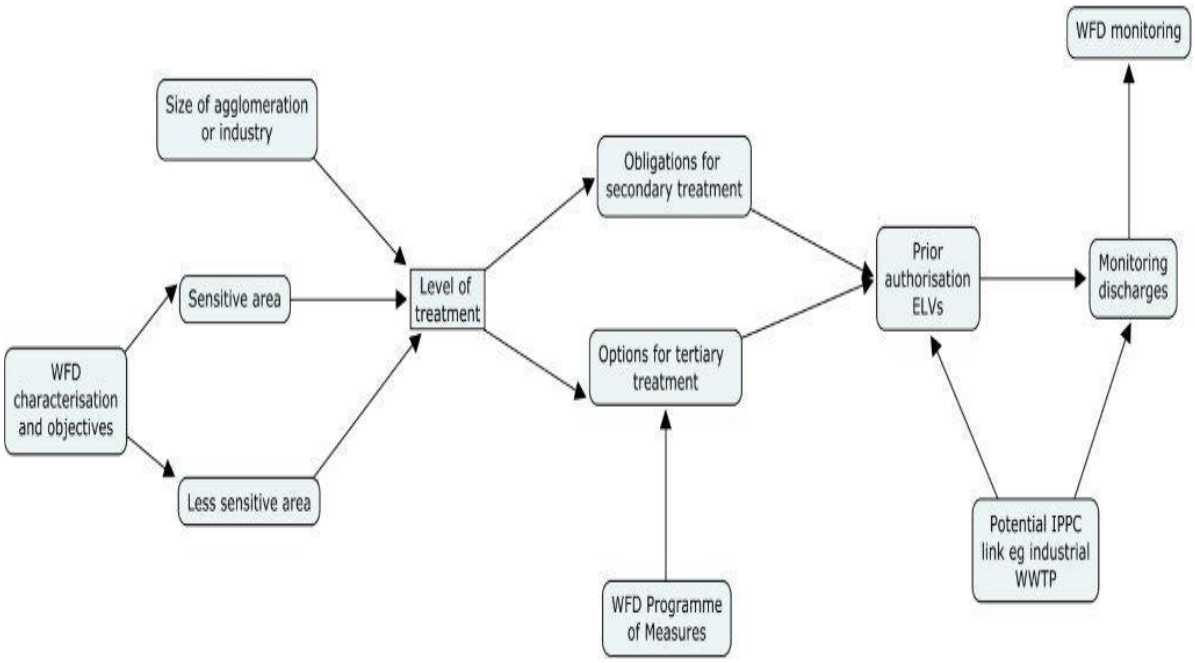
For the water manager and IPPC regulator/s it is, therefore, important to consider the following issues arising from the interaction with the UWWTD:

1. Specific discharge conditions under the UWWTD that apply to IPPC installations are minimum conditions. Therefore, permitting authorities should ensure that permit determinations arising from BAT meet at least these conditions.

2. Water managers should identify pressures arising from WWTPs for each water body (e.g. nutrients, BOD, etc) and the consequences these have for meeting the objectives of the WFD and other relevant Water Directives. If the UWWTD has not been fully implemented yet, assessment should be made of the pressures that might remain after full implementation.

3. Where water objectives are still not being met after implementation of the UWWTD, water managers need to identify which WWTPs require further controls and how these are to be introduced in the POMs in subsequent RBMPs

Figure 8. An overview of the practical interactions between the UWWTD and the IPPCD and WFD.



8. E-PRTR REGULATION

The European Pollutant Release and Transfer Register (E-PRTR) was established in January 2006 by Regulation (EC) No 166/2006. Its aim is to further implement reporting obligations imposed on Member States from the UNECE (United Nations Economic Commission for Europe) PRTR Protocol to the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters. The register gathers environmental information and data sent from industrial facilities in the Member States.

Since 2007, the first year of reporting, it covers 65 categories of economic activities across Europe. Those activities are described in Annex I of the Regulation and are grouped in 9 activities sectors:

1. energy;
2. production and processing of metals;
3. mineral industry;
4. chemical industry;
5. waste and waste water management;
6. paper and wood production and processing;
7. intensive livestock production and aquaculture;
8. animal and vegetable products from the food and beverage sector; and
9. other activities.

The first five categories mirror categories 1-5 of Annex I of the IPPC Directive, with the remaining categories splitting up industrial activities identified in category 6 of Annex I of IPPC (the European Commission's Guidance Document for the implementation of the E-PRTR of May 2006 provides a detailed breakdown of the comparison of E-PRTR categories and IPPC Annex I installations). Article 5 of the Regulation stipulates that operators of installations that undertake one or more of these activities, and that exceed a specified threshold, have to report on releases. For each facility, information is provided concerning the amounts of pollutant releases to air, water and land as well as off-site transfers of waste and of pollutants in waste water. Some information on releases from diffuse sources is also available and will be gradually enhanced. The E-PRTR takes into account releases to water and requires that releases of pollutants which exceed the threshold values stated in column 1b of Annex II are reported. It also requires that the river basin where the water is to be released is identified.

There is a clear link with the IPPC Directive as all the activities regulated by it are covered by the E-PRTR. However the scope of E-PRTR is wider as it targets some activities not regulated by IPPC, these are known as the "new activities". They are:

- 1(e) Coal rolling mills with a capacity of 1 tonne per hour;
- 1(f) Installations for the manufacture of coal products and solid smokeless fuel;
- 3(a) Underground mining and related operations;
- 3(b) Opencast mining and quarrying where the surface of the area effectively under extractive operation equals 25 hectares;
- 5(f) Urban waste-water treatment plants with a capacity of 100,000 population equivalents;

- 5(g) Independently operated industrial waste-water treatment plants which serve one or more activities of Annex I of the E-PRTR Regulation with a capacity of 10,000 m^3 per day;
- 6(b) Industrial plants for the production …and other primary wood products (such as chipboard, fibreboard and plywood) with a production capacity of 20 tonnes per day;
- 6(c) Industrial plants for the preservation of wood and wood products with chemicals with a production capacity of 50 m^3 per day;
- 7(b) Intensive aquaculture with a production capacity of 1,000 tonnes of fish or shellfish per year;
- 9(e) Installations for the building of, and painting or removal of paint from ships with a capacity for ships 100 m long.

Prior to the adoption of the E-PRTR Regulation, information on releases from IPPC installations had to be reported by EPER. E-PRTR somewhat extends the scope of release reporting. However, the basic framework was already familiar to IPPC operators and competent authorities.

The reporting of releases from IPPC installations may, however, be different to that required for compliance monitoring. The IPPC Directive requires that ELVs are prescribed in permit conditions. Compliance monitoring for these conditions are, therefore, for concentrations of pollutants at release, rather than total annual emissions. Some installations may have conditions for annual releases (e.g. power stations to ensure targets under the LCDP or NECD are met), but this would not be the case for many IPPC installations.

The data derived from E-PRTR monitoring may also be useful in contributing to the assessment of pressures in water bodies under the WFD. This would be the case where total long-term loading is a useful criterion, such as examining loading into coastal sediments. Regarding immediate concentrations of substances in water, more routine compliance monitoring from implementation of IPPC could be of more direct benefit.

The E-PRTR Regulation is explicitly referenced by the EQS Directive (Article 5). This requires Member States to establish an annual inventory of emissions, loss and discharges of substances that are listed in the EQS Directive. The Directive specifically states that in preparing the inventory, Member States should draw on the information obtained from implementation of the E-PRTR Regulation.

For water managers and IPPC regulator/s it is, therefore, important to consider the following issues arising from the interaction with E-PRTR:

1. IPPC permitting authorities need to ensure that permit conditions include the necessary monitoring requirements for installations to collect and report the data needed for the pollution inventory.

2. Results of the inventory should be communicated to water managers specifically to meet the inventory obligations of the EQS Directive and for any wider assessment of pressures identified as needed for other pollutants considered to be important within RBMPs.

9. REACH REGULATION

9.1 Introduction

The REACH Regulation is the longest, most detailed, and complicated item of EU environmental legislation. Its essential elements are:

- all chemical substances manufactured or imported in quantities of one tonne or more must be registered with the European Chemicals Agency (ECHA) by the manufacturer/importer;
- the registration contains a dossier with information to enable the substance to be used safely;
- ECHA can evaluate dossiers and substances;
- downstream users are to contribute to the dossier;
- substances of very high concern are not to be used unless authorised;
- companies will be required to make efforts to find safer substitutes as part of the authorisation procedure; and
- the manufacture, marketing and use of substances can be restricted.

This Chapter summarises the key elements of REACH and considers its interaction with the IPPC Directive and WFD.

9.2 Key elements of REACH[3]

Registration (Title II)

Any manufacturer or importer of a substance in quantities of one tonne or more per year is required to submit a registration to ECHA. The registration provisions require the generation of data on the manufactured or imported substances, with a view to using these data to assess the risks related to these substances and to develop and recommend appropriate risk management measures.

Manufacturers and importers must obtain information on the substances they manufacture or import and use this information to assess the risks arising from their use and ensure that these risks are properly managed. To reflect this the manufacturers and importers are required to submit a technical dossier for substances in quantities of one tonne or more as well as a chemical safety report for substances in quantities of ten tonnes or more. The technical dossier contains information on the properties, uses and on the classification of a substance as well as guidance on safe use.

The chemical safety report is based on a chemical safety assessment in accordance with Article 14. The chemical safety assessment includes a human health assessment, physiochemical hazard assessment, environmental hazard assessment and an assessment of whether the substance is persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB). If the substance meets the criteria for classification as dangerous in accordance with Directive 67/548/EEC or is assessed to be a PBT or vPvB, the

[3] The description of REACH draws on the European Commission's 2007 summary 'REACH in Brief'.

chemical safety assessment has to include the additional steps of an exposure assessment and risk characterisation.

ECHA is required to undertake a completeness check of each registration but this will not include an assessment of the quality or adequacy of any data or justifications submitted.

Information in the supply chain (Title IV)

REACH requires that not only manufacturers and importers but also their customers, that is downstream users and distributors, have the information they need to use chemicals safely. Therefore the supplier of a substance or a preparation is required to provide the recipient with a safety data sheet compiled in accordance with Annex II, when particular circumstances are met.

The primary tool for information transfer is the well-established and familiar safety data sheet (SDS) for all dangerous substances. The provisions of the Safety Data Sheets Directive 91/155/EEC were carried over into the REACH Regulation and in addition added the requirement for SDS to be provided for PBT or vPvB substances and preparations containing them. Where chemical safety assessments are performed according to the registration requirements, relevant exposure scenarios need to be annexed to the safety data sheet and have thus to be passed down the supply chain. New information on hazardous properties and information that challenges the quality of risk management measures in the safety data sheets will be passed up the supply chain.

Any actor in the supply chain who is required to prepare a chemical safety report has to place the relevant exposure scenarios (including use and exposure categories where appropriate) in an annex to the safety data sheet, covering identified uses and including specific conditions. The downstream user shall include relevant exposure scenarios, and use other relevant information, from the safety data sheet supplied to him when compiling his own safety data sheet for identified uses. The distributor shall pass on relevant exposure scenarios, and use other relevant information, from the safety data sheet supplied to him when compiling his own safety data sheet for uses for which he has passed on information.

Downstream users (Title V)

Downstream users are any industrial users of chemicals or users of chemicals in other industrial processes or producers of manufactured articles. They are required to consider the safety of their use of substances and to apply appropriate risk management measures. Hence, a downstream user has the right to make a use known to the supplier with the aim of making this an identified use. In making a use known, sufficient information is to be provided to allow the manufacturer, importer or downstream user to prepare an exposure scenario, for use in the chemical safety assessment. Downstream users in receipt of such information may prepare an exposure scenario for the identified use, or pass the information to the next actor up the supply chain.

To get the relevant information, downstream users have the right to make their uses known to their suppliers so that the suppliers can include these uses in their chemical safety assessments as “identified” uses or pass the request on up the supply chain. Downstream users can apply a system of brief general descriptions of uses that can be used as a minimum to identify such uses to the supplier. The relevant exposure scenarios developed for these uses

need to be annexed to the SDS. A downstream user can also choose to keep their use confidential or decide to use a substance outside the conditions described in the exposure scenario(s) communicated to them. In these cases they will have to perform a chemical safety assessment (CSA) developing the exposure scenarios for the intended uses and, if necessary, a refinement of the supplier's hazard assessment. This obligation does not apply if the downstream user uses less than 1 tonne of the substance per year. However, a downstream users relying on the 1 tonne exemption still needs to consider the use(s) of the substance and identify, apply and recommend appropriate risk management measures.

Evaluation (Title VI)

ECHA is responsible for the evaluation of the dossiers and for co-ordinating the evaluation of the substances. The substance evaluation process aims to clarify any grounds for considering if a substance constitutes a risk to human health or the environment. The evaluation of dossiers consists of checking registration dossiers and checking testing proposals. The purpose of checking a registration dossier for compliance is to ensure that the legal requirements of REACH are fulfilled and that the quality of the submitted dossiers is sufficient. For substance evaluation ECHA, in cooperation with the Member States, will develop criteria for prioritising substances with a view to evaluating these further. This prioritisation is risk-based and covers the following criteria:

- hazard information, for instance structural similarity of the substance with known substances of concern or with substances which are persistent and liable to bio-accumulate, suggesting that the substance or one or more of its transformation products has properties of concern or is persistent and liable to bio-accumulate;
- exposure information;
- tonnage, including aggregated tonnage from the registrations submitted by several registrants.

Based on these criteria ECHA will compile a draft Community rolling action plan, which covers a period of three years and specifies the substances to be evaluated each year. ECHA is also responsible for coordinating the substance evaluation process and ensuring that substances on the Community rolling action plan are evaluated. In doing so, ECHA relies on the competent authorities of Member States. In carrying out an evaluation of a substance, the competent authorities may appoint another body to act on their behalf. Member States may choose a substance or substances from the draft Community rolling action plan with the aim of becoming the competent authority for that/those substances.

Authorisation (Title VII)

Substances of very high concern (Annex XIV) are subject to authorisation by the Commission with regard to particular uses. The aim of the authorisation procedure is to ensure the good functioning of the internal market while assuring that the risks from substances of very high concern are properly controlled and that these substances are progressively replaced by suitable alternative substances or technologies where these are economically and technically viable. To this end all manufacturers, importers and downstream users applying for authorisations are required to analyse the availability of alternatives and consider their risks, and the technical and economic feasibility of substitution. Chemicals do not have to be registered in order to enter the authorisation

procedure. Note also that while incorporation of the substance in articles is a substance use that requires an authorisation, the use of articles is not subject to authorisation.

Restrictions

The Restrictions procedure provides for Community-wide regulation for conditions for the manufacture, placing on the market or use of certain substances where there is an unacceptable risk to health or the environment or the prohibition of any of these activities. All activities with a substance which are not restricted are allowed under REACH unless the substance is included in the authorisation system. Any substance on its own, in a preparation or in an article may be subject to Community-wide restrictions if it is demonstrated that risks need to be addressed on a Community wide basis. Thus, the restrictions provisions act as a safety net. Proposals for restrictions would be prepared by Member States or by ECHA on behalf of the Commission as a structured Dossier, which has to demonstrate that there is a risk to human health or the environment that needs to be addressed at Community level and to identify the most appropriate set of risk reduction measures.

9.3 Interactions with the IPPC Directive, EQS Directive and WFD

REACH is a critically important Regulation to reduce the placing on the market (and use) of certain toxic and otherwise harmful substances either through requiring their substitution or restricting their use in inappropriate processes and uses. The Regulation requires assessment of individual substances according to objective criteria and assesses their appropriate use.

Ensuring that toxic substances are not used inappropriately is important in reducing their addition to the environment. This assessment is not undertaken with respect to the particular objectives of specific locations in the environment, such as an individual water body. Rather REACH provides a general approach to reducing the body of toxic substances in use. Substances addressed include some addressed by the EQS Directive and, therefore, reduction in use will assist in achieving the EQS. Similarly, it will help deliver good chemical status for surface and groundwaters under the WFD.

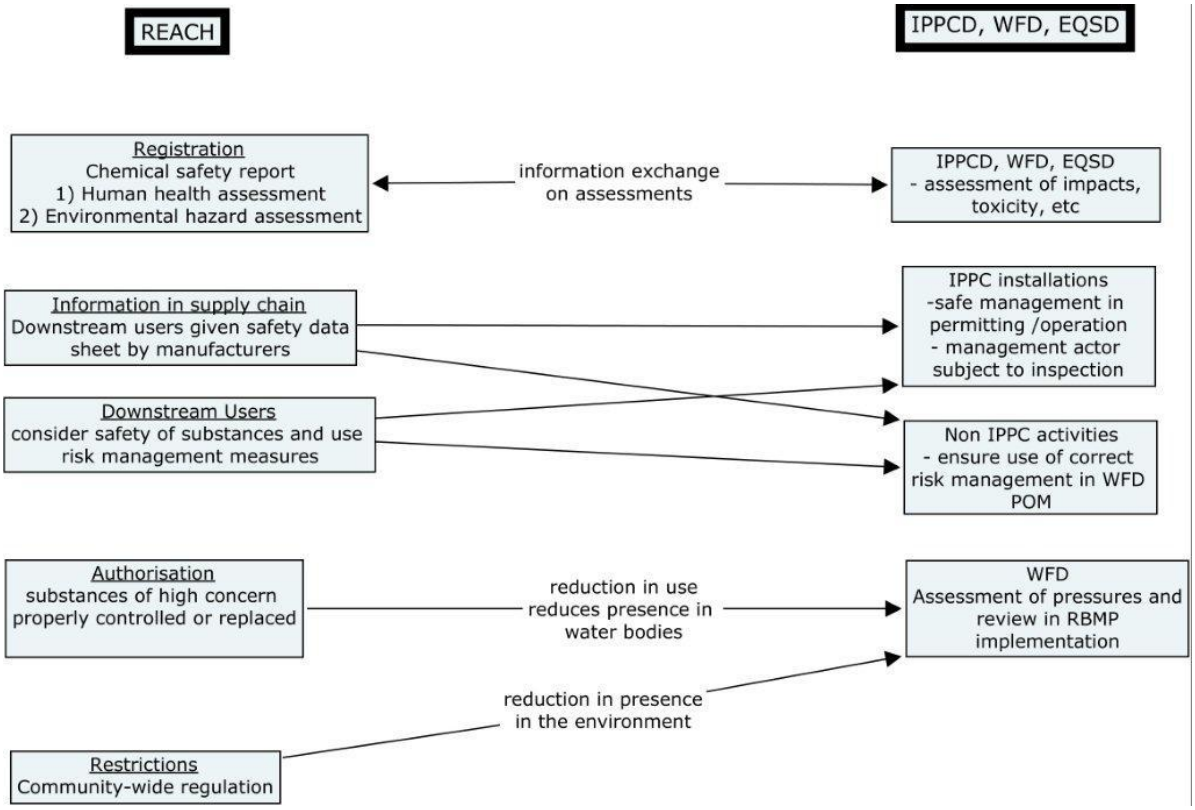
The objectives of the Water Directives are, therefore, supported by the future implementation of REACH. Thus it is appropriate in examining pressures on water bodies and taking account of in programmes of measures. However, the application of REACH is not directed by measures within the POM – REACH is a basic measure to be taken account of. The interaction is, effectively one way in operation – the Water Directives drawing on the benefits of REACH. However, this is important in that the benefits of REACH will affect the need for any additional measures to be undertaken.

IPPC operators need to consider the environmental and safety implications of the operation of their installations. Operators may be manufacturers and/or downstream users of substances covered by REACH. Therefore, they are required to consider the safety of their use of substances and to apply appropriate risk management measures. In doing this they need to have the correct information supplied to them. However, no two installations are the same, so it is important for operators and permitting authorities to consider the risks arising from specific uses of substances. Conditions may need to be imposed in permits (e.g. to prevent routine release or to be addressed in safety management plans). It is expected that operators will be required to take strict measures to minimise release of REACH substances. This

would, therefore, contribute to meeting objectives of the Water Directives. However, this ought to be driven by implementation of IPPC (informed by REACH) rather than additional drivers from the Water Directives themselves. These interactions are summarised in Figure 9.

It is also important to note that the progressive implementation of the REACH Regulation will result in the generation of significant amounts of information on the hazardousness of individual substances which may be a threat to the aquatic environment. Such information will assist water managers in improving their understanding of the pressures on water bodies (e.g. in revising RBMPs) and in interpreting the relationship between IPPC installation activities and water objectives. This information may, for example, allow authorities to develop specific EQS for substances which can then guide development of measures, including conditions in IPPC permits.

Figure 9. Interactions between REACH and the IPPCD, WFD and EQSD



9.4 Conclusions

For water managers and IPPC regulator/s it is, therefore, important to consider the following issues arising from the interaction with REACH:

1. In assessing pressures on water bodies (water status) and, specifically, issues relating to pollutants specified by the EQSD and GWD, as well as those identified by basin authorities, water managers should consider how far action to control specific substances under REACH will contribute to reducing their presence in the water bodies and, therefore, whether such action may be sufficient to meet objectives.

2. IPPC authorities and water managers should, for specific substances of concern, identify whether assessments undertaken under REACH are available and provide information on toxicity, etc., which may help in determining appropriate permit conditions or help in understanding the behaviour and impact of those substances in water bodies.

10. GUIDANCE UNDER THE WFD COMMON IMPLEMENTATION STRATEGY

10.1 Introduction

This Chapter provides detail of the key issues related to integration with the IPPC Directive addressed by the most relevant guidance documents produced under the WFD Common Implementation Strategy. Eight of these are considered to varying degrees of detail depending on their potential relationship to IPPC. For each of the guidance documents included, the relevant guidance or conclusions are highlighted, together with brief comments on the relevance of interaction with the IPPC Directive. The guidance documents are not treated according to the chronological order in which they were published. Rather they are treated according to a logic of implementation. This begins with the analysis of pressures and continues with a series of guidance documents on monitoring. It then proceeds by guidance on planning, including developing programmes and measures and specific action relating to groundwaters. It concludes with more conceptual potential interactions on economic assessment and public participation.

It is worth noting that most of the CIS guidance documents include, at the outset, the key principle of integration that the WFD is seeking to take forward. This is set out as:

- '**Integration of environmental objectives**, combining quality, ecological and quantity objectives for protecting highly valuable aquatic ecosystems and ensuring a general good status of other waters;
- **Integration of all water resources**, combining fresh surface water and groundwater bodies, wetlands, transitional and coastal water resources **at the river basin scale**;
- **Integration of all water uses, functions, values and impacts** into a common policy framework, i.e. investigating water for the environment, water for health and human consumption, water for economic sectors, transport, leisure, water as a social good, investigating both point-source and diffuse pollution, etc.;
- **Integration of disciplines, analyses and expertise,** combining hydrology, hydraulics, ecology, chemistry, soil sciences, technology engineering and economics to assess current pressures and impacts on water resources and identify measures for achieving the environmental objectives of the Directive in the most cost-effective manner;
- **Integration of water legislation into a common and coherent framework.** ..[old water legislation and new water legislation]..;
- **Integration of a wide range of measures, including pricing and economic and financial instruments, in a common management approach** for achieving the environmental objectives of the Directive. Programmes of measures are defined in **River Basin Management Plans** developed for each river basin district;
- **Integration of stakeholders and the civil society in decision-making,** by promoting transparency and information to the public, and […] involving stakeholders in the development of river basin management plans;
- **Integration of different decision-making levels that influence water resources and water status,** be they local, regional or national, for an effective management of all waters; and **Integration of water management from different Member States,** for river basins shared by several countries, existing and/or future Member States of the European Union.'

The stress on integration is interesting in that the WFD should indeed be an integrating measure. However, as will be seen, there are only limited references to the IPPC Directive in the guidance produced under the CIS and little examination of what would be meant by integrating the obligations of these two Directives.

10.2 CIS Guidance No. 3. Analysis of Pressures and Impacts

This guidance concerns the requirements in Article 5 of the WFD to analyse pressures and impacts, that is:

- An analysis of its characteristics;
- A review of the impact of human activity on the status of surface waters and groundwater; and
- An economic analysis of water use.

The reason for the guidance is that 'the WFD establishes a number of objectives for surface waters and groundwater, and the pressures and impacts analyses must assess the risks of failing to achieve each of them'. Any 'pressures that could affect the status of aquatic ecosystems must be considered in the analyses'.

It stresses that the WFD requires 'information to be collected and maintained on the type and magnitude of significant anthropogenic pressures' according to four broad categories (together with any other relevant pressures, such as land use):

- Point sources of pollution;
- Diffuse sources of pollution;
- Effects of modifying the flow regime through abstraction or regulation; and,
- Morphological alterations.

For groundwaters the guidance notes that Annex II(2) prescribes a different process with the following stages:

- Initial characterisation, including identification of pressures and risk of failing to achieve objectives;
- Further characterisation for at risk groundwater bodies;
- Review of the impact of human activity on groundwaters for transboundary and at risk groundwater bodies;
- Review of the impact of changes in groundwater levels for groundwater bodies for which lower objectives are to be set according to Article 4.5; and,
- Review of the impact of pollution on groundwater quality for which lower objectives are to be set.

However, there are common elements for surface and groundwaters, such as reviewing point and diffuse pollution sources and effects of abstraction. With regard to the WFD objective of preventing or limiting inputs of pollutants into groundwater (Article 4.1(b)(i)), the guidance notes that, at the time of publication, further information on this issue would arise with adoption of the EQS Directive.

Assessment of pressures is driven by that fact that if a water body fails to meet its objective, or is at risk of failing to meet its objective, then the cause of this failure (i.e. the pressure or combination of pressures) must be investigated. Thus the guidance interprets the WFD requirement that significant pressures must be identified as meaning any pressure that on its own, or in combination with other pressures, may lead to a failure to achieve the specified objective. Thus there is an element of risk assessment for water bodies at risk of failing to meet objectives.

The guidance includes considerable discussion on the problems of scaling, i.e. that 'different kinds of pressures do not impact the different water bodies at the same space and time scales'. This presents a challenge for data collection, analysis of the impacts of pressures and robustness of the conclusions over time. The guidance notes that some impacts can be localised, but that others are intermittent or 'diffuse'. Examples, relevant to IPPC installations, include:

- Local pollution causing impacts on water bodies relatively continuously.
- Abstraction which might only be a significant impact during summer months when rivers are at low flow.
- Pollution emissions which contribute to a pollution load over a wide area and in combination with other sources (e.g. acid deposition).

The guidance, therefore, stresses that the 'correct time and space scales of data collection of both pressures and states are the most important points that make it possible to establish sound (therefore recognised as true) relationships, and consequently appropriate programmes of measures'. The correct identification of pressures requires consistent identification of the relevant targets, their size and the susceptibility to being impacted. Understanding timescales also needs to be determined, including variance within a year and between years.

The guidance provides examples of points sources, the following of which are relevant to IPPC:

- Industrial (IPPC and non-IPPC)
    - Effluent disposal to surface and groundwaters
    - Toxic substances have direct effect, increased suspended solids, organic matter alters oxygen regime, nutrients modify ecosystem
- Thermal power generation
    - Return of cooling waters cause alteration to thermal regime
    - Elevated temperatures, reduced dissolved oxygen, changes in biogeochemical process rates
    - Biocides in cooling water Direct toxic effect on aquatic fauna.

In assessing whether a pressure on a water body is 'significant', the assessment 'must be based on a knowledge of the pressures within the catchment area, together with some form of conceptual understanding, of water flow, chemical transfers, and biological functioning of the water body within the catchment system'. This means that there has to be some understanding that that pressure can cause an impact. This may be based on relatively simple assessment of data on pollutant concentrations compared to standards or may require complex analyses. The guidance explores different approaches to how assessments of different complexities and types may be carried out (different responses of water types, pollutant mixing models, etc, etc). The precise detail of these is not important for the

determination of the interaction with IPPC, although different levels of complexity, for example, would have widely different implications for IPPC operators and regulators.

However, it is important to note that the guidance states that 'the conclusion cannot be that this analysis can only be achieved by constructing a detailed, process-based, numerical computer model of the entire linked surface and groundwater system. This type of approach may be possible, in some situations […]. In practice, the information required to adopt the modelling approach will rarely be available at present, and probably not generally in the foreseeable future. By implication, the initial analysis will usually be based on less demanding methods for which the required data are available, e.g. pressure screening tools [….]. Such analyses will be subject to refinement as further analysis is needed to determine risk, relevant data become available, and useable tools are developed'.

The guidance provides an outline of a 'generic approach to the identification of specific pollutants'. Note that this is from the perspective of water managers – i.e. which pollutants should they have concern for. The guidance suggests starting with the list of pollutants in Annex VIII of the WFD and to screen for 'all available information on pollution sources, impacts of pollutants and production and usage of pollutants in order to identify those pollutants that are being discharged into water bodies in the river basin district'. With regard to available data on sources the guidance notes the need to examine 'production processes, usage, treatment, emissions' and highlights information 'from existing obligations and programmes'. The guidance notes the following specific sources of information related to IPPC installations:

- Integrated Pollution Prevention Directive (96/61/EC) Data and Reports
- Collate sites authorised under the IPPC Directive and their discharges.
- National Data Storages and Reports, EPER

Having obtained these data, assessments (monitoring and/or modelling) and comparisons with impact criteria (e.g. water standards) should be undertaken. However, the guidance notes the limitations of current EQS and that further assessment may be needed.

The guidance also provides an example of the German LAWA Pressure screening tool which addresses a wide range of potential pollutant sources. However, with regard to industrial sources, the criteria applied are:

- 'Statement of systems according to IPPC Directive = pollutants according to EPER
- Annual loads of plants with obligation to report according to IPPC Directive: consideration of the particular size threshold for the annual load of 26 substances (cf. Table 1: Size thresholds; EPER)
- Annual loads of priority substances, substances of the quality objective directive, and river basin-specific substances, insofar as these substances are limited by water directives
- Food industry facilities >4000 EP'

The pollutant screening approach in the guidance will be generally correct, but the guidance also warns that 'a safety net is needed to ensure that pollutants that may be environmentally significant are not incorrectly excluded'. Cases include:

- Whether a number of small (individually minor) pollution sources may be expected to have a significant combined effect;
- Trends that may indicate an increasing importance of a pollutant, even though the EQS is not currently exceeded;
- The presence of pollutants with similar modes of toxic action and hence potentially additive effects.

With regard to groundwaters, the guidance suggests that 'the concept of "potential impact" is introduced to describe the effects that a pressure is likely to have on a groundwater body, and that potential impact is used in the evaluation of whether the body is "at risk" of failing the Article 4 objectives'. This is because 'it will not always be possible to accurately measure the impact by monitoring groundwater levels and quality'.

10.3 CIS Guidance No. 7. Monitoring under the Water Framework Directive

This guidance details the monitoring obligations under the WFD. For surface waters the WFD indicates that monitoring information from surface waters is required for:

- The classification of status.
- Supplementing and validating the risk assessment procedure described in Annex II;
- The efficient and effective design of future monitoring programmes;
- The assessment of long-term changes in natural conditions;
- The assessment of long-term changes resulting from widespread anthropogenic activity;
- Estimating pollutants loads transferred across international boundaries or discharging into seas;
- Assessing changes in status of those bodies identified as being at risk in response to the application of measures for improvement or prevention of deterioration;
- Ascertaining causes of water bodies failing to achieve environmental objectives where the reason for failure has not been identified;
- Ascertaining the magnitude and impacts of accidental pollution;
- Use in the intercalibration exercise;
- Assessing compliance with the standards and objectives of Protected Areas;
- Quantifying reference conditions (where they exist) for surface water bodies.

For groundwaters, monitoring information is required for:

- Providing a reliable assessment of quantitative status of all groundwater bodies or groups of bodies;
- Estimating the direction and rate of flow in groundwater bodies that cross Member States boundaries;
- Supplementing and validating the impact assessment procedure;
- Use in the assessment of long term trends both as a result of changes in natural conditions and through anthropogenic activity;
- Establishing the chemical status of all groundwater bodies or groups of bodies determined to be at risk;
- Establishing the presence of significant and sustained upwards trends in the concentrations of pollutants;

- Assessing the reversal of such trends in the concentration of pollutants in groundwater.

The guidance examines the three types of monitoring described in the WFD: surveillance, operational and investigative monitoring. For example, the guidance notes that an additional objective of groundwater surveillance and operational monitoring is to provide information that can be used in the assessment and in establishing the presence of long term trends in pollutant concentrations. Monitoring programmes will need to be supplemented by monitoring obligations for specific protected areas. Thus the guidance states that 'Member States may wish to integrate monitoring programmes established for other Protected Areas within the programmes established under the Directive. This is likely to improve the cost effectiveness of the various programmes.'

The guidance states that investigative monitoring may be required in specified cases:

- where the reason for any exceedences of environmental objectives is unknown;
- where surveillance monitoring indicates that the environmental objectives for a body of water are not likely to be achieved and operational monitoring has not already been established, in order to ascertain the causes of a water body or water bodies failing to achieve the environmental objectives; or
- to ascertain the magnitude and impacts of accidental pollution.

The guidance states that 'The results of the monitoring would then be used to inform the establishment of a programme of measures for the achievement of the environmental objectives and specific measures necessary to remedy the effects of accidental pollution. Investigative monitoring will thus be designed to the specific case or problem being investigated. In some cases it will be more intensive in terms of monitoring frequencies and focused on particular water bodies or parts of water bodies, and on relevant quality elements.' Such monitoring could be used as an early warning against accidental pollution and monitoring could include a range of chemical, biological and toxicology methods.

The guidance does not specifically refer to the IPPC Directive nor any monitoring or reporting obligations arising from the Directive. The monitoring programmes to be established under the WFD clearly have a link with the operation of IPPC installations. Surveillance monitoring could be important in informing enforcement action under IPPC or informing permit review, while investigative monitoring, as it seeks to identify the specific reasons for failure to achieve environmental objectives, could inform permit determinations. There is also the potential for synergy between monitoring conditions established in IPPC permits and monitoring programmes under the WFD.

Guidance concerning the role and harmonisation of monitoring approaches between the respective Directives would, therefore, be beneficial for optimising outcomes, reducing costs and enhancing co-operation.

10.4 CIS Guidance No. 15. Groundwater Monitoring (WG C)

A subsequent CIS guidance document provides further guidance on groundwater monitoring. This stresses that groundwater monitoring networks need to include:

- A quantitative monitoring network to supplement and validate the Article 5 characterisation and risk assessment procedure with respect to risks of failing to achieve good groundwater quantitative status.
- A surveillance monitoring network to: (a) supplement and validate the Article 5 characterisation and risk assessment procedure with respect to the risks of failing to achieve good groundwater chemical status; (b) provide information for use in the assessment of long-term trends in natural conditions and in pollutant concentrations resulting from human activity and; (c) to establish, in conjunction with the risk assessment the need for operational monitoring.
- An operational monitoring network to: (a) establish the status of all groundwater bodies, or groups of bodies, determined as being 'at risk', and (b) establish the presence of significant and sustained upward trends in the concentration of pollutants.
- Appropriate monitoring to support the achievement of Drinking Water Protected Area objectives.

The guidance states that the results of the monitoring must be used, inter alia, to:

- establish the chemical and quantitative status of groundwater bodies (including an assessment of the available groundwater resource);
- assist in further characterisation and validate risk assessments of groundwater bodies;
- assist in the design of, and evaluate effectiveness of, programmes of measures;
- identify anthropogenically induced trends in pollutant concentrations and their reversal.

The document also provides guidance on the selection of representative operational monitoring sites. It states that the locations of such sites should be prioritised on the basis of:

- Availability of suitable existing sites (e.g. from the surveillance monitoring programme) that provide representative samples.
- Potential for supporting different WFD monitoring programmes (e.g. suitable springs can act as quality, quantity and surface water sampling stations).
- Potential for integrated multi-purpose monitoring, e.g. combining requirements for Nitrates Directive monitoring, Drinking Water Protected Area monitoring, monitoring linked to registration of plant protection or biocidal products, IPPC Directive monitoring and Groundwater Directive compliance.

This guidance, therefore, highlights similar issues to Guidance No. 7 covering general monitoring under the WFD with regard to the purpose of monitoring and its links to pollution issues, such as might arise from IPPC installations. Although the guidance has a strong quantitative monitoring element, this largely is focused on water levels, rather than specific users (such as could be the case with some IPPC installations).

Only in the selection of monitoring sites are IPPC installations specifically referred to in that authorities should look for synergies in monitoring programmes between the WFD and IPPC monitoring.

10.5 CIS Guidance No. 19. Surface water chemical monitoring

Still further monitoring guidance is provided in guidance No. 19 for surface water chemical monitoring. The guidance makes no mention of IPPC, although IPPC installations are likely to be one source of chemicals requiring monitoring. The most interesting area of potential interaction with IPPC is on the selection of monitoring sites. The guidance states:

'The starting point of investigative monitoring will often be that surveillance or operational monitoring have revealed that the EQS values are exceeded, but the causes of the failures are unknown or poorly understood. It is, however, very difficult to give general guidance on how to proceed in investigative monitoring since a case by case approach is the only way forward to take account of local conditions, the type of pressures, and the specific aim of the investigation. This will in general require expert knowledge and judgment. The necessary monitoring points, the matrix and parameters to be monitored as well as the frequency of sampling and the duration of the monitoring have to be adjusted to the specific case or problem under investigation. Investigative monitoring is characterised by spatial and temporal flexible sampling and can be stopped as soon as the cause of non-compliance has been identified. When a programme of measures is in operation and its effect can be expected to be measurable, a suitable operational monitoring has to be established.'

The guidance states that 'before starting investigative monitoring, thorough pressure analysis may be required. In particular, it is important to clarify whether point or diffuse sources have to be taken into account as potential cause for non-compliance'. Also 'in order to identify the causes of exceedance of EQS in a water body or several water bodies, Member States shall monitor the priority substance(s) or other pollutant(s) of which the water concentration exceeds EQS.'

Clearly the role of emissions from IPPC installations may be important and monitoring programmes under IPPC will interact with these monitoring obligations described by the CIS guidance. However, the guidance does not discuss this specific area of interaction.

10.6 CIS Guidance No. 11. Planning Processes

The guidance on planning processes includes guidance relating to programmes of measures (POM) – the element of planning most relevant to the IPPC Directive. The POM consists of, for each district, the regulatory provisions or *basic measures* to be implemented in order to achieve the objectives defined for 2015 by the management plan in accordance with Community and/or national laws. If these are insufficient to achieve the set objectives, *supplementary measures* shall be taken.

The guidance briefly discusses the 'combined approach' listed as part of the basic measures (WFD Article 10). The guidance states that 'this means that water policy should be based on using control of pollution at source through the setting of emission limit values and of environmental quality standards. For example, for point source discharges liable to cause

pollution, basic measures can be a requirement for prior regulation (i.e. a prohibition on the entry of pollutants) or a requirement of authorisation or registration laying down emission controls for the pollutants concerned'.

The guidance argues that the combined approach refers to a range of Directives including the IPPC Directive as well as respective daughter Directives of the Dangerous Substances Directive and Nitrates Directive. It is important to note that the IPPC Directive explicitly draws on the combined approach. However, the daughter Directives of the DSD offer an ELV or EQS approach as alternatives (not a combined approach) and the Nitrates Directive does not impose a binding EQS to be met. It is, therefore, the IPPC Directive that should form the key elaboration of the concept of the combined approach.

The guidance continues by stating that 'Article 10(3) specifies that where different quality objectives or quality standards have been established according to the different directives referred to in article 10, and they require stricter conditions than those which result from the application of article 10, the emission controls must be tightened. Therefore, if the application of the environmental quality standard approach required tighter controls on emissions than would otherwise be the case, those controls would need to be tightened.' This is a critical element of the guidance with respect to IPPC, but the point of interaction could be more clearly made. Emission limit values prescribed in IPPC permits would have to be tightened if they did not meet the environmental objectives.

The guidance also considers the WFD objectives regarding the 'recovery of the costs of water services'. Water pricing policies should:

- take account of the principle of the recovery of costs or water services, including environmental and resource costs;
- embody the "polluter pays" principle;
- provide adequate incentives to use water resources efficiently;
- ensure that water use groups (separated into at least industry, households and agriculture) make an adequate contribution to the recovery of the cost of water services.

The latter point, therefore, includes an objective for the industrial sector. Water use is an issue that may be addressed in IPPC permitting alongside other aspects of the efficient use of resources. BAT determination will include an assessment of the resource use efficiency of different techniques. IPPC permitting does not, however, allow for any direct consideration of water pricing. It is worth noting, though, that changing water pricing policies (WFD) and stimulating use of techniques that are more resource use efficient (IPPC) are complimentary in their outcomes.

Finally, in establishing the POM, the guidance notes that 'the Directive includes a number of provisions that allow for derogation from the environmental objectives for legitimate economic and technical reasons. This will help Member States to strike a balance between environmental, economic and social goals. Justification for the use of the derogation must, in all cases, be included with the RBMP.' However, it does not elaborate further on such derogations nor on the implications of derogations for other regulatory regimes, etc. This issue is addressed in Guidance No. 20.

10.7 CIS Guidance No. 17. Guidance on Preventing or Limiting Direct and Indirect Inputs in the Context of the Groundwater Directive 2006/118/EC

This guidance focuses on preventing or limiting inputs to groundwaters. This allows the guidance to consider the meaning of a number of issues such as 'limit' and the relationship of controls to other measures.

The guidance discusses the links between the prevent or limit objective and threshold values. The "prevent or limit" objective in the WFD/GWD protects all groundwater from unacceptable inputs of pollutants. It protects a wide range of receptors and protects groundwater from pollution at a local scale. The guidance stresses that 'this contrasts with the requirements for good chemical status, as the assessment of good chemical status is carried out over the whole of a groundwater body. In most cases, this will be a large area'. Good chemical status 'is limited to only a few receptors and specific circumstances, and does not necessarily protect groundwater quality at a local scale'. 'In principle, prevent or limit measures are our first line of defence in preventing unacceptable inputs of pollutants to all groundwater'.

The guidance stresses, therefore, that the effective implementation of the prevent or limit objective via routine regulation should ensure that groundwater quality is protected and that its 'day to day regulation' can consist of permits, general binding rules or codes of practice to control specific activities on the land surface. Permit conditions and/or "Limit Values" may be used to ensure that no unacceptable input of pollutants into groundwater occurs. The guidance stresses that 'whilst the threshold values that have to be established pursuant to Article 3 of the GWD will help to assess good chemical status, these values (and the associated compliance regime) will often not be appropriate to meet the more stringent requirements of the prevent or limit objective'.

The guidance notes that 'other European legislation indirectly provides some level of protection for groundwater or provides relevant reference information for the protection of groundwater'. It specifically lists the **IPPC** and **UWWT** Directives in this category.

The guidance discusses the concept of the 'prevent or limit' approach to pollution control. The goal of the 'prevent or limit' objectives set out in the WFD and GWD is to prevent pollution. The guidance, therefore, begins by stressing the need for competent authorities to have a clear understanding of the term 'pollution'. It notes that the WFD (which the GWD uses) has a broader definition of 'pollution' than the older GWD. The WFD definition is "*...the direct or indirect introduction, as a result of human activity, of substances or heat into the air, water or land which may be harmful to human health or the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems, which result in damage to material property, or which impair or interfere with amenities and other legitimate uses of the environment*" (Article WFD 2(33)). The WFD 'therefore extends controls to cover all pollutants (all substances liable to cause pollution, including radioactive substances as well as carbon dioxide or heated water from cooling) and is not restricted to the groundwater environment. The WFD does not mention microbiological agents'.

Hazardous substances are defined in the WFD as "*substances or groups of substances that are toxic, persistent and liable to bio-accumulate, and other substances or groups of substances which give rise to an equivalent level of concern*" (Article 2(29)). The GWD requires that these substances should not be introduced into groundwater (Article 6(1)(a)).

Harm is deemed to have occurred when hazardous substances are present in the discharge in amounts that are discernible over and above the naturally occurring background concentrations in the receiving groundwater. Article 6.3, however provides exemptions about inputs of pollutants in certain circumstances. For new discharges it is not acceptable to take into account the dilution of these substances by the groundwater flow, nor is it acceptable to say that such substances can enter groundwater because it has previously been polluted. At sites where the land is historically contaminated and hazardous substances have already entered the groundwater, pollution will already be considered to have occurred. It is clear that in taking forward this requirement for IPPC installations it is necessary to ensure that permit conditions meet these strict obligations for potential discharges of hazardous substances.

The guidance also seeks to interpret the term 'input', which is not defined in the WFD, but is in the GWD as "*the direct or indirect introduction of pollutants into groundwater as a result of human activity*". Thus it considers that the term input 'is distinctly different from discharge' (used in the old GWD 80/68/EEC) 'in that it covers all pollutants that enter groundwater, and is not restricted to deliberate disposals. This means that the term input covers a broader range of scenarios/situations where substances are entering the subsurface than is covered by 80/68/EEC'. The guidance gives examples of inputs from industrial sources as: accidents, spills, leaks, storage, waste disposal and land filling. Thus to limit an input into groundwater means to take all measures necessary to prevent pollution, which will ensure that: there is no deterioration in status; and there is no significant and sustained upward trend in the concentrations of pollutants in groundwater. Limiting inputs to prevent pollution will ensure that the concentration of the substance remains below a level such that harm to a receptor does not occur, or that local maximum allowable concentrations and/or relevant groundwater quality standards are not exceeded.

Thus the requirement to address inputs from industrial activities may mean consideration of IPPC permit conditions beyond the setting of ELVs. IPPC provisions relating to accident prevention and management are clearly relevant, but a range of other site management activities to be prescribed in permits may be important in ensuring groundwaters are not polluted.

10.8 CIS Guidance No. 20. Guidance Document on Exemptions to the Environmental Objectives

This guidance seeks to interpret the series of exemptions set out in Article 4 of the WFD. These allow for extension of the deadline, achieving less stringent objectives, allowing temporary deterioration and addressing new modifications to water bodies. The guidance highlights that Art. 4 paragraphs 8 and 9 stress that exemptions for one water body must not compromise the achievement of environmental objectives in another water body and that at least the same level of protection must be achieved as provided for in existing Community law.

Article 4.4 allows for extension of deadlines to allow for phased achievement of objectives due to reasons of technical feasibility, that improvements are disproportionately expensive or due to natural conditions. The issue of disproportionate cost also arises in Article 4.5 where conditions of waters may be so poor that achieving objectives may involve disproportionate cost, although Member States must achieve the highest status possible within this constraint. Article 4.6 allows for temporary deterioration in status due to force majeure, such as natural

events (e.g. floods) and accidents. Article 4.7 refers to exemptions due to new modifications of water bodies.

IPPC is relevant to some of these exemptions. Clearly the application of BAT cannot be considered to not be technically feasible - this would be a contradiction of the meaning of BAT. However, the timing of the implementation of BAT at an installation might be applicable to the phased introduction of measures indicated in Article 4.4.

In considering disproportionate costs the Guidance state 'the costs of measures required under existing Community legislation already agreed at the time of the adoption of the Directive cannot be considered when deciding on disproportionate costs'. This includes the IPPC and UWWTD. If implementing certain techniques under IPPC is costly, then it is under the provisions of the IPPC Directive that justification for disproportionate cost needs to be assessed.

Issues of new modifications to water bodies largely address flood defences, dams, etc., and are not applicable to IPPC. However, temporary deterioration due to accidents is linked to IPPC, in that accident prevention and management is an objective of IPPC regulation. There is an obligation on operators to act to avoid accidents and reduce the impact of those that occur. However, if they do occur and waters are negatively affected, the WFD allows for a temporary derogation in such cases.

10.9 CIS Guidance No. 1. Economics and the Environment - The Implementation Challenge of the Water Framework Directive

This guidance notes that there is a variety of different economic analyses and actions to be undertaken in implementing the WFD:

- To carry out an economic analysis of water uses in each River Basin District;
- To assess trends in water supply, water demand and investments;
- To identify areas designated for the protection of economically significant aquatic species;
- To designate heavily modified water bodies based on the assessment of changes to such water bodies and of the impact (including economic impact) on existing uses and costs of alternatives for providing the same beneficial objective;
- To assess current levels of cost-recovery;
- To support the selection of a programme of measures for each river basin district on the basis of cost effectiveness criteria;
- To assess the potential role of pricing in these programmes of measures – implications on cost-recovery;
- To estimate the need for potential (time and objective) derogation from the Directive's environmental objectives based on assessment of costs and benefits and costs of alternatives for providing the same beneficial objective;
- To assess possible derogation resulting from new activities and modifications, based on assessment of costs and benefits and costs of alternatives for providing the same beneficial objective;
- To evaluate the costs of process and control measures to identify a cost-effective way to control priority substances.

A number of these are either not directly relevant to IPPC or are of marginal relevance. However, cost-effectiveness assessment of measures (e.g. controls on priority substances) has a parallel to the assessment of costs within the overall determination of BAT under IPPC.

The guidance sets the assessment of costs and cost-effectiveness of measures within the overall context of developing programmes of measures (POM). The process recommended is that potential measures for each water body are identified together with an assessment of the cost of each and the effectiveness (in terms of environmental impact) of each. To determine the cost-effectiveness the guidance recommends to:

- Assess and rank cost-effectiveness of measures;
- Select the most cost-effective programme of measures that can reach environmental objectives;
- Calculate range for the total discounted costs of this programme;
- Undertake a sensitivity analysis to assess robustness of results.

If the total costs of the proposed programme are judged to be disproportionate, it is recommended to estimate whether a derogation might be needed from an economic point of view and on which basis:

1. Compare total costs to financial resources – if costs can be reduced or better managed over longer time horizon, propose time derogation;
2. Assess total costs and benefits (including water-related environmental benefits) – if total costs disproportionate as compared to benefits, propose less stringent environmental objectives – account for socio-economic and distributional implications if considered necessary.

To assess the financial implications of the POM:

- Assess the socio-economic and distributional impact of the selected programme;
- Assess the financial and budgetary implications of the selected programme, establish alternative financial plans;
- Identify the accompanying (financial, technical, institutional) measures for implementing the selected programme;
- Assess the potential impact on cost-recovery and incentive pricing.

This guidance is effectively a relatively standard approach to determine cost-effectiveness. However, the guidance states that the cost-effectiveness analysis is best performed at the river basin scale. Undertaking the analysis at lower scale requires an adequate integration between analyses undertaken for sub-units of the river basin. Also specific care needs to be given to the choice of the effectiveness indicator. Indeed, different effectiveness indicators may lead to a different outcome for the ranking of measures, e.g. addressing the full range of environmental issues encompassed in the definition of water status. This indicates a broader assessment of costs and cost-effectiveness than would be familiar with most analysis under IPPC.

The conceptual and methodological interactions between assessing costs and benefits, etc., under the WFD and IPPC Directive are not explored and, indeed, there would be a benefit in

exploring further how far different forms of economic analysis are prescribed in EU environmental law and how comparable these are.

10.10 CIS Guidance No. 8. Public Participation in Relation to the Water Framework Directive

This guidance document examines the requirements in Article 14 of the WFD for public participation in river basin planning. It is worth noting that the WFD was the first EU environmental Directive to be adopted after signature of the Aarhus Convention and to state that it had taken account of the obligations arising from the Convention. The IPPC Directive was subsequently amended to incorporate the additional participatory requirements.

However, as is most useful, the guidance follows the detailed timetable for drafting and finalising RBMPs and suggests ways to maximise public involvement in these. The IPPC Directive has a much more precise and limited participatory process and, therefore, apart from the basic principles, there is little concrete interaction between the Directives that can be drawn upon from this guidance.

10.11 Conclusions

There has been a limited number of direct references to the IPPC Directive across the body of the guidance produced under the CIS. Of course for some guidance one would not expect any reference to IPPC (e.g. on intercalibration). However, given the potential interaction on assessing pressures, developing measures and monitoring, the limited number of references to IPPC is perhaps surprising. Even where the IPPC Directive is mentioned, it is generally little more than as a passing reference. There is certainly no analysis of what IPPC implementation can or cannot do in detail to meet a particular aspect of the implementation of the WFD. This would certainly be an aspect that could be explored in any revisions of the relevant guidance (together with explorations of interactions with other EU law, e.g. the Liability Directive).

11. BAT REFERENCE DOCUMENTS (BREFS)

11.1 Introduction

The BREFs are non-binding guidance developed through the information exchange process set up by the European Commission. Together with much background information, the BREFs seek to describe the techniques that can be considered to be the best available and the emission levels associated with such assessments of BAT (although the latter is not always possible).

The BREFs are usually (but not always) developed for specific industrial sectors (e.g. drawing on Annex I of the IPPC Directive). Their aim is to not to try to cover every conceivable individual circumstance of an installation for that sector. Therefore, the BREFs are only guidance. Two points must be emphasised:

- Following the guidance on BAT in the BREF is not a legal guarantee that BAT has been determined for an installation (e.g. the BREF may be out of date).
- Following the guidance in the BREF does not remove the obligation on permitting authorities to ensure environmental quality standards in the local environment are complied with (possibly requiring stricter emission limit values).

The BREFs may or may not have considered the requirement for operators or permitting authorities to examine impacts in the local environment. Given the fact that many BREFs are a few years old, it is unlikely that there would be explicit reference to the Water Framework Directive, but reference to other Directives may occur which have relevance to the wider WFD objectives.

This Chapter provides an examination of those BREFs which might be considered most likely to address water objectives in some form or another. This may either be that they concern activities with significant potential discharges to water or that it is very difficult to define BAT Associated Emission Levels (AELs) and, therefore, the reader might be directed to examine the water environment itself.

11.2 Cooling Water BREF

The Cooling Water BREF considers BAT associated with different types of cooling systems that can be used by IPPC installations. Cooling water systems can have various impacts on the water environment. The two principle impacts addressed by the BREF are the release of biocides introduced as anti-foulants in cooling water and the discharge of heat into water bodies. In both cases the BREF not only discusses techniques to reduce impacts (as other BREFs do), it discusses how to assess which techniques are appropriate with reference to the level of impact in receiving waters including in relation to EU legal objectives. This BREF, therefore, provides the clearest statements of interaction with the Water Directives.

The BREF addresses the impact of anti-fouling substances on the aquatic environment. It promotes the concept of linking 'the level of environmental impact of a process substance with the required cooling configuration and monitoring requirements. With higher potential risks for the environment in case of leakage the concept leads to improved anti-corrosiveness, indirect cooling design and an increasing level of monitoring of the cooling water.' This is, therefore, a direct interaction between considering the impact on the receiving environment and process design. The BREF considers different processes for optimizing the application of biocides, but it stresses that 'an important element in introducing a BAT-based approach to water treatment, in particular for recirculating systems using non-oxidizing biocides, is the making of informed decisions about what water treatment regime is applied, and how it should be controlled and monitored'. Furthermore 'selection of an appropriate treatment regime is a complex exercise, which must take into account a number of local and site-specific factors, and relate these to the characteristics of the treatment additives themselves, and the quantities and combinations in which they are used'.

Thus the 'BREF seeks to provide the local authorities responsible for issuing an IPPC permit with an outline for an assessment'. The BREF makes reference to the Biocidal Products Directive 98/8/EC, but proposes two concepts for assessment for permitting authorities (which it considers are complimentary):

1. 'A screening assessment tool based on the existing concepts, which allows a simple relative comparison of cooling water additives in terms of their potential aquatic impact (the Benchmarking Assessment).
2. A site specific assessment of the expected impact of biocides discharged in the receiving water, following the outcome of the Biocidal Products Directive and using the methodology to establish Environmental Quality Standards (EQSs) of the future Water Framework Directive as key elements (the Local Assessment for Biocides)'.

'The Benchmarking Assessment can be seen as a method to compare the environmental impact of several alternative cooling water additives while the Local Assessment for Biocides provides a yard stick for the determination of a BAT compatible approach for biocides in particular (PEC/PNEC <1). The use of local assessment methodologies as a tool in controlling industrial emissions is already common practice.' Effectively, the Local Assessment methodology is a direct recommendation to examine the objectives of the Water Directives and ensure that they are addressed in IPPC permitting. This is unusual in being so clearly stated as such in a BREF.

The BREF considers the effect of use of cooling water on abstraction of water from water bodies. It notes that a range of different types of water from different water bodies may be used. It stresses the need to distinguish between the terms 'water use' and 'water consumption'. 'Water use means that the same volume of heated cooling water is directed back to the source from which it has been taken (once-through). Water consumption mean that only part of the water used for cooling (blowdown of recirculating systems) is directed back into receiving water, the remainder having disappeared by evaporation and drift during the process of cooling.' A variety of process issues and techniques affect water use and water consumption (which are not relevant to this project). The BREF does, however, stress that 'in Member States different authorities deal with water as a resource or as a receiving environment', but that 'in any case water use should be part of an integrated environmental permit, especially where supplies are limited'. It notes that 'the major legislation on

European level is the Water Framework Directive. It focuses on both the water quality and on the quantitative groundwater status defined in terms of the effect of the ground water level on associated surface ecosystems and in terms of sustainability of the water supply'. However, the BREF does not provide any indication of what the WFD might require regarding abstraction nor how such requirements might be interpreted in any decisions concerning BAT, etc.

The BREF considers the issue of fish entrainment. However, this largely is addressed by demonstrating the problems that entrainment can have and examples of where this has been monitored or addressed. Detailed guidance on BAT or links to water objectives in legislation is not considered.

In Section 3.3.3 the BREF addresses the issues of how to consider the levels of heat emissions to water. It notes the large difference in relative heat inputs between once-through systems and recirculating systems. It states that 'there is little information on the effects on the aquatic ecosystem of heat emissions, but there are experiences with high summer temperatures and small receiving waterways'. Relevant for the environmental impact of heat emissions is not only the actual temperature in the water, but also the temperature rise at the boundary of the mixing zone as a consequence of the heat discharge into the water. The amount and level of the heat discharged into the surface water related to the dimensions of the receiving surface water are relevant to the extent of the environmental impact. In situations where heat discharges at relatively small surface waters and the hot water plume reaches the opposite side of the river or canal this can lead to barriers for the migration of Salmonids. However, it notes a number of impacts, including by reducing levels of dissolved oxygen:

'Temperature rise may lead to increased rates of respiration and of biological production (eutrophication). The discharge of cooling water into the surface water influences the total aquatic environment, especially fish. The temperature has a direct effect on all life forms and their physiology and an indirect effect by affecting the oxygen balance. Warming reduces the saturation value of oxygen; with high oxygen concentration, that leads to a reduced oxygen level. Warming also accelerates the microbial degradation of organic substances, causing increased oxygen consumption. Also, where circulation of the cooling water occurs or where a number of industries use the same limited source of surface water, heat emissions need careful consideration to prevent interference with the operation of industrial processes downstream.'

The BREF considers that recirculation of cooling water, using an open or closed recirculating wet system, is BAT where the availability of water is low or unreliable. In recirculating systems an increase of the number of cycles can be BAT, but demands on cooling water treatment may be a limiting factor. The BREF describes a range of technical issues to consider in the design of different cooling systems to optimise heat exchange, etc., which are not directly relevant to this project.

Importantly, the BREF stresses that while some calculations of impact are possible ('when cooling water is warmed up by an average of 10K, 1 MWth of heat requires a cooling water flow of about 86 m3/hour. Broadly speaking each kWth needs 0.1 m3/hour of cooling water'), care must be taken to examine the variable nature of the receiving environment, such as:

- seasonal variation in the temperature of the receiving water;
- seasonal variation in the water level of rivers and the variation in the velocity of the stream;
- the extent of mixing of the discharged cooling water with the receiving water (near field and far field);
- at coastal sites, tidal movements or strong currents and
- convection in the water and to the air.

Taking these issues into account, the inlet and outlet sites are also important in determining the behaviour of the plume of heated water and the BREF provides a detailed annex on heat plume behaviour.

The BREF refers to 'legislative requirements of heat emissions', by which it refers to the Fishlife Directive 78/659/EEC. For the salmonid and cyprinid waters that are required to be designated, the BREF specifically refers to the temperature limits set out in Annex I of the Directive:

- maximum water temperature at the boundary of the mixing zone;
- maximum temperature during the breeding period of "cold water species";
- maximum temperature rise.

The conclusion to be reached from this presentation in the BREF is that the BREF is not indicating a specific heat discharge level that is associated with BAT that is generally applicable. Rather, the BREF acknowledges the case by case variability of discharges and the need to consider the impacts that specific discharges have, including in relation to meeting the obligations under other EU law.

The BREF does not refer to the WFD. However, Directive 78/659/EEC is repealed by the WFD (its ecological objectives being superseded by the WFD). Clearly, the wider ecological objectives of the WFD would need to guide decisions for operators and permitting authorities on appropriate heat discharges.

11.3 Intensive animal units (Pigs and Poultry) BREF

The Pigs and Poultry BREF may be another BREF which may require operators and permitting authorities to take a more detailed examination of the local environment as it is less prescriptive of some techniques and does not contain BAT AELs.

The BREF does cross refer to the receiving environment in some cases for the determination of BAT. For example for application of manure (p19) it states 'BAT is to take into account the characteristics of the land concerned when applying manure; in particular soil conditions, soil type and slope, climatic conditions, rainfall and irrigation, land use and agricultural practices, including crop rotation systems. BAT is to reduce pollution of water by doing in particular all of the following: not applying manure to land when the field is: water-saturated, flooded, frozen, snow covered, not applying manure to steeply sloping fields, not applying manure adjacent to any watercourse (leaving an untreated strip of land), and spreading the manure as close as possible before maximum crop growth and nutrient uptake occur'. However, while this highlights the fact that BAT cannot simply be determined by the

nature of the installation but must consider the surrounding environment, the conditions listed are not environmental objectives per se (akin to an EQS), but conditions in the environment to affect process operation.

The BREF (section 1.4.2) provides detailed assessment of potential emissions to ground and surface waters. It highlights that these can arise from different aspects of the process (housing, manure storage, manure spreading, etc), from normal operation and accidental spillage and that there are various techniques to address these issues. The BREF describes the problems that addition of nitrogen and phosphorus cause to surface and ground waters and techniques to reduce some inputs (e.g. levels of nitrogen in animal feed). The only EU Directive directly referred to is the Nitrates Directive 91/676/EEC and, even then, only a simple statement of the main obligations is provided ('Members States are obliged to identify zones, that drain into waters vulnerable to pollution from nitrogen compounds and that require special protection; i.e. the Nitrate Vulnerable Zones. In these zones land spreading is restricted to a maximum level of 170 kg N/ha per year'). Reference to the Nitrates Directive is important in that manure application cannot be allowed to exceed application rate limits within NVZs. However, beyond this it does not set statutory environmental standards to be taken account of.

For example, section 1.4.2 of the BREF summarises the emissions to soil, groundwater and surface water – from different aspects of the installation and types of equipment – 'however, from all the sources, landspreading is the key activity responsible for the emissions of a number of components to soil, groundwater and surface water'. The BREF lists the substances that may be of concern in water discharges – principally emission of nitrogen and phosphorus, but other elements, such as potassium, nitrite, NH4 +, micro-organisms, (heavy) metals, antibiotics, metabolics and other pharmaceuticals may end up in manure and their emissions may cause effects in the long run. Contamination of waters due to nitrates, phosphates, pathogens (particularly faecal coliforms and Salmonella) or heavy metals is the main concern.

In addressing these issues, the BREF refers to practice in some Member States, such as calculating nutrient application rates. Only one environmental 'objective' is mentioned in relation to phosphorus, for example, 'concentrations of 20 – 30 micrograms P/l in lakes or slow rivers can cause water eutrophication, with the danger of a growth of toxic blue algae (cyanophytes) in fresh water, which are P limited'. However, the BREF provides little guidance to the reader to examine receiving waters in detail or specific objectives relating to them. Section 3.3.5.3 on emissions of N, P and K to surface water recommends some examination of the surrounding environment, including:

- assessing the land receiving slurry to identify the risk of causing run-off to watercourses and then deciding whether to spread.
- avoiding weather conditions in which the soil could be seriously damaged, as this could have significant knock-on environmental effects.
- agreeing safe distances from watercourses, boreholes, hedges and neighbouring properties.

However, this guidance is a far cry from stating clearly that the WFD, for example, should set objectives relating to N and P for water bodies and how such objectives should be considered in relation to permitting of pig and poultry farms.

11.4 Chlor-akali BREF

Chlor-alkali plants are major sources of water pollution and, prior to IPPC, were a major driver in the development of the dangerous substances Directive and relevant daughter Directives.

The pollutant of most concern from the chlor-alkali industry is mercury, which is specific to the mercury cell technology. Indeed historical mercury and PCDD/Fs contamination of land and waterways from mercury and diaphragm chlor-alkali plants is a big environmental problem at some sites. The BREF provides a number of examples of achievable levels of mercury removal from waste water systems from across Europe. All of this information is provided as final concentrations, etc. It is without reference to the objectives of receiving waters.

The BREF provides extensive detail on reducing discharges of other substances. For example, it provides detail on minimising consumption/avoiding discharge of sulphuric acid by means of one or more of the following options or equivalent systems:

- on-site re-concentration in closed loop evaporators
- using the spent acid to control pH in process and waste water streams
- selling the spent acid to a user that accepts this quality of acid
- returning the spent acid to a sulphuric acid manufacturer for re-concentration.

However, the BREF does not refer to water objectives – it describes BAT on the basis of techniques. Curiously this includes the EQS adopted under the Dangerous Substances Directive (the BREF predates the EQS Directive).

The Chor-Alkali BREF is an example of a BREF addressing a category of installation with a well known impact of receiving waters, yet it does not view its guidance from the perspective of the objectives of those receiving waters.

11.5 Economics and Cross-Media BREF

The BREF which addresses cross-media effects seeks to provide guidance to authorities on the general objective of IPPC to reduce impacts on the environment as a whole and, therefore, to clarify how impacts in different environmental media might be compared and permitting decisions made accordingly. Given that this BREF is (on this issue) focused on the environment and not on the process, it might be expected to raise issues of environmental quality or other objectives that link to those of the EU Water Directives.

The recommended approach to cross-media analysis (section 2 of the BREF) follows a series of steps:

- Scope and identify alternative options – this is process focused, i.e. what options (consistent with BAT) are available for the installation.
- Inventory of emissions – what emissions would occur for each option (pollutant releases, raw material consumption, energy consumption and waste generation).
- Calculate the cross-media effects – this is a calculation that incorporates seven

different environmental themes – human toxicity, global warming, aquatic toxicity, acidification, eutrophication, ozone depletion and photochemical ozone creation.

It can be seen that the themes included in the calculation of cross-media effects include some of direct relevance to the Water Directives (human and aquatic toxicity, eutrophication, acidification). On the inventory of emissions, the guidance continues with consideration of how to assess energy consumption and waste arisings. However, it does not address water use.

In assessing aquatic toxicity, the BREF judges toxicity with reference to the PNEC for individual substances. The BREF notes that the derivation procedure given 'is similar to the approach used in the Water Framework Directive' and that further work is being carried out in relation to biocides by the European Chemicals Bureau.

While this is a methodological link to the EU policy development on water, the BREF also makes clear the need for permitting to address local water issues. It describes (section 2.5.3.2) how to calculate dilutions to PNEC. However, it states 'this methodology is useful in deciding in a general case, but it will not be sufficient for assessing the environmental impacts of an individual installation. When determining BAT at an installation, a more detailed assessment which might require detailed dilution modelling of individual pollutants is likely to be required. There may also be a need to consider the synergistic and antagonistic effects of combining pollutants. Issues such as the type of water course (river, lake, coastal water, etc.), the dilution available, ambient pollution levels and the other uses of the watercourse (drinking water, swimming, fisheries, etc.), will all need to be considered when setting individual permit conditions'.

This is a very clear statement that BAT for individual installations includes a consideration of the impact on the local environment. However, the BREF does not directly point to the statutory objectives in EU water law as a means of judging these impacts.

Similarly, in its guidance on eutrophication, the BREF states 'although useful for making decisions in general cases, this approach is not suitable for assessing the eutrophication potential of emissions on the local environment for an individual installation. It ignores the local dispersion characteristics, the fate of the pollutant once released, the nature of the receiving environment and the sensitivity of the local environment to the individual pollutant released'.

The guidance on interpretation of cross-media conflicts (section 2.6) notes that the methodology is not perfect and expert judgement is required. It suggests particular issues to consider, such as the presence of sensitive receptors, whether the local environment is already poor, the 'contribution to a benchmark', long-term effects, etc. Clearly, each of these can be viewed from the perspective of the legal obligations in the Water Directives. However, legal obligations relating to these issues are not mentioned in the BREF.

Section 2.6.4 addresses screening local environmental effects. The BREF refers to Article 9(4) and Recital 18 of the IPPC Directive, indicating that 'it is for Member States to decide how to take account of local environmental conditions'. The BREF refers to different approaches across the EU, e.g. on assessing dilution. It then states 'nevertheless, there may be local situations, where an environmental quality standard for a pollutant is already being exceeded or is close to its threshold. In these cases, a detailed assessment of that pollutant

may still be appropriate to assess the likely impact'. The BREF does not refer to EU legal standards as such, nor to Article 10 of the IPPC Directive requiring permits to take account of these.

The Cross-Media BREF, therefore, provides guidance to stimulate permitting authorities to consider local environmental impacts, including the quality of the local environment, in setting permit conditions. It does not, however, provide more than a passing reference to the Water Directives and no specific analysis of how to include the need to deliver EQS set at EU level.

11.6 Conclusions

The BREFs have provided the main source of guidance and support to operators and permitting authorities across Europe. Most BREFs provide little or no reference to objectives in waters affected by discharges from the installations that they cover, i.e. like the Chlor-Alkali BREF and others such as the BREF on Pulp and Paper. Some may refer to concern in waters in the general introduction to demonstrate that particular pollutants need to be controlled. The BREF on Tanning has a particular focus on efficiency of water use, but measures to reduce water consumption are identified according to techniques which are appropriate, rather than suggesting different consumption levels appropriate to different water bodies. It is rare, therefore, that the BREF gives explicit guidance to the permitting authority to refer to the objectives in receiving waters to determine what is required.

The main exception to this is the cooling water BREF. Effectively, this has been driven by the need to guide the reader to tackle discharges of heat, but it is impossible to define any common standard on the discharge – only to point to avoidance of undue environmental damage – thus what needs to be done is determined by the receiving environment. Interestingly, this approach is also seen (partly) in its treatment of biocides, such as referring to the WFD and EQS Directive, even though it could have followed the practice of many other BREFs in setting recommended standards for concentrations in discharges. The BREF on intensive animal units, in contrast, could have directed the reader to water objectives as a stronger guide for specific action, given the difficulty of providing precise guidance on some techniques, but this was not done. The Cross-Media BREF provides guidance to stimulate permitting authorities to consider local environmental impacts, including the quality of the local environment, in setting permit conditions and this is something that can be built upon in taking forward practical consideration of the interaction between IPPC and the WFD.

As the BREFs are revised, there is certainly a need for some to consider the interaction of their particular recommended techniques and BAT AELs in comparison to variations in water objectives. However, it has to be said that the BREFs are not meant to be a complete guide to IPPC permitting practice, rather they are the outcome of exchange of information on BAT - and that should be their focus.

An important conclusion is that simply following the guidance in a BREF will not ensure that a permit is 'WFD proof'.

12. THE INDUSTRIAL EMISSIONS DIRECTIVE

12.1 Introduction

The Commission published a proposal in December 2007 to recast the IPPC Directive and six other industrial emissions Directives into a new Industrial Emissions Directive (IED). The proposal included a wide range of amendments to IPPC. Proposals to amend the scope of the Directive (Annex I) and specific emissions limits on the sectoral Directives are less relevant to the issues identified in this report. However, other measures on the status of BREFs, the greater emphasis on enforcement, etc., are relevant. The proposal provoked significant debate within and between the European Parliament and the Council. However, the institutions have concluded their tripartite discussions in June 2010 and have reached compromise amendments on the proposal. Therefore, the text of what will be eventually published as the future IED is now known. This Chapter, therefore, draws on the Commission proposal (COM (2007) 844, 21.12.2007) and the text of the agreed amendments (Council 11226/10) (a consolidated text not yet being available).

12.2 Definitions

The IED does not alter the definition of 'pollution' or 'environmental quality standard' from the IPPC Directive. Therefore, the comments on these provided in Chapter 2 still apply.

The definition of 'permit' is, however, changed to be simply a written authorisation to operate, rather than referring to ensuring compliance with the Directive. This, therefore, is closer to the presumed working meaning as found in the WFD and 'prior authorisation' in the UWWTD (although these Directives do not provide definitions in this case).

The core definition of BAT is not changed.

12.3 Scope of the installation

The IPPC Directive is essentially unclear about the scope of an installation (as discussed in Chapter 3). The IED changes the definition of 'installation' to state that 'directly associated activities' are those 'on the same site'. In other words, activities off-site are not directly associated activities in the meaning of the IED. However, there is flexibility in permitting, as a permit may cover more than one installation (so potentially optimising environmental performance).

In Chapter 3 it was noted that the scope of what a competent authority considers to be within the scope of an installation could affect the nature of the interaction with water objectives. The IED limits that scope. However, it must be stressed that this limit is in terms of the Directive itself. If a Member State fully implements the Directive (ensuring BAT, etc., is applied and enforced), yet includes additional issues within its permitting, it is difficult to see

that this would not be in compliance. Therefore, national flexibility in regulatory scope will be likely to continue.

12.4 BAT and ELVs

The proposal generated significant debate on the status of BREFs, how far permits should reflect these and whether the EU should adopt minimum ELVs for different sectors. While these issues are highly important in implementing IPPC (both practically and with regard to its fundamental principles), they do not effectively affect the interaction with the WFD. The IED requires the formal adoption of BREFs and permitting authorities to give reasons for departure from the conditions in them. However, the principle of WFD interaction remains. The IED includes the provision for the Commission to assess the need for ELVs for further industry sectors. These would provide no additional interaction with the WFD than that already seen, for example, by the Waste Incineration Directive. Although strongly proposed by the European Parliament, the Commission's reluctance to take this forward would suggest that few, if any, such proposals will emerge in the future.

The IED also explicitly states that Member States may set permit conditions stricter than would be determined by the application of BAT. They may also set less strict ELVs where it can be shown that application of BAT would be disproportionately costly due to the geographic location or technical characteristics of the installation. The former provision would be consistent with applying stricter conditions to meet environmental requirements, such as those from the WFD. The latter, however, has the potential for operators to argue that even applying BAT to meet some WFD objectives (such as to a specific timetable) is disproportionately costly. Thus implementation of BAT as required by IPPC cannot be guaranteed under the IED. This may have implications for meeting WFD objectives. In applying the latter provision, competent authorities are required to ensure no significant pollution is caused and a high level of environmental protection is achieved. However, this is not clarified, although there might be a case for arguing that a delay in achieving WFD objectives would not be consistent with achieving a high level of environmental protection.

12.5 Meeting an EQS

The IPPC requirement to apply stricter conditions than would be derived from the application of BAT in order to meet an EQS (defined above as set out in Community law) is retained in the IED.

12.6 Monitoring

The monitoring requirements of IPPC are largely retained by the IED (including in relation to E-PRTR, etc). However, the IED includes the requirement for periodic monitoring in relation to dangerous substances likely to be on the site having regard to the possibility of soil and groundwater contamination. This is not monitoring of specific releases, but considers the simple presence of substances on the site. This may aid better achievement of water objectives.

12.7 Permit review

The IED is more prescriptive with regard to the review of permits than the IPPC Directive. However, the principle of interaction with the WFD and EQS Directive described earlier in this report remain valid.

12.8 Inspection and enforcement

The IED introduces far more detailed provisions for inspection and enforcement than the IPPC Directive. It requires Member States to produce inspection plans. Apart from information on installations, the plan shall include a general assessment of relevant significant environmental issues. Based on the plans, inspection programmes shall be developed, which may target inspections based on a systematic appraisal of environmental risks. The risks shall include, at least, the criterion 'the potential and actual impacts of the installations concerned on human health and the environment taking into account the levels and types of emissions, the sensitivity of the local environment and the risk of accidents'.

Routine inspection shall be sufficient to examine the full range of relevant environmental effects of the installation and shall be sufficient to determine not only whether permit conditions are complied with, but also whether the permit conditions are effective. This indicates that inspectors should consider why certain permit conditions have been applied and whether these are delivering what they are aimed at delivering (e.g. objectives in the local environment).

These inspection requirements bring a much more prescribed interaction with the Water Directives. A broad inspection plan should be informed by information on pressures from RBMPs, as should inspection programmes. Where the RBMPs identify concerns over pressures the water managers should, therefore, inform the IED competent authorities. Individual inspectors also need to liaise with water managers in preparing for, or subsequent to, individual inspections. If there are serious issues concerning an installation (whether compliant or not), the IED requires inspection to take account of these.

12.9 Conclusions

The IED is a major new development for IPPC competent authorities. It is not possible in this short Chapter to provide detailed analysis of the many changes that it introduces. Many of the critical issues concerning the interaction between IPPC and the Water Directives remain in place with the IED. Some aspects of the scope of the installation and application of BAT might make some changes in a few instances. However, it is with regard to inspection and enforcement that the most explicit change can be seen. IPPC permits have now largely been issued (although whether to the right standard in all cases is debatable), so that the focus in the IED has naturally moved to include enforcement. That this has not simply required an assessment of permit compliance, but requires a consideration of interaction with the environment, is significant. This, therefore, presents a key challenge to inspection authorities.

13. CHALLENGES TO AUTHORITIES AND GENERAL CONCLUSIONS

13.1 Overview of interactions

The preceding chapters of this report have explored the interactions between Directives from different perspectives – individual interactions, IPPC regulatory cycle and river basin planning cycle. Figure 10 Error! Reference source not found. brings together some of these key interactions from the core objective of delivering environmental protection of waters. This objective is the primary goal of the WFD, supported by the EQS Directive and GWD and is part of the general IPPC Directive objective of achieving a high level of protection of the environment as a whole.

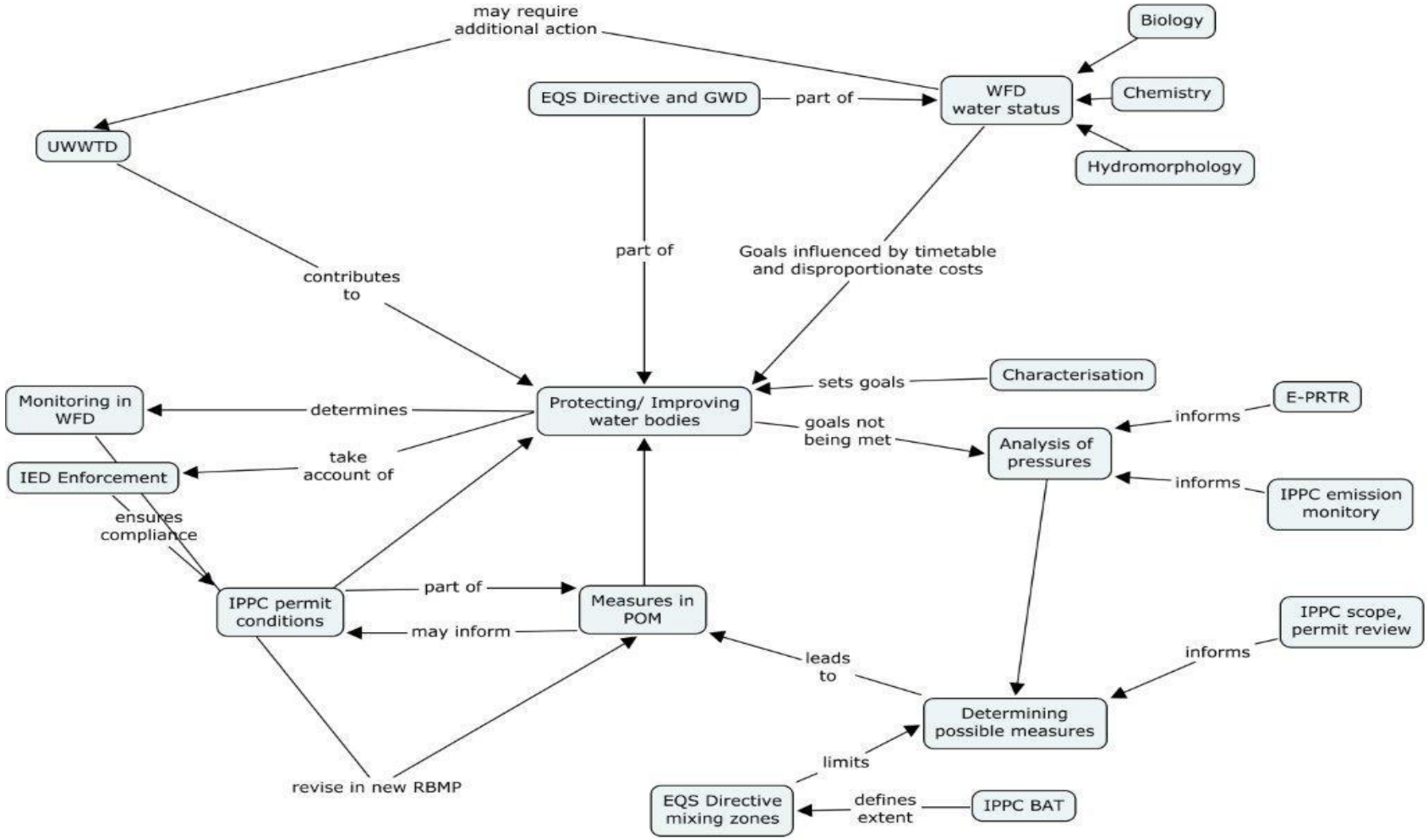
It can be seen that objective setting for waters is the province of the WFD, supported by the EQS Directive and GWD. However, actions to deliver these objectives are partially delivered through implementation of IPPC and other Directives, such as the UWWTD. Implementation is not only about identifying action (i.e. permit conditions), but also effective enforcement. The latter role and its interaction with the WFD is enhanced by the IED. Actions are also supported by monitoring activities, which link to other instruments such as E-PRTR.

Objectives (e.g. mixing zones) and actions to be taken are also tempered by various criteria, notably the timetabling of the implementation of the various requirements and the need to take account of cost issues, etc.

Overall, there is a wide range of interactions that will occur, or that may occur, in implementing the Directives. These interactions have sometimes been interpreted by supporting guidance, but often are not.

Therefore, there are a number of challenges for each environmental manager in ensuring that they perform their own particular tasks and yet meet, or at least do not compromise, the requirements arising in other legislation. This Chapter explores these challenges, how authorities may respond and concludes with discussion of the implications of this work for the latter stages of this IMPEL project.

Figure 10. An overview of the key interactions between the Directives addressed in this study



13.2 Examining the challenges for competent authorities

The interactions described in this report present a wide number of challenges to the relevant competent authorities in the Member States. The challenges may be of different types:

- Legal uncertainty, e.g. due to inconsistencies between Directives and Regulations.
- The scope of interpretation of IPPC – that different approaches to this affect the nature of the challenge differently for different Member States.
- Spatial scale – that the Directives 'management units' are at different scales with challenges for integration between them.
- Defining obligations on installations – how to translate understanding of pressures on Good Chemical Status and GES to discharge requirements for permits.
- Cost issues – how to address the issues of disproportionate costs in the different Directives in an integrated way.
- Pollutants – do the different Directives address all of the pollutants of concern to the other Directives?
- Inspection and enforcement – how to take forward the IED obligation to consider environmental issues in enforcement activity.
- Timetabling – e.g. how to address the problem of the fact that the Directives have been implemented over non-complimentary timetables.
- Implementation timetables in Directives – addressing the deadlines faced by competent authorities in individual decision making.
- Monitoring and information – how the Directives have their own monitoring obligations and integrating these with the need for information transfer between different authorities.
- The opportunities and limitations of current and revised BREFs.
- The opportunities and limitations of the CIS Guidance documents.
- The value of guidance at a national level.

In examining these challenges, this report seeks to examine the questions:

- 'How to design permits that are both IPPC and WFD proof.
- How to design enforcement both IPPC and WFD proof.'

Therefore, before examining each of the challenges in turn, this Chapter examines what might be meant by permits or enforcement being both 'IPPC and WFD proof'.

13.3 The concept of WFD and IPPC proof permits

A core question at the heart of this project is how to ensure that the licensing and enforcement are both WFD and IPPC proof? What is meant by this? In the context of this study, such licensing/permitting applies only to those activities subject to both Directives. Operators, permitting and enforcement authorities all ought to be familiar with what is required for a permit to be 'IPPC proof' – in other words how to be compliant with the IPPC Directive. Operators (especially), but also regulators, want certainty in their planning.

Changing regulatory 'goal posts' is often bad for business and does not do much for the reputation of regulators. Ensuring that a permit or licence is robust with regard to the legal obligations relating to it is important.

Having said this, it has to be noted that, in a few Member States, IPPC permits have not be issued to all installations and, secondly, there is concern whether some permits that have been issued are compliant. This is a subject beyond the scope of the report. However, it is important to note that it should not be assumed that operators and competent authorities are all fully aware of permits being 'IPPC proof'.

Being 'WFD proof' presents more complex challenges. To begin with, it is necessary for the operator/competent authorities to know whether (and, if so, in what way) the installation may impact on surface and groundwaters. For some installations there is no obvious impact, while for others it is unclear and information about the installation and receiving waters is needed to address this. A permit will be 'WFD proof' if:

- There is no demonstrable interaction with surface and groundwaters.
- The interaction with surface and groundwaters does not affect any of the objectives set out in the Water Directives.

However, if the activities of the installation do affect the objectives set out in the Water Directives, it may still be 'WFD proof', for example:

- There is a problem in currently meeting water objectives, but future upgrades mean that Good Status will be achieved in 2021 or 2027.
- The application of a mixing zone under the EQS Directive means that no EQS is exceeded.
- Other exemptions apply.

Effectively, the permit conditions need to be consistent with the measures set out in the RBMP, which might result in a significant delay in achieving Good Status.

It is also important to note that other permit conditions are also needed to ensure that they are 'WFD proof'. In particular, monitoring obligations must be sufficient to meet the needs of the inventory of emissions under the EQS Directive. This ought to be addressed through IPPC monitoring and the E-PRTR, but monitoring gaps may occur which need to be addressed.

13.4 The concept of WFD and IPPC proof enforcement

Enforcement is a key process in delivering effective environmental control of regulated activities. The IPPC Directive requires Member States to ensure compliance, but provides little further information on how this to be done. The Recommendation on Minimum Criteria for Environmental Inspections provides more detailed guidance and this has formed a focus for much of IMPEL's work, including the current work in Doing the Right Things.

Enforcement activity may take one of two characters. It may either focus entirely on whether compliance with legal obligations has been met (and may include consideration of risks of future non-compliance) or it may also include some form of compliance promotion activity or

working with operators to consider wider environmental impacts not necessarily linked to their formal legal obligations in a permit.

For inspection or supervision activity focused simply on permit compliance, then the interaction with the WFD is indirect. Presuming the permit is 'WFD proof', then the enforcement activity would address compliance issues (are permit conditions met?), thereby delivering WFD objectives with regard to the installation. However, the inspector would simply be working to the conditions prescribed in the permit (for whatever reason they are included).

Where enforcement activity takes a broader view of installation activity, then it will bring up the opportunity to examine WFD issues that either were not addressed in permitting, or which were uncertain at the time. It is important to note that the forthcoming IED will require inspections to consider the effectiveness of permits and for inspection planning to consider environmental impacts. This provides a stronger link to the WFD. It is, therefore, important for inspectorates to begin to consider this enhanced role in preparation for the implementation of the IED.

WFD proof enforcement can, however, only take place with the proactive involvement of water managers. Monitoring results, or other information, may identify issues with an IPPC installation, and water managers should communicate this to both the IPPC permitting and inspection competent authorities. Simply relying on them to ask for the information may not be sufficient.

13.5 Integrated approach: challenge and opportunity

The IPPCD and WFD are both based on a fundamental principle – that integrated approaches to environmental management deliver better thought out and more cost effective approaches to environmental objectives. Both Directives also emphasise their integrating role with regard to EU law, acting as framework measures within which other legislation is to be integrated.

IPPC authorities and water managers ought to be familiar with such integrated approaches, such as examining multiple objectives and multiple pressures in the landscape of a river basin to deliver a more holistic approach to water management. However, this report has emphasised the need for even greater integration – between the site-based integrated assessments of IPPC regulation and the spatially-based integrated management of the WFD.

The following sections of this Chapter repeatedly refer to the need for collaboration between IPPC and WFD authorities on a range of different implementation issues. These are major integration challenges – some are higher level conceptual challenges, others simple challenges for communication between local staff. Failure to rise to these challenges is a major risk both to the implementation of IPPC and the WFD – the risk that permits are not IPPC and WFD 'proof'.

However, the effort to deliver such integration is also a major opportunity. Not only will authorities be more confident in their regulatory decisions, but the analysis and co-operative working will deliver better environmental outcomes and provide more robust decision making, which enhances relationships with stakeholders. Such integrated thinking is, therefore, a theme running through the remainder of this Chapter.

13.6 Legal consistency and interpretation

Drawing on the experience of IMPEL's work on better lawmaking and on practicability and enforceability of legislation, it is important to raise the issue of whether there are challenges arising from lack of legal consistency between the Directives covered in this report. IMPEL stresses such issues as a critical foundation for clear practical regulatory and environmental management activity.

In Chapter 2 it was noted that there are some minor differences in definitions and there is little change in these definitions with the new IED. However, the essential scope of what is meant by 'pollution', etc., probably has little practical consequence for the interaction between the Directives.

It is also important to note that the core regulatory (IPPC) or planning (WFD) frameworks do not show legal inconsistencies between the Directives.

Therefore, it is not thought that legal inconsistency is a challenge with regard to the interaction between the Directives. Note that this does not include consideration of legal clarity. A number of terms and concepts in the Directives have been criticised for lack of clarity. However, these are questions for how the individual Directives are implemented, which might bear on the interaction (e.g. what is an 'installation'?).

There is a risk that IPPC and water authorities interpret issues differently and, as a result, have different views on the appropriate ways forward and that stakeholders receive mixed messages. It can be seen that the legal texts to which these authorities work should not, in themselves, cause significant variations in interpretation. The guidance produced under the CIS, e.g. on exemptions and mixing zones, is also clear concerning the relative roles and interpretations of the Directives. Therefore, if there are differences in interpretation between authorities, this may have arisen through national interpretation of the legislation or simply through not allowing the EU law to challenge the pre-existing approaches that were found in some Member States.

13.7 The scope of interpretation of IPPC

The IPPC Directive has some flexibility in terms of what is, or is not, included in the scope of an 'installation' and, therefore, to what the objectives of IPPC apply. The definition of the scope may be set in national law or decided on a case by case basis. These are potential challenges to IPPC permitting authorities, but also are challenges in relation to the interaction with the WFD.

IPPC permitting authorities need, therefore, to consider whether any flexibility in deciding what is, or is not, included in the scope of an IPPC permit (whether in national guidance or on a case by case basis) includes a consideration of the potential benefits of including particular aspects of a process for meeting WFD and other water Directives' objectives. For example, would including manure spreading enable greater controls for water pollution? Note that

answers will vary between Member States depending on the availability and effectiveness of other regulatory regimes to meet the same objectives. This clearly requires co-operation between the relevant water and IPPC authorities.

13.8 Spatial scale and other spatial issues

The issue of scale as set out in Chapter 2 presents a significant challenge to competent authorities. The WFD effective units of scale are the river basin and the water body. The EQS Directive incorporates two scales – standards are viewed at the same scales as in the WFD – they form part of the objective setting. However, in tackling point sources, these are viewed at the installation scale. The IPPC Directive is largely focused on the scale of the installation.

Analyses at one scale need to be interpreted at another scale in order for effective implementation transfer to take place. Thus, if there is a problem in a water body, how does this translate to one point source emission? Also assessment of cost issues may be at different scales (see separate discussion in this Chapter). It is important for authorities to seek ways to transfer information between scales and determine what has to be known at a given scale, and what is simply convenient at that scale. It would be particularly useful, for example, for IMPEL members to identify cross-scale issues that they have found problematic and/or found solutions to address.

The spatial nature of river basin planning (see WFD Chapter) presents a further challenge for the relationship between water protection and IPPC regulation. Meeting water objectives requires a consideration of how pressures are changing across the landscape and, therefore, it may not be appropriate to view individual pressures in isolation. In developing measures to meet objectives, action may be required at some distance from where a problem is observed and may require actions on a number of different pressures across the landscape. This may mean that different options for different measures in different locations may need to be compared and contrasted (e.g. for cost-effectiveness). This presents a challenge for working with IPPC authorities which may view the relationship of an installation with the water environment as being more immediate.

13.9 Defining obligations on installations: linking water objectives to discharge controls

The critical interaction between the WFD and IPPC Directives is what does the WFD require with respect to controls on discharges (or other obligations) from installations? For the WFD, the issue of scale is important – translating objectives for ecological status of a water body into requirements for a localised point source of pollution. It may be necessary to have detailed research on the links between a discharge and an impact. Usually dispersion modelling will be required. For the EQS Directive, there will be additional methodological challenges if Member States adopt the option of using EQS based on biota or sediments, where the relationship with discharge concentrations is less clear than with a water quality EQS.

The challenge breaks down into a number of sub-challenges:

- Are the water objectives adequately demonstrably linked to specific pollutant concentrations of concern, whether derived from standards established under the EQSD and GWD or identified as important for individual water bodies by river basin authorities?
- Is there a demonstrable relationship between the pollutant concentrations (which may not be water column-based) and levels of point source discharge?
- Is the relative contribution of one source, compared to multiple sources, understood?
- Is there adequate monitoring information to justify these conclusions?
- Are the consequences of different process changes on changes to discharges understood?
- Are there other options for control?
- Which controls are more effectively enforced?
- Which options (between different pressures and for the individual installation) are cost-effective?

It is not known how important any or all of these (or other) issues is in setting permit conditions based on water objectives. This is clearly an important area for gathering experience from IMPEL members in this project and identifying good practice in addressing each of these questions.

13.10 Cost and economic issues

The costs of taking action are an issue affecting the measures to be adopted in both the IPPC Directive and WFD. The IED introduces increased flexibility in departing from the application of BAT based on disproportionate costs. The WFD allows, within certain criteria, the Article 4 objectives to be delayed due to disproportionate costs. The CIS Guidance 1 notes that assessment of cost issues is appropriate at water body or river basin level and this potentially establishes a mis-match with installation specific analysis.

The draft guidance on mixing zones, in considering reducing the extent of mixing zones beyond that achieved following the application of BAT, also refers to disproportionate costs as determining whether action may be taken.

There is, therefore, some consistency or comparability of approach between the Directives. However, it has to be stressed that none of the Directives defines what constitutes disproportionate costs, although Guidance has been published (see above). The use of disproportionate cost has been used by authorities, e.g. within the first RBMPs, but there has been no test in case law of whether the use of disproportionate cost is justified in all cases. It is possible that in some cases, the argument has not been well made.

In any case, the issue presents a major challenge to competent authorities. The draft guidance on mixing zones provides an example of an explicit link to cost issues in two Directives. However, how far do cost issues concerning an individual installation (IPPC) compare to cost issues for a water body (WFD), where the latter may need to weigh up the relative costs and benefits of different measures to meet the broader objectives.

There is a need for the water and IPPC competent authorities to work together to identify and compare the criteria used to determine disproportionate costs and how these are comparable

in each regulatory/management regime. Comparison of approaches between Member States would also be beneficial.

13.11 Specific pollutants

The Directives each prioritise specific pollutants in the measures that they adopt. For the EQS Directive and UWWTD the list of pollutants/priority substances is provided in the Directives. For IPPC, there is a list, but this is non-exhaustive. For the WFD, the analysis of the state of water bodies could identify a wide range of pollutants of concern through the analyses undertaken for each water body and specified in a River Basin Management Plan. It is also important to note that the IPPC Directive and WFD have a wide definition of 'pollution', including issues such as thermal discharges.

It is certainly possible that the pollutants of concern to one regulatory/management regime may not be obvious priorities in another regime. This is particularly the case where there are multiple sources of a pollutant. This presents a challenge to the competent authorities to communicate the pollutants to be addressed for their respective regimes. For example, water managers may need to highlight particular pollutants of concern so that IPPC permitting authorities ensure these are addressed as priorities in setting permit conditions. Note that identifying pollutants of concern may not involve changes to permit discharge ELVs, but could require changes to monitoring requirements in permits. Such a case involves the EQS Directive, as well as those identified regionally or nationally in River Basin Management Plans. The EQSD, for example, requires monitoring of discharges of the priority substances in the Directive, but it is not clear if IPPC operators that discharge such substances have comprehensive monitoring obligations in their permits in relation to all of these substances which they discharge.

13.12 Interpreting water objectives in IPPC permits

The objectives of the Water Directives concern specified pollutants, pollutants identified for individual water bodies, water use and other objectives. Any or all of these may be affected by the operation of an IPPC installation. These need to be interpreted in the permitting process for IPPC installations.

Thus IPPC permitting authorities, therefore, need to understand the environmental objectives arising from the Water Directives (locally and regionally, e.g. transboundary). This requires communication with water managers on the objectives and to consider whether particular installations, types of discharge, individual pollutants, water use, etc., are a potential risk and what might be appropriate to address these in permit conditions.

Where permit conditions may be required to meet the objectives of Water Directives that are 'beyond' BAT, consideration needs to be given to:

a. How well such permit conditions have been assessed in relation to meeting the water objectives.
b. Whether there is flexibility in the objectives, such as with regard to timetabling.
c. Whether other activities also threaten those objectives and, therefore, whether water managers might consider action on these issues as more cost effective.

d. The outcomes of tests of disproportionate costs for stricter permit conditions.

For the water manager, it is, therefore, important to undertake a clear analysis of which IPPC installations may cause pressures on water bodies – through direct point discharges to water (pollutants, heat, etc.), diffuse pollution and indirect discharges (e.g. via soil contamination, deposition of air pollutants, etc) and abstraction of water, etc. The inventory of pressures in a RBMP should include all pressures arising from IPPC installations. Water managers, therefore, need to understand clearly the performance of each relevant IPPC installation – including current performance, future predicted performance (e.g. as it upgrades to BAT) and consequences of non-compliance (e.g. history of non-compliant discharges). This requires close liaison with IPPC permitting and enforcement authorities – drawing on the pollution inventory (E-PRTR) and routine monitoring results, etc.

Water managers also need to understand the consequences of the pressures from IPPC installations on the status of the water bodies. Where there are concerns over water status, analysis of pollutant behaviour, consequences of abstraction, etc., may be needed. Water managers should work with IPPC permitting and enforcement authorities to benefit from any analysis undertaken during IPPC permitting and ensure the full range of installation performance is included in any analysis. Where such analyses show a potential for negative consequences arising from IPPC installation activity, this should be communicated to the IPPC permitting and enforcement authorities.

With regard to the EQSD specifically, it is important to have clear/precise information from water managers on any concerns over individual EQS (water, sediment and/or biota) in relevant water bodies for permitting authorities. Also, in any future consideration of reduction of the extent of mixing zones permitting authorities need to ensure that tests of disproportionate cost under the IPPC Directive are adequately taken into account.

Operators and permitting authorities should identify any substances potentially released from installations addressed by the EQS in the GWD and threshold values developed by water authorities and how far these are controlled by the application of BAT and whether any pollutants are at risk of showing a sustained upward trend. Permitting authorities should also discuss with water managers which discharges are small enough to be exempted from consideration from the GWD.

13.13 Carrying capacity and multiple pollutant sources

The discussion has focused on the relationship between an individual IPPC installation and specific objectives arising from the Water Directives, assuming that risks to those objectives arise from a single installation. However, in many cases it is likely either that:

- Risks to the objectives arise from the actions of a number of IPPC installations; and/or
- Risks to the objectives also arise from activities not regulated under IPPC.

This is not a unique situation for the water environment, but is of concern to those seeking to meet EU air limit values, for example in urban areas with multiple industrial and transport pollution sources.

In such cases the carrying capacity, for example, of a water body for a particular pollutant or pressure is around the objective established either by the Member State in a RBMP or derived from a standard in the EQSD or GWD. For existing or new installations, the question arises as to what is appropriate in terms of obligations for permit conditions?

To address the threat to water bodies from multiple sources requires a detailed assessment underlying the POM in a RBMP. At a minimum it should be assumed that IPPC installations will be required to operate to BAT. Indeed, if this is not the case, then improving installation performance ought to be a priority measure.

Where installations are operating to BAT, yet risks to objectives remain, then the guidance under the WFD (economics and exemptions) indicate that measures for different pressures (e.g. economic actors) should be assessed according to the cost effectiveness of those measures. This may indicate that taking action against other pressures may be of lower cost than seeking to take additional measures beyond BAT for IPPC installations.

It is also important to note that proposals to go 'beyond BAT' for IPPC installations will initiate tests for disproportionate costs, as described earlier. Where there is more than one installation involved in presenting a risk to water objectives, then cost-effectiveness analysis and tests of disproportionate costs would need to address the relative risks posed by those installations.

In a case where a water objective is just being met, for example, and all IPPC installations are clearly operating to BAT, but there is a proposal for a new installation that may threaten that objective, there are three options:

- That new measures are adopted against other non-IPPC activities that contribute to the threat (although justification to those affected may be difficult in some cases).
- That the new installation is required to go 'beyond BAT'.
- That the application is refused.

There does not seem to be a valid argument to allow for the water objective to be breached even though the new installation may be IPPC compliant, nor to argue for other installations to go 'beyond BAT' to allow for the new installation to be built.

13.14 Monitoring and information

All of the Directives included in this study include requirements for monitoring – of a process, discharges, water quality, biota, etc. In some cases the monitoring requirements are precise – IPPC operators should monitor for substances for which they have permit conditions; under the EQS Directive there should be monitoring for substances know to be of concern, etc. In other cases, the monitoring requirements are generalised, such as the nature of routine monitoring under the WFD.

However, all of these monitoring obligations have the potential for overlap. In some cases, the Directives make specific reference to monitoring in other Directives (e.g. drawing on E-PRTR data) and CIS guidance has referenced IPPC monitoring as a useful source of information for assessing pressures and contributing to WFD monitoring.

Of course, the type and frequency of monitoring under one regime may, or may not, be suitable for use within the monitoring/analytical processes of another regime. Therefore, care has to be taken simply to indicate that monitoring results can be integrated between regimes. However, there are clearly opportunities to do this from which competent authorities may benefit.

The challenge for competent authorities is, therefore, to ensure that monitoring information is made readily available across environmental management regimes and is in a form that can be used. If there is a mis-match between regimes of type or frequency of monitoring, this should be discussed between authorities. In some cases the nature of the monitoring may need to remain unchanged to meet the requirements of that regime, while in other cases flexibility may be possible.

Monitoring information from operators and general monitoring from water authorities should, therefore, be shared to maximise the value of each. Permitting authorities should, therefore, identify relevant emission and ambient monitoring requirements in permit conditions, not only to ensure compliance, but may also possibly to ensure a better understanding of the relationship between the installation and specific water objectives. Water managers would need to be involved in discussion on the latter to determine appropriate monitoring.

Monitoring of IPPC installations will, therefore, provide important information on pressures on water bodies and water managers should seek access to the results of such monitoring. Where there is concern over the activity of an IPPC installation, the water manager could discuss with the IPPC permitting authority the possibility for the installation operator to fund and undertake monitoring on the local environment to investigate impacts of the installation.

Where there is concern over an EQS (e.g. from the EQSD), operators/permitting authorities need to determine where monitoring information, modelling analysis, etc., is available to examine the relationship between installation activity and an EQS and where additional analysis needs to be developed/undertaken. Also where a mixing zone may need to be identified, permitting authorities need to identify clearly discharge levels consistent with BAT and work with water managers to determine whether this requires designation of a mixing zone and, if so, the extent of the designation. In order to achieve these objectives permitting authorities will need to work closely with water managers.

With regard to the GWD, permitting authorities should consider how monitoring obligations in permits can contribute to GWD monitoring requirements and ensure reported monitoring data are communicated to water managers.

13.15 Inspection and enforcement

Inspection and enforcement activity is critical to ensuring installations comply with permit conditions and, thereby, the requirements concerning permits within POMs are fulfilled. However, the IED introduces new challenges for competent authorities regarding enforcement. The IED requires inspection to take account of the impact of installations on the environment and not simply checking on compliance with permit conditions.

For some Member States, inspectors already take this broader approach, but for others this is a new departure. It may require examination of some of the issues considered during the

permitting process. It will involve working with water authorities to determine if installations are impacting on water bodies (whether in compliance with permit conditions or not). This not only requires inter-institutional relationships to be forged, but also requires additional time (and, therefore, resources). It should also be noted that additional feedback to permitting authorities may be needed if concerns are raised, thereby potentially triggering permit reviews.

Supervision and inspection authorities should, therefore, ensure not only that specific permit conditions are complied with (basic inspection), but also examine if the predicted consequences for water objectives are being met. Inspection authorities should consult with water managers for any concerns over incidents of non-compliance. The results of this inspection should result in a report on the findings on the appropriateness of permit conditions in meeting water objectives to permitting authorities in order to stimulate a permit review if necessary.

In examining the results of monitoring (routine or investigative), water managers should be ready to communicate to IPPC enforcement authorities any cases where the outputs of an IPPC installation are having an unexpected consequence for water bodies. This may be due to non-compliant behaviour (which requires inspection) or due to unforeseen behaviour of pollutants, etc., which might require a re-examination of operations and permit conditions.

With regard to the EQSD, supervision and inspection authorities should ensure not only that specific permit conditions are complied with (basic inspection), and also examine if the predicted consequences for EQS and extent of mixing zones are being met. Inspection authorities should consult with water managers for any concerns over incidents of non-compliance, unexpected pollutant behaviour, etc. Results of inspections should be communicated to permitting authorities (for potential permit review) and water managers (e.g. for review of mixing zones).

With regard to the GWD inspectors should discuss with water managers any concerns over the levels and trends of pollutants in groundwater to determine whether these represent non-compliant activity by installations or the need to consider a revision of permit conditions.

13.16 Transboundary issues

The IPPC Directive (Article 9(4)) requires that permits shall contain provisions on the minimization of long-distance or transboundary impacts. Such transboundary impacts may be local or distant from the installation, e.g. acid deposition. The nature of the impact of such transboundary effects is made more complex with the objectives established by the WFD and the measures to be adopted under them. Water bodies may cross frontiers or are used as frontiers. The WFD recognises this and encourages co-ordination of all aspects of WFD implementation across frontiers – from setting objectives to developing programmes of measures.

The challenge for water managers is to ensure that in assessing pressures transfrontier impacts are identified and the challenge for IPPC authorities is to ensure these are included in the assessments of environmental impact during permitting. This should involve discussions with water managers and IPPC authorities from the neighbouring Member State and specific mechanisms for such bilateral discussions should be established.

There are clearly likely to be challenges arising from conflicting views about achieving objectives on one side of a frontier and controlling pressures on the other side of a frontier. Mechanisms need to be established to address this, which may varying according to different bilateral relationships and structures. This may need to involve the Commission and/or international river Commissions.

13.17 The implementation timetables in Directives

The practical link between IPPC and the water Directives needs to take account of the relative implementation timetable of the Directives. Under IPPC all new installations needed IPPC permits from 23 October 2003 and all existing installations from 23 October 2007. In theory, therefore, all installations currently operating should have been issued with permits consistent with the requirements of the IPPC Directive. While many Member States have largely met this timetable, a number are behind (although most are now largely compliant). The key timetable elements of the WFD relevant to the interaction are:

- Characterisation of water bodies (characteristics, review of human impacts, economic analysis): October 2004
- Programmes of measures established: October 2009
- River basin management published: October 2009
- Programmes of measures made operational: October 2012

For the obligations on IPPC installations arising from the WFD, these ought to be set out in the programmes of measures. However, no operating installation ('existing' or 'new' under the IPPC Directive) should, by October 2009, be operating without a permit. Therefore, there is the potential for the WFD to identify issues that IPPC operators and permit writers have not identified as permits were issued. This presents a significant challenge to IPPC authorities in considering what is needed for permit reviews. With regard to Directive 2008/105/EC, transposition is not required until 13 July 2010. Therefore, no IPPC permits will have taken account of the obligations arising from the Directive.

There may be cases where IPPC permits are not actually compliant with the Directive (e.g. incorrect determination of BAT). In such cases any negative impacts on water bodies would provide an added pressure to deliver compliance. Water managers may, therefore, in certain cases question how compliant problematic installations may be.

Whether problems have arisen from this mis-match of the implementation timetables of the Directives remains to be identified and could form part of the collection of experience from IMPEL members in the project.

13.18 Implementation timetables in decision making

The specific timetables set out in Directives described above are not the only timetables that present a challenge. In particular, IPPC implementation has its own internal timetables, such as when permit applications have to be made, how quickly permits have to be determined by competent authorities and timetables to implement inspection plans. These are not prescribed in the Directive, but are common administrative practices.

Many of the interactions described in this report are not simple in character – identifying whether a discharge affects WFD objectives may be a complex analytical process. This can take time and be difficult to integrate into the administrative timetables. Some Member States have mechanisms to extend permit determination timetables in problematic cases and, therefore, water managers should indicate at an early stage to IPPC authorities if they consider that this may be the case.

A more fundamental problem can arise if the information necessary to examine interactions is poorly stored or difficult to make available. If operators or IPPC competent authorities ask questions to water managers that take time to answer because of how information is stored, then again there will be problems meeting administrative timetables. It would, therefore, be beneficial for IPPC and water authorities to discuss the types of information each needs, how it is presented, stored and made available in order to streamline this process.

Most administrative timetables are flexible to allow for difficult situations, but the challenge for authorities is to create systems that reduce these to a minimum. This can be achieved by IPPC and WFD authorities working together to identify what information exchange is needed and how each side can (or cannot) respond within reasonable time periods.

13.19 Practical points of process

The preceding sections have emphasised on numerous occasions the need for exchange of information between IPPC authorities and water managers. There is an initial need in determining if IPPC installations are an issue for water objectives and then, if they are an issue, a series of further interactions required in relation to setting mixing zones, permit conditions, monitoring, enforcement, permit revision, updating RBMPs, etc.

The mechanisms to deliver such interaction will vary significantly between Member States. In some cases the same authority is responsible for implementation of the IPPCD and WFD, etc.. In others there are separate authorities, some local, some national and sometimes more than one for each Directive. Each arrangement presents opportunities and constraints in implementation.

The WFD provides a strong basis for bringing interested parties together in river basin planning. Such a process should, therefore, be built upon in developing relationships between water and IPPC authorities. Where there are significant issues arising from IPPC installations, it may be appropriate to establish some form of formal liaison group between authorities. In other cases where problems are limited and localised, the interaction may be more ad hoc.

In any case both IPPC and water authorities need to develop clear guidance to relevant staff on the issues that may be relevant arising from the implementation of the Directives/Regulations addressed in this report and procedures for how to liaise with their partner authorities. A number of the interactions will occur at a local level and it is important that local inspectors/permitters and local water managers understand what needs to be done, low exemptions, etc., apply and how to work with each other.

13.20 The opportunities and limitations of current and revised BREFs.

It was seen in this report that the BREFs rarely examine the expected performance of installations from the perspective of the nature of the surrounding environment. The BREFs are largely technical assessments of BAT. Indeed, this is to be expected as they were developed out of the information exchange on BAT and through working groups with strong technical expertise.

Wherever the BREFs have detailed information on techniques that can result in BAT AELs, the focus is mostly on options for these techniques without reference to the receiving environment. However, where there is difficulty in considering a BAT AEL, or otherwise to determine what is required, more consideration is given to the surrounding environment to help identify appropriate techniques. This is clearly seen in the cooling water and animal unit BREFs. It is disappointing, however, that the economics and cross media BREF has not provided an examination of how to address environmental quality standards or other environmental objectives in IPPC permitting.

The BREFs are currently in the process of revision. It is likely that this revision will need to be revisted in the light of the new provisions of the IED (i.e. the formal adoption of BREFs). However, while it is not to be expected that all BREFs should examine general WFD (or other water) interactions, it is recommended that the revision of the economics and cross media BREF should take the opportunity to expand its scope to consider the interaction with environmental objectives set out in EU law (not only from the WFD). This would add great value to the BREF and support IPPC implementation and, not least, expand on the understanding of the practical application of the optimisation of impacts across the different media.

13.21 Guidance under the CIS

The implementation of the WFD (and supporting Directives) has stimulated the development of an extensive range of guidance documents to support analysis and implementation of a range of elements.

The CIS guidance has generally been good at exploring some of the interactions between Directives (notably the WFD and GWD). However, the guidance has generally given only cursory notice of the IPPC Directive and has certainly not explored the nature of the interaction between the Directives.

The draft guidance on mixing zones under the EQS Directive is an important exception to this and explores a range of issues from determining the relationship between the extent of mixing zones and BAT and the issue of disproportionate costs. It is, therefore, a useful model for guidance on other areas of interaction with the WFD.

Overall, it is perhaps surprising that interaction between Directives has not been explored further in the CIS guidance. This is not limited to IPPC. For example, there could be further exploration of the interaction with Natura 2000.

It is not clear whether or when any CIS guidance will be updated. Such updates would, at least, await experience from implementation of the first RBMPs. If, or when, such updates

are produced it is recommended that they address the issue of interactions with wider EU environmental law, including the IPPC Directive/IED in more detail, building on the experience of these interactions in the Member States and identifying best practice.

13.22 National/regional guidance

The above discussion has focused on the nature of guidance produced at EU level. Many national authorities produce guidance supporting the implementation of IPPC aimed at providing operators with greater clarity and certainty about what is required. Where such guidance is produced, it is important that it is clear about the obligations on operators to examine the impacts of their installations on the surrounding environment. Such guidance ought to consider key issues relating to the Water Directives and support operators in directing them to the issues to consider and information sources to consult.

The implementation of the WFD and EQS Directive provides far greater detail about particular environments and water managers could assist in developing guidance for IPPC operators (and others) relevant to different water bodies – what are the local issues and how to take them into account?

Developing such guidance is a challenge to competent authorities. However, without such guidance, operators may submit permit applications which lack sufficient information to assess their impact and this would result either in additional time and costs to applicants in completing the information and/or additional time for permitting authorities to address the problems that arise. It would not be necessary for guidance to be produced for every conceivable circumstance, but significant categories of installation or significantly sensitive water bodies could be subject to a focus for the production of such guidance.

13.23 Conclusions for the IMPEL project

This report has sought to explore the widely different interactions between the Directives which form the scope of the IMPEL project. It has identified interactions which seem clear (at least on some levels) and others which are open to considerable debate. It has also (very briefly) touched on Member State experience in describing interactions in RBMPs.

This IMPEL project continues through the collection of views and experience of interaction between the Directives from IMPEL members, seeking input from both IPPC regulators and water managers. This will take the form of a questionnaire distributed to IMPEL members, for example exploring the challenges identified in this Chapter. The questionnaire results will be collated and analysed and form the basis (together with this report) of discussion at a workshop in 2011. This process will conclude with a report which will clarify the understanding of the nature of the interactions and identify the range of Member State experience in addressing those interactions. It will also seek to identify best practice at Member State level and make recommendations for IMPEL members and others as appropriate.

14. ANNEX I: BIBIOGRAPHY

14.1 Legislation

- Water Framework Directive: Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy [link]
- IPPC Directive: Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control [link]
- Environmental Quality Standard Directive: Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy [link]
- Directive 2006/118/EC on the protection of groundwater against pollution and deterioration [link]
- REACH Regulation: Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency [link]
- Urban Waste Water Treatment Directive: Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment [link]
- E PRTR Regulation: Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register [link]
- Proposal for a Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) (Recast) COM(2007) 844, 21.12.2007.
- Proposal for a Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) (Recast) – Approval of the final compromise text. Council of the European Union, 11226/10, 17 June 2010.

14.2 BREFs

- Chlor-Alkali Manufacturing Industry [link]
- Economics and Cross Media Effects [link]
- Industrial Cooling Systems [link]
- Intensive Rearing of Poultry and Pigs [link]
- Pulp and Paper Industry [link]
- Tanning of Hides and Skins [link]

14.3 CIS Guidance

- Guidance Number 1: Economics and the Environment - The Implementation Challenge of the Water Framework Directive [link]
- Guidance Number 3: Analysis of Pressures and Impacts [link]

- Guidance Number 7: Monitoring under the Water Framework Directive [link]
- Guidance Number 8: Public Participation in Relation to the Water Framework Directive [link]
- Guidance Number 11: Planning Processes [link]
- Guidance Number 15: Groundwater Monitoring (WG C) [link]
- Guidance Number 17: Guidance on Preventing or Limiting Direct and Indirect Inputs in the Context of the Groundwater Directive 2006/118/EC [link]
- Guidance Number 19: Surface water chemical monitoring [link]
- Guidance Number 20: Exemptions to the environmental objectives [link]

14.4 EPRTR

- European Commission's Guidance Document for the implementation of the European PRTR of 31 May 2006 [link]

14.5 REACH

- European Commission. REACH in Brief [link]

15. ANNEX II. TERMS OF REFERENCE FOR PROJECT

No	Name of project
	Linking the implementation of the Water Framework Directive to the implementation of the IPPC Directive. ***Phase 1, 2010*** ***Phase 2, 2011***

1. Scope

1.1. Background	The European Water Framework Directive (WFD) sets objectives for water quality and for ecology, which are to be realised in 2015. Basic principles in the directive are water management based on river basins and the "combined approach" of emission limit values and quality standards. Main instrument in the WFD is the River Basin Plan containing Programmes of measures to attain the goals on a river basin scale. The WFD requires emission controls, permits and/or best environmental practice for point and diffuse sources, such as industrial and agricultural emissions in to the water system. A progressive reduction of pollution from priority substances and cessation of emissions, discharges and losses of priority hazardous substances into the water system is required. The priority substances are to be added to the EU priority list (Directive 2008/105/EC). A distinction is made between the approach for priority substances (including the priority hazardous substances) and for dangerous substances in general. Priority substances and other dangerous substances relevant at the national or river basin level are to be incorporated in the river basin plans and the necessary measures. However, implementation of the measures for both types of substances in national legislation is the responsibility of the individual Member States. WFD refers in Article 10 to specific EU Directives. As a baseline Member States have to comply with emission controls, emission limit values and permitting set out in these directives. One of the directives is the IPPC directive (2008/1/EC).This directive requires EU Member States to regulate emissions to air, soil and water from certain large industrial and agricultural installations on a local scale by permitting and enforcement. The total number across EU is 52.000 installations. The IPPC-directive also requires a combined approach to achieve an high level of environmental protection. Emission limit values in permits must be set based on the best available techniques (BAT). The available BREF documents provide guidance on BAT for the different sectors controlled under IPPC. Where an EQS requires stricter conditions

	than those required by BAT additional measures are required in permit (article 10 IPPC dir.). Data on emissions have to be stored annually in the PRTR. However, also serious knowledge gaps exist on IPPC emissions and present reporting might be unsatisfactory. Therefore it requires improved IPPC implementation reporting and use of E-PRTR. Inventory of discharges, emissions and losses of priority substances are required by WFD daughter directive 2008/105/EC. Some Member States, such as France, have developed new web-applications (e.g. GIDAF) to collect data on industrial emissions and on groundwater and surface water quality in the proximity of industries. The local environmental conditions (environmental quality standards) must be taken into account. This local regulation must contribute to attaining the goals of the WFD. Hence, the WFD and the IPPC-directive are complementary. Permitting and enforcement will become more and more important for ensuring the realisation of WFD objectives for water quality and ecology for various water types. The river basin plan is an instrument to prevent the shifting off of problems on a basin scale. The WFD/IPPC permit regulates the emissions for installations on a local scale and not on a basin scale. This scale problem of instruments can result in shifting off of water quality problems and other effects to other water bodies, countries or authorities. In all circumstances, the conditions of the permit shall contain provisions on the minimisation of long distance or trans boundary pollution and ensure a high level of protection for the environment as a whole. As it is up to individual Member States to decide under WFD which measures are being used for achieving good water quality on the one hand, and on the other hand permission and controls of emissions from installations covered under IPPC directive will be important for achieving good water quality, it seems important that both tools, river basin management plans and inspection plans are synchronized to each other (beyond BAT) Determining BAT is becoming more common practice; the IPPC-office in Seville provides BAT reference documents. However there is no Community wide or other widely accepted approach or method for determining effects of emissions and the shifting off of problems in water systems. To analyse impacts no methods are prescribed and every country (or region) can use a different method. These different impact analyses can be contradictory and lead to competition between member states. This will not contribute to provide for a level playing field in this matter. IMPEL report on the inter-relationship of the IPPC Directive with other Directives (2006) stated the risk of the need for multiple

	permits at installations due to fact that environmental regulation is often the responsibility of a single regulatory authority. In other cases a number of regulatory authorities are responsible for the protection of individual environmental media or individual sectors. The report concluded also that there are some discrepancies between the directives. In summary: • How to ensure that the licensing and enforcement are both WFD and IPPC proof? • How can permits attribute to achieving both IPPC and WFD goals.
1.2. Link to MAWP and IMPEL's role and scope	Strategic Goal II - Improving methodologies Strategic Goal III - Development of good practices Learning from each other and showing results of our work, in particular for the inspection and permitting processes within the scope of the RBMP. Strategic Goal V - Providing feedback to policy makers It will also assist in the aim to "continue the activity of providing feedback to the Commission or EU Institutions on better legislation issues, gathering information on experience of implementing EU legislation". Strategic Goal VI - Promotion of IMPEL and dissemination of its products. In this case by programming a specific "Water project".
1.3. Objective(s)	The objectives of the project are: - To define the relationship (complementary and competition) between IPPC implementation and WFD implementation from the scope of permitting, enforcement and data collection. Also other relevant directives are taken into account e.g. priority substances directive (2008/106/EC) and urban waste water treatment directive (91/271/EC). - An inventory of problems and best practices in the member states, with regard to permitting, enforcement ,data collection and data collection systems. - Provide recommendations for competent authorities to contribute to better implementation and enforcement of the WFD requirements and the (reviewed) IPPC directive, to contribute to better performance of environmental inspections and permits in the Member States.

1.4. Definition	The project will be undertaken in two phases: • Phase 1 (2010): Study on the relationship between the IPPC directive, the WFD and other adjacent legislation. The conclusions of IMPELS report on the inter-relationship of the IPPC Directive with other Directives (2006) can provide a basis. • Phase 2 (2011): Identifying best practices through the use of a questionnaire and holding a workshop resulting in recommendation on the implementation of WFD and IPPC Directives
1.5. Product(s)	**Product Phase 1** Phase 1 will be concluded by a Phase 1 Report defining the relationship between IPPC and WFD from the scope of permitting and enforcement assembled by the member states point of view. **Product Phase 2** Phase 2 will be concluded by a Phase 2 Report containing: • best practices from IMPEL reps. of Member States on environmental permitting and enforcement to comply with the requirements of the IPPC directive and the Water Framework Directive. • recommendations for competent authorities to meet the requirements of both the WFD and IPPC directives.

2. Structure of the project

2.1. Participants	This project will be lead by the Netherlands (Water management Inspectorate) and Austria (Austria Lower Government). During the cluster 1 meeting in April 2009 and the general assembly several countries have indicated they want to participate in this project. It is important to have a core group of about 5 or 6 different countries, representing both northern and Mediterranean MS. For the gathering of the information and the workshop a large group of participants is required. (about 35 participants from all IMPEL members, and EC, including core team members). Participants are permit writers and inspectors involved in regulating industrial emissions (eg. both water and environment from one member state can add value). They need to be familiar with WFD and/or IPPC requirements. Experts in the field of priority substances, emission control, monitoring, and data

	management are welcomed. Also water/environmental managers with a more broad and integral view. Preferably in the composition of the team the various river basins should be represented.
2.2. Project team	Core team: - The Netherlands Water management Inspectorate, Florence EIZINGA and Henri EMOND. - The Environment Department of Administration of Lower Austria Government, Christof PLANITZER. - Min. three representatives from other member states (preferably a mix of people with a water background and people with an IPPC background). Also a geographical diversity (new/old MS, river basins) is desired.
2.3. Manager Executor	The Netherlands Water Management Inspectorate and the Environment Department of Administration of Lower Austria Government.
2.4. Reporting arrangements	- Progress reports to spring meetings of Cluster 1 and General Assembly - Draft final reports to autumn meetings of Cluster 1 and General Assembly
2.5 Dissemination of results/main target groups	The reports will be put on the IMPEL website and disseminated to the authorities in the Member States. The report will be sent to the relevant international bodies in the field of water and environmental regulation.

3. Resources required

3.1 Project costs	Phase 1, 2010 - Consultant conducting the study, writing the Phase 1 report ad drafting the questionnaire): €30,000 - 3 Meetings core group á 6 pax = 6 * 3 * (500 + 150) €11,700 *Total estimated costs 2010:* *€41,750* Phase 2, 2011 - Consultant writing the Phase 2 report: € 10,000 - Accommodation for the workshop participants (35 pax = 35 * 2 (nights) * 150 € 10,500

	- Travel costs: 35 * € 500 € 17,500 - Additional costs for meeting rooms, lunches and associated facilities € 5,000 - 2 Meetings core group á 6 pax = 6 * 2 * (500 + 150) = € 7,800 *Total estimated costs 2011:* *€50.800*
3.2. Fin. from Com.	All costs should to be covered by Life+.
3.3. Fin. from MS (and any other)	As an alternative the Netherlands Water Authority will finance the consultant.
3.4. Human from Com.	-

4. Quality review mechanisms

The quality of the final draft reports will be reviewed in Cluster 1. The draft reports will be reviewed by the core team.

5. Legal base

5.1. Directive/Regulation /Decision	- Directive 2008/1/EC (ex 96/61/EC of 24 September 1996) concerning integrated pollution prevention and control. - Proposal for a Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control. - Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. - Directive on Priority Substances (Directive 2008/105/EC) of the European Parliament and the Council on environmental quality standards in the field of water policy. - Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment.
5.2. Article and description	- WFD Article 10 - IPPC Articles 10 and 18
5.3 Link to the 6th EAP	More effective implementation and enforcement of environmental legislation is one of the priorities of the 6th EAP. Well-designed approaches to reconsideration of permits will support this.

6. Project planning

6.1. Approval	- Draft TOR will be discussed in cluster 1 (Brussels, September 2009)

	- TOR submitted for approval in the general assembly, Brussels, October 2009.
6.2. Fin. Contributions	-
6.3. Start	Phase 1: January 2010; Phase 2: January 2011
6.4 Milestones	**Phase 1, 2010:** - Core team (kick off) meeting: January 2010. - Tender procedure, February 2010. - Conducting study and writing Phase 1 Report by the consultant March – April 2010. - Assessment of draft Phase 1 Report by core team 1 June 2010. - Discussion of final draft Phase 1 Report in IMPEL cluster I, September 2010. - Adoption of Phase 1 Report in IMPEL GA, October 2010. - Core team meeting to prepare Phase 2: October 2010. - Drafting questionnaire by consultant, November 2010. **Phase 2, 2011:** - Circulate questionnaire: January 2011. - Consultant collects answers to questionnaire, carries out analysis and draft Phase 2 Report, March 2011. - Core team meeting to prepare Workshop and discuss draft Phase 2 Report: April 2011. - Workshop, May 2011. - Core team meeting to discuss final draft Phase 2 Report: June 2011. - Discussion of final draft Phase 2 Report in IMPEL cluster I, September 2011. - Adoption of Phase 2 Report in IMPEL GA, October 2011.
6.5 Product	See under 6.4
6.6 Adoption	See under 6.4

16. ANNEX II. ANNOTATED OVERVIEW OF KEY ARTICLES IN THE IPPC DIRECTIVE AND THEIR RELEVANCE TO THE WATER DIRECTIVES

Article No	Text	Relevance to Water Directives
Article 2(2)	2. 'pollution' means the direct or indirect introduction, as a result of human activity, of substances, vibrations, heat or noise into the air, water or land which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment;	The definition of pollution encompasses the main impacts that IPPC installations may have on the objectives of the Water Directives, including the discharge of substances and of heat. Therefore, as far as they can be, these pressures on water can be included in IPPC objectives relating to pollution control.
Article 2(3)	3. 'installation' means a stationary technical unit where one or more activities listed in Annex I are carried out, and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution;	The definition of installation has some flexibility in it. Importantly, directly associated activities should be included which may affect pollution, including pollution of concern to the Water Directives.
Article 2(5)	5. 'emission' means the direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in the installation into the air, water or land;	This has the same relevance as that for 'pollution'.
Article 2(6)	6. 'emission limit values' means the mass, expressed in terms of certain specific parameters, concentration and/or level of an emission, which may not be exceeded during one or more periods of time; emission limit values may also be laid down for certain groups, families or categories of substances, in particular for those listed in Annex III. The emission limit values for substances normally apply	Emission limit values are the key condition set out in permits. Importantly, they are set at the point of discharge and, therefore, interpreting which ELVs are necessary will (in addition to general determination of BAT) depend upon the behaviour of pollutants in water once discharged. Assessing the requirements for specific pollutants to meeting Water Directives' objectives will also require interpretation as ELVs for

	at the point where the emissions leave the installation, any dilution being disregarded when determining them; with regard to indirect releases into water, the effect of a water treatment plant may be taken into account when determining the emission limit values of the installation involved, provided that an equivalent level is guaranteed for the protection of the environment as a whole and provided this does not lead to higher levels of pollution in the environment, without prejudice to Directive 2006/11/*E*C or the Directives implementing it;	incorporation into the IPPC regulatory regime.
Article 2(7)	7. 'environmental quality standard' means the set of requirements which must be fulfilled at a given time by a given environment or particular part thereof, as set out in Community legislation;	Water Directives set out a range of environmental quality standards within the meaning of IPPC. These include the specific standards in the EQS Directive (and others) as well as the standard of good ecological status.
Article 2(9)	9. 'permit' means that part or the whole of a written decision (or several such decisions) granting authorisation to operate all or part of an installation, subject to certain conditions which guarantee that the installation complies with the requirements of this Directive. A permit may cover one or more installations or parts of installations on the same site operated by the same operator;	Permits set out the obligations on the installation. Any requirements on an installation necessary to meet the objectives of the Water Directives have to be set out in the permit.
Article 2(12)	12. 'best available techniques' means the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole: (a) 'techniques' shall include both the technology	BAT is elaborated in detail in the IPPC Directive. The EQS Directive also refers to the application of BAT to discharges, without further elaboration of the concept. Therefore, the IPPC Directive provides the interpretation of the concept. For IPPC installations the EQS Directive does not provide any additional requirement with regard to the interpretation of BAT. However, the EQS Directive does not limit its reference to BAT to IPPC installations. Therefore, the concept may be applied more widely, as necessary.

	used and the way in which the installation is designed, built, maintained, operated and decommissioned; (b) 'available techniques' means those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator; (c) 'best' means most effective in achieving a high general level of protection of the environment as a whole. In determining the best available techniques, special consideration should be given to the items listed in Annex IV;	The definition of BAT is both generalised for the sector and specific to the installation. However, it is not interpreted as driven by details of individual environmental objectives (e.g. a specific EQS). Thus the application of BAT should reduce impacts on the water environment, but may not be sufficient to meet water objectives.
Article 3	**General principles governing the basic obligations of the operator** 1. Member States shall take the necessary measures to provide that the competent authorities ensure that installations are operated in such a way that: (a) all the appropriate preventive measures are taken against pollution, in particular through application of the best available techniques; (b) no significant pollution is caused;… (e) the necessary measures are taken to prevent accidents and limit their consequences; (f) the necessary measures are taken upon definitive cessation of activities to avoid any pollution risk and return the site of operation to a satisfactory state. 2. For the purposes of compliance with this Article, it	The principles governing the basic obligations of the operator require that Member States consider a variety of potential impacts on the environment, e.g. 'no significant pollution', after site impacts, etc. There is no definition of 'significant', however. The Article does, however, refer 'in particular through the application' of BAT. This indicates that the application of BAT alone may not be sufficient to meet environmental objectives, including those established by the Water Directives.

	shall be sufficient if Member States ensure that the competent authorities take account of the general principles set out in paragraph 1 when they determine the conditions of the permit.	
Article 6 (1)(a)	**Applications for permits** 1. Member States shall take the necessary measures to ensure that an application to the competent authority for a permit includes a description of: (a) the installation and its activities;	Permit applications should contain a description of the installation and activities. These should be sufficient to lead to an understanding of potential impacts on the water environment.
Article 6 (1)(c)	(c) the sources of emissions from the installation;	Permit applications should contain a description of the sources of emissions. These should be sufficient to lead to an understanding of potential impacts on the water environment.
Article 6 (1)(e)	(e) the nature and quantities of foreseeable emissions from the installation into each medium as well as identification of significant effects of the emissions on the environment;	Permit applications should contain a description of the nature and quantities of emissions. These should be sufficient to lead to an understanding of potential impacts on the water environment. IPPC permit applications should also identify significant effects. These should include risks to meeting the objectives of the Water Directives. The information on emissions (if agreed in the permits) would form part of the assessment of pressures under the WFD and for the inventory of emissions (e.g. via E-PRTR) through the EQS Directive.
Article 6 (1)(f)	(f) the proposed technology and other techniques for preventing or, where this not possible, reducing emissions from the installation;	The proposed techniques for reducing emissions should address the risk of impacts to the water environment.
Article 6 (1)(i)	(i) measures planned to monitor emissions into the environment;	Measures to monitor emissions will be important in the monitoring of pressures within the monitoring plans under the WFD and monitoring obligations under the EQS Directive.
Article 7	**Integrated approach to issuing permits** Member States shall take the measures necessary to ensure that the conditions of, and procedure for the grant of, the permit are fully coordinated where more than one competent authority is involved, in order to	The IPPC Directive requires authorities issuing permits to co-ordinate permitting functions. This does not explicitly refer to authorities responsible for environmental management (e.g. separate water authorities). However, the principle of co-ordination should be built upon in integrating the objectives of the Water Directives into the

	guarantee an effective integrated approach by all authorities competent for this procedure.	permitting processes of IPPC.
Article 9 (1) to (3)	**Conditions of the permit** 1. Member States shall ensure that the permit includes all measures necessary for compliance with the requirements of Articles 3 and 10 for the granting of permits in order to achieve a high level of protection for the environment as a whole by means of protection of the air, water and land. 2. In the case of a new installation or a substantial change where Article 4 of Directive 85/337/EEC applies, any relevant information obtained or conclusion arrived at pursuant to Articles 5, 6 and 7 of that Directive shall be taken into consideration for the purposes of granting the permit. 3. The permit shall include emission limit values for polluting substances, in particular those listed in Annex III, likely to be emitted from the installation concerned in significant quantities, having regard to their nature and their potential to transfer pollution from one medium to another (water, air and land). If necessary, the permit shall include appropriate requirements ensuring protection of the soil and ground water and measures concerning the management of waste generated by the installation. Where appropriate, limit values may be supplemented or replaced by equivalent parameters or technical measures. For installations under point 6.6 in Annex I, emission limit values laid down in accordance with this paragraph shall take into account practical considerations appropriate to these categories of	Permits shall contain ELVs and, potentially, other conditions. The interactions indentified above in relation to permit applications equally apply in this case. ELVs shall be established for pollutants likely to be emitted in significant quantities. 'Significant' is not defined. However, any substances likely to result in any impact of concern to the Water Directives may be assumed to be significant.

	installation.	
Article 9 (4) to (8)	4. Without prejudice to Article 10, the emission limit values and the equivalent parameters and technical measures referred to in paragraph 3 shall be based on the best available techniques, without prescribing the use of any technique or specific technology, but taking into account the technical characteristics of the installation concerned, its geographical location and the local environmental conditions. In all circumstances, the conditions of the permit shall contain provisions on the minimisation of long-distance or transboundary pollution and ensure a high level of protection for the environment as a whole. 5. The permit shall contain suitable release monitoring requirements, specifying measurement methodology and frequency, evaluation procedure and an obligation to supply the competent authority with data required for checking compliance with the permit. For installations under point 6.6 in Annex I, the measures referred to in this paragraph may take account of costs and benefits. 6. The permit shall contain measures relating to conditions other than normal operating conditions. Thus, where there is a risk that the environment may be affected, appropriate provision shall be made for start-up, leaks, malfunctions, momentary stoppages and definitive cessation of operations. The permit may also contain temporary derogations from the requirements of paragraph 4 if a rehabilitation plan approved by the competent authority ensures that these requirements will be met within six months and	Permit conditions need, inter alia, to take account of local environmental conditions. These include the specific conditions and objectives of any receiving waters. Permits shall contain monitoring requirements. As stated above these monitoring obligations may contribute to, and may need to be adapted, to assist in the monitoring objectives of the Water Directives. Permit conditions also need to address not normal operating conditions. Such conditions may result in abnormal pollutant discharges and this need to be addressed. Permitting authorities need to consider transboundary impacts. Mechanisms for transboundary assessment and development of measures are promoted by the WFD and these should form the basis for consideration of transboundary impacts for many waters for IPPC installations. Member States have the option to use general binding rules. These may provide a standardised approach to delivering emission reductions. However, in individual cases objectives relating to the Water Directives may require an approach not consistent with the GBR and a bespoke permit may be required.

	if the project leads to a reduction of pollution. 7. The permit may contain such other specific conditions for the purposes of this Directive as the Member State or competent authority may think fit. 8. Without prejudice to the obligation to implement a permit procedure pursuant to this Directive, Member States may prescribe certain requirements for certain categories of installations in general binding rules instead of including them in individual permit conditions, provided that an integrated approach and an equivalent high level of environmental protection as a whole are ensured.	
Article 10	**Best available techniques and environmental quality standards** Where an environmental quality standard requires stricter conditions than those achievable by the use of the best available techniques, additional measures shall in particular be required in the permit, without prejudice to other measures which might be taken to comply with environmental quality standards.	This is a critical point of interaction with the Water Directives. These Directives set EQS and, therefore, permits must contain additional measures if the basic application of BAT is insufficient to meet them (or if other measures are not appropriate).
Article 12	**Changes by operators to installations** 1. Member States shall take the necessary measures to ensure that the operator informs the competent authorities of any planned change in the operation. Where appropriate, the competent authorities shall update the permit or the conditions. 2. Member States shall take the necessary measures to ensure that no substantial change planned by the operator is made without a permit issued in accordance with this Directive. The application for a permit and the decision by the competent authority must cover those parts of the installation and those	Changes to installations require a re-assessment of the installation and revision of a permit. Any changes likely to result in a changed impact on the water environment would, therefore, have to be taken account of, following the issues set out above.

	aspects listed in Article 6 that may be affected by the change. The relevant provisions of Article 3, Articles 6 to 10 and Article 15(1), (2) and (3) shall apply *mutatis mutandis*.	
Article 13	**Reconsideration and updating of permit conditions by the competent authority** 1. Member States shall take the necessary measures to ensure that competent authorities periodically reconsider and, where necessary, update permit conditions. 2. The reconsideration shall be undertaken in any event where: (a) the pollution caused by the installation is of such significance that the existing emission limit values of the permit need to be revised or new such values need to be included in the permit; (b) substantial changes in the best available techniques make it possible to reduce emissions significantly without imposing excessive costs; (c) the operational safety of the process or activity requires other techniques to be used; (d) new provisions of Community or national legislation so dictate.	The requirement to update permits is not precise. However, revision is to be undertaken if pollution is significant and if there are new provisions in Community legislation. For some installations the WFD and EQS Directives have been elaborated or adopted after permits have been determined. Therefore, these provisions may need to stimulate a reassessment of the impacts of those installations and a revision of the permits. Also the improved understanding of water bodies within the first river basin planning cycle may change the assessment of known pressures, as may information on monitoring of sources and concentrations under the EQS Directive. Thus, at this stage, reassessment of permit conditions may be needed.
Article 14	**Compliance with permit conditions** Member States shall take the necessary measures to ensure that: (a) the conditions of the permit are complied with by the operator when operating the installation; (b) the operator regularly informs the competent authority of the results of the monitoring of releases and without delay of any incident or accident significantly affecting the environment;	The IPPC Directive requires that compliance with permit conditions is complied with and monitoring is undertaken. This is an important process for ensuring installations meet their obligations established to protect the water environment.

	(c) operators of installations afford the representatives of the competent authority all necessary assistance to enable them to carry out any inspections within the installation, to take samples and to gather any information necessary for the performance of their duties for the purposes of this Directive.	
Article 18(1)	**Transboundary effects** 1. Where a Member State is aware that the operation of an installation is likely to have significant negative effects on the environment of another Member State, or where a Member State likely to be significantly affected so requests, the Member State in whose territory the application for a permit pursuant to Article 4 or Article 12(2) was submitted shall forward to the other Member State any information required to be given or made available pursuant to Annex V at the same time as it makes it available to its own nationals. Such information shall serve as a basis for any consultations necessary in the framework of the bilateral relations between the two Member States on a reciprocal and equivalent basis.	If assessment of pressures (or pollutant sources under the EQS Directive) indicates a transboundary impact, then this should be addressed within the permitting of the IPPC Directive.
Article 19(1) and (2)	**Community emission limit values** 1. Where the need for Community action has been identified, on the basis, in particular, of the exchange of information provided for in Article 17, the European Parliament and the Council, acting on a proposal from the Commission, shall set emission limit values, in accordance with the procedures laid down in the Treaty, for: (a) the categories of installations listed in Annex I except for the landfills covered by points 5,1 and 5,4	Community emission limit values are not widely set for water discharges (cases include the UWWT Directive, Waste Incineration Directive, Titanium Dioxide Directives). Those established under the Dangerous Substances Directive daughter Directives will be phased out as the EQS Directive is implemented. Indeed, during adoption of the EQS Directive the setting of ELVs for priority substances was rejected as it was considered that IPPC fulfils this role.

	of that Annex, and (b) the polluting substances referred to in Annex III. 2. In the absence of Community emission limit values defined pursuant to this Directive, the relevant emission limit values contained in the Directives listed in Annex II and in other Community legislation shall be applied as minimum emission limit values pursuant to this Directive for the installations listed in Annex I.	
Annex III	**Indicative List of the Main Polluting Substances to be Taken Into Account if they are Relevant for Fixing Emission Limit Values** **Water** 1. Organohalogen compounds and substances which may form such compounds in the aquatic environment. 2. Organophosphorus compounds. 3. Organotin compounds. 4. Substances and preparations which have been proved to possess carcinogenic or mutagenic properties or properties which may affect reproduction in or via the aquatic environment. 5. Persistent hydrocarbons and persistent and bioaccumulable organic toxic substances. 6. Cyanides. 7. Metals and their compounds. 8. Arsenic and its compounds. 9. Biocides and plant health products. 10. Materials in suspension. 11. Substances which contribute to eutrophication (in particular, nitrates and phosphates). 12. Substances which have an unfavourable influence	The indicative list of polluting substances for water effectively should include the priority substances listed under the EQS Directive as any significant discharge of any of these should be subject to an ELV.

	on the oxygen balance (and can be measured using parameters such as BOD, COD, etc.).	
Annex IV	Considerations to be taken into account generally or in specific cases when determining best available techniques, as defined in Article 2(12), bearing in mind the likely costs and benefits of a measure and the principles of precaution and prevention: 1. the use of low-waste technology; 2. the use of less hazardous substances; 3. the furthering of recovery and recycling of substances generated and used in the process and of waste, where appropriate; 4. comparable processes, facilities or methods of operation which have been tried with success on an industrial scale; 5. technological advances and changes in scientific knowledge and understanding; 6. the nature, effects and volume of the emissions concerned; 7. the commissioning dates for new or existing installations; 8. the length of time needed to introduce the best available technique; 9. the consumption and nature of raw materials (including water) used in the process and energy efficiency; 10. the need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it; 11. the need to prevent accidents and to minimise the consequences for the environment; 12. the information published by the Commission	This annex lists the issues to be considered in determining BAT. Most of these concern the nature of the techniques themselves. However, there is a condition related to the impact on the environment and risks to it. It is possible that the new conditions set out in the Water Directives affect the understanding of what this means.

	pursuant to Article 17(2), second subparagraph, or by international organisations.	

17. ANNEX III. ANNOTATED OVERVIEW OF KEY ARTICLES IN THE WFD DIRECTIVE AND THEIR RELEVANCE TO THE IPPC DIRECTIVE

Article No	Text	Relevance to IPPC
Article 1	Purpose The purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which: (a) prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems; (b) promotes sustainable water use based on a long-term protection of available water resources; (c) aims at enhanced protection and improvement of the aquatic environment, inter alia, through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and the cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances; (d) ensures the progressive reduction of pollution of groundwater and prevents its further pollution, and (e) contributes to mitigating the effects of floods and droughts	This Article sets out the main aims of the WFD. IPPC would contribute to the progressive reductions in emissions of priority substances and reduction in pollution of groundwater.
Article 2(17)	17. Surface water status is the general expression of the status of a body of surface water, determined by the poorer of its ecological status and its chemical status.	IPPC installations can affect surface water status (e.g. by abstraction) and, through discharges, chemical and ecological status.
Article 2(18)	18. Good surface water status means the status achieved by a surface water body when both its ecological status and its chemical status are at least "good".	Effective implementation of IPPC contributes to achieving good surface water status.
Article 2(22)	22. Good ecological status is the status of a body of surface water, so classified in accordance with Annex V.	Effective implementation of IPPC contributes to achieving GES.
Article 2(24)	24. Good surface water chemical status. means the chemical status required to meet the environmental objectives for surface waters established in Article 4(1)(a), that is the chemical status achieved by a body of surface water in which concentrations of pollutants do not exceed the environmental quality standards established in Annex IX and under Article 16(7), and under other relevant Community legislation setting	Achieving good chemical status and meeting EQS for priority substances will be in part delivered through control of discharges from IPPC installations.

	environmental quality standards at Community level.	
Article 2(31)	31. Pollutant means any substance liable to cause pollution, in particular those listed in Annex VIII.	IPPC controls the emissions of pollutants.
Article 2(33)	33. Pollution means the direct or indirect introduction, as a result of human activity, of substances or heat into the air, water or land which may be harmful to human health or the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems, which result in damage to material property, or which impair or interfere with amenities and other legitimate uses of the environment.	A similar initial definition to the IPPC Directive, although the WFD includes specific impacts on aquatic systems within the definition. The range of 'pollution' regulated by IPPC, therefore, should cover the range of 'pollution' of concern to the WFD.
Article 2(35)	35. Environmental quality standard means the concentration of a particular pollutant or group of pollutants in water, sediment or biota which should not be exceeded in order to protect human health and the environment.	IPPC installations should operate so as not to exceed an EQS (subject to any additional provisions).
Article 2(36)	36. Combined approach means the control of discharges and emissions into surface waters according to the approach set out in Article 10.	IPPC is based around the combined approach of emission controls and environmental objectives.
Article 2(40)	40. Emission limit values means the mass, expressed in terms of certain specific parameters, concentration and/or level of an emission, which may not be exceeded during any one or more periods of time. Emission limit values may also be laid down for certain groups, families or categories of substances, in particular for those identified under Article 16. The emission limit values for substances shall normally apply at the point where the emissions leave the installation, dilution being disregarded when determining them. With regard to indirect releases into water, the effect of a waste-water treatment plant may be taken into account when determining the emission limit values of the installations involved, provided that an equivalent level is guaranteed for protection of the environment as a whole and provided that this does not lead to higher levels of pollution in the environment.	Emission limit values are the key tool for regulation under IPPC, being established in permits and based on BAT.
Article 2(41)	41. Emission controls are controls requiring a specific emission limitation, for instance an emission limit value, or otherwise specifying limits or conditions on the effects, nature or other characteristics of an emission or operating conditions which affect emissions. Use of the term 'emission control' in this Directive in respect of the	IPPC permits may include a variety of emission controls, including ELVs, best practice, etc. Note the specific statement that this WFD definition of emission

	provisions of any other Directive shall not be held as reinterpreting those provisions in any respect.	controls is not to be interpreted for the use of the term in other Directives.
Article 3(4)	4. Member States shall ensure that the requirements of this Directive for the achievement of the environmental objectives established under Article 4, and in particular all programmes of measures are coordinated for the whole of the river basin district. For international river basin districts the Member States concerned shall together ensure this coordination and may, for this purpose, use existing structures stemming from international agreements. At the request of the Member States involved, the Commission shall act to facilitate the establishment of the programmes of measures.	The WFD requires the co-ordination of action to achieve its objectives. Note that this includes all programmes of measures. Therefore, the WFD obliges Member States to ensure that, for any POM that includes objectives for IPPC installations, there is co-ordination between IPPC competent authorities with other competent authorities responsible for other aspects of WFD implementation.
Article 4 (1)(a) and 4(1)(b)	Environmental objectives 1. In making operational the programmes of measures specified in the river basin management plans: (a) for surface waters (i) Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water, subject to the application of paragraphs 6 and 7 and without prejudice to paragraph 8; (ii) Member States shall protect, enhance and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water, with the aim of achieving good surface water status at the latest 15 years after the date of entry into force of this Directive, in accordance with the provisions laid down in Annex V, subject to the application of extensions determined in accordance with paragraph 4 and to the application of paragraphs 5, 6 and 7 without prejudice to paragraph 8; (iii) Member States shall protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential and good surface water chemical status at the latest 15 years from the date of entry into force of this Directive, in accordance with the provisions laid down in Annex V, subject to the application of extensions determined in accordance with paragraph 4 and to the application of paragraphs 5, 6 and 7 without prejudice to paragraph 8;	The environmental objectives are extensive, requiring water bodies to be protected, enhanced and restored as appropriate. These environmental objectives form the basis for determining measures, such as for IPPC installations. This includes the specific provisions for different types of water bodies, including artificial and HMWB.

	(iv) Member States shall implement the necessary measures in accordance with Article 16(1) and (8), with the aim of progressively reducing pollution from priority substances and ceasing or phasing out emissions, discharges and losses of priority hazardous substances without prejudice to the relevant international agreements referred to in Article 1 for the parties concerned; (b) for groundwater (i) Member States shall implement the measures necessary to prevent or limit the input of pollutants into groundwater and to prevent the deterioration of the status of all bodies of groundwater, subject to the application of paragraphs 6 and 7 and without prejudice to paragraph 8 of this Article and subject to the application of Article 11(3)(j); (ii) Member States shall protect, enhance and restore all bodies of groundwater, ensure a balance between abstraction and recharge of groundwater, with the aim of achieving good groundwater status at the latest 15 years after the date of entry into force of this Directive, in accordance with the provisions laid down in Annex V, subject to the application of extensions determined in accordance with paragraph 4 and to the application of paragraphs 5, 6 and 7 without prejudice to paragraph 8 of this Article and subject to the application of Article 11(3)(j); (iii) Member States shall implement the measures necessary to reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order progressively to reduce pollution of groundwater. Measures to achieve trend reversal shall be implemented in accordance with paragraphs 2, 4 and 5 of Article 17, taking into account the applicable standards set out in relevant Community legislation, subject to the application of paragraphs 6 and 7 and without prejudice to paragraph 8;	This provision again would be, in part and where relevant, contributed to by reduction and prevention of discharge of the priority substances from IPPC installations through appropriate permit conditions. Provisions for groundwaters emphasise more the prevention or limitation of inputs of pollutants and achieving good chemical status. This again would be, in part and where relevant, contributed to by reduction and prevention of discharge of pollutants from IPPC installations through appropriate permit conditions. This specific provision to reverse upward trends of pollutants may affect consideration of the environmental impacts of IPPC installations to ensure upward trends are not allowed.
Article 4(4)	4. The deadlines established under paragraph 1 may be extended for the purposes of phased achievement of the objectives for bodies of water, provided that no further deterioration occurs in the status of the affected body of water when all of the following conditions are met: (a) Member States determine that all necessary improvements in the status of bodies of water cannot reasonably be achieved within the timescales set out in that paragraph for at least one of the following reasons: (i) the scale of improvements required can only be achieved in phases exceeding the	The deadlines for meeting environmental objectives may be extended for the reasons given. Two conditions are particularly relevant to IPPC installations – that of technical feasibility and that of disproportionate cost. The use of such reasons would have to be set out in the RBMP.

	timescale, for reasons of technical feasibility; (ii) completing the improvements within the timescale would be disproportionately expensive; (iii) natural conditions do not allow timely improvement in the status of the body of water. (b) Extension of the deadline, and the reasons for it, are specifically set out and explained in the river basin management plan required under Article 13. (c) Extensions shall be limited to a maximum of two further updates of the river basin management plan except in cases where the natural conditions are such that the objectives cannot be achieved within this period. (d) A summary of the measures required under Article 11 which are envisaged as necessary to bring the bodies of water progressively to the required status by the extended deadline, the reasons for any significant delay in making these measures operational, and the expected timetable for their implementation are set out in the river basin management plan. A review of the implementation of these measures and a summary of any additional measures shall be included in updates of the river basin management plan.	Note that the WFD does not set out the basis for determining what would be 'disproportionately expensive'. Therefore, care should be taken to ensure that permitting decisions relying on this reason are fully justified as a challenge to such a decision that is upheld could result in unnecessary costs in some circumstances.
Article 4(5)	5. Member States may aim to achieve less stringent environmental objectives than those required under paragraph 1 for specific bodies of water when they are so affected by human activity, as determined in accordance with Article 5(1), or their natural condition is such that the achievement of these objectives would be infeasible or disproportionately expensive, and all the following conditions are met: (a) the environmental and socioeconomic needs served by such human activity cannot be achieved by other means, which are a significantly better environmental option not entailing disproportionate costs; (b) Member States ensure, for surface water, the highest ecological and chemical status possible is achieved, given impacts that could not reasonably have been avoided due to the nature of the human activity or pollution, for groundwater, the least possible changes to good groundwater status, given impacts that could not reasonably have been avoided due to the nature of the human activity or pollution;	This Article sets out further reasons why the general environmental objectives may not be achieved. Again reference is made to actions being 'disproportionately expensive' (again without clarification).

	(c) no further deterioration occurs in the status of the affected body of water; (d) the establishment of less stringent environmental objectives, and the reasons for it, are specifically mentioned in the river basin management plan required under Article 13 and those objectives are reviewed every six years.	
Article 4(6)	6. Temporary deterioration in the status of bodies of water shall not be in breach of the requirements of this Directive if this is the result of circumstances of natural cause or force majeure which are exceptional or could not reasonably have been foreseen, in particular extreme floods and prolonged droughts, or the result of circumstances due to accidents which could not reasonably have been foreseen, when all of the following conditions have been met: (a) all practicable steps are taken to prevent further deterioration in status and in order not to compromise the achievement of the objectives of this Directive in other bodies of water not affected by those circumstances; (b) the conditions under which circumstances that are exceptional or that could not reasonably have been foreseen may be declared, including the adoption of the appropriate indicators, are stated in the river basin management plan; (c) the measures to be taken under such exceptional circumstances are included in the programme of measures and will not compromise the recovery of the quality of the body of water once the circumstances are over; (d) the effects of the circumstances that are exceptional or that could not reasonably have been foreseen are reviewed annually and, subject to the reasons set out in paragraph 4(a), all practicable measures are taken with the aim of restoring the body of water to its status prior to the effects of those circumstances as soon as reasonably practicable, and (e) a summary of the effects of the circumstances and of such measures taken or to be taken in accordance with paragraphs (a) and (d) are included in the next update of the river basin management plan.	Temporary deterioration in status is allowed due to various natural conditions, flooding, etc., and due to accidents. It is the last point which is relevant to IPPC installations, which should consider accident management. The WFD requires that 'all practicable steps' are taken to prevent further deterioration. In this regard it should be expect that accident management plans for relevant IPPC installations should ensure that steps are taken to reduce impacts of accidents if they occur.
Article 5	Characteristics of the river basin district, review of the environmental impact of human activity and economic analysis of water use 1. Each Member State shall ensure that for each river basin district or for the portion of an international river basin district falling within its territory: • an analysis of its characteristics,	The assessment of characteristics of RBDs includes a review of the impact of human activity of water status. This review should include information on relevant impact of IPPC installations (discharges and/or water

	• a review of the impact of human activity on the status of surface waters and on groundwater, and • an economic analysis of water use is undertaken according to the technical specifications set out in Annexes II and III and that it is completed at the latest four years after the date of entry into force of this Directive. 2. The analyses and reviews mentioned under paragraph 1 shall be reviewed, and if necessary updated at the latest 13 years after the date of entry into force of this Directive and every six years thereafter.	use). This analysis should be reviewed for each subsequent RBMP. Therefore, information from the IPPC permitting process and subsequent monitoring, reporting and inspection will be relevant.
Article 6	Register of protected areas 1. Member States shall ensure the establishment of a register or registers of all areas lying within each river basin district which have been designated as requiring special protection under specific Community legislation for the protection of their surface water and groundwater or for the conservation of habitats and species directly depending on water. They shall ensure that the register is completed at the latest four years after the date of entry into force of this Directive. 2. The register or registers shall include all bodies of water identified under Article 7(1) and all protected areas covered by Annex IV. 3. For each river basin district, the register or registers of protected areas shall be kept under review and up to date.	The WFD includes a register of protected areas. Requirements for protected areas arise from the legislation establishing those designations (e.g. Habitats Directive) and, therefore, any impacts of IPPC installations should already be considered from the interaction between those Directives and IPPC. However, the WFD provides an additional focus and forum for assessment and integration of measures within the RBMP.
Article 7	Waters used for the abstraction of drinking water 1. Member States shall identify, within each river basin district: • all bodies of water used for the abstraction of water intended for human consumption providing more than 10 m3 a day as an average or serving more than 50 persons, and • those bodies of water intended for such future use. Member States shall monitor, in accordance with Annex V, those bodies of water which according to Annex V, provide more than 100 m3 a day as an average. 2. For each body of water identified under paragraph 1, in addition to meeting the objectives of Article 4 in accordance with the requirements of this Directive, for surface water bodies including the quality standards established at Community level under Article 16, Member States shall ensure that under the water treatment regime applied, and in accordance with Community legislation, the resulting water will meet the	The provisions for drinking water protected areas are incorporated into the WFD and a similar relationship with IPPC as for other protected areas applies.

	requirements of Directive 80/778/EEC as amended by Directive 98/83/EC. 3. Member States shall ensure the necessary protection for the bodies of water identified with the aim of avoiding deterioration in their quality in order to reduce the level of purification treatment required in the production of drinking water. Member States may establish safeguard zones for those bodies of water.	
Article 8(1)	Monitoring of surface water status, groundwater status and protected areas 1. Member States shall ensure the establishment of programmes for the monitoring of water status in order to establish a coherent and comprehensive overview of water status within each river basin district: • for surface waters such programmes shall cover: (i) the volume and level or rate of flow to the extent relevant for ecological and chemical status and ecological potential, and (ii) the ecological and chemical status and ecological potential; • for groundwaters such programmes shall cover monitoring of the chemical and quantitative status, • for protected areas the above programmes shall be supplemented by those specifications contained in Community legislation under which the individual protected areas have been established.	Monitoring programmes should include the full range of elements of ecological and chemical elements. Monitoring will relate to the assessment of pressures and risk to water status and, therefore, in some cases will link to the monitoring of discharges and local environment of IPPC installations. Thus some harmonisation of monitoring approaches may be appropriate.
Article 9(1)	Recovery of costs for water services 1. Member States shall take account of the principle of recovery of the costs of water services, including environmental and resource costs, having regard to the economic analysis conducted according to Annex III, and in accordance in particular with the polluter pays principle. Member States shall ensure by 2010 • that water-pricing policies provide adequate incentives for users to use water resources efficiently, and thereby contribute to the environmental objectives of this Directive, • an adequate contribution of the different water uses, disaggregated into at least industry, households and agriculture, to the recovery of the costs of water services, based on the economic analysis conducted according to Annex III and taking account of the polluter pays principle. Member States may in so doing have regard to the social, environmental and economic effects of the recovery as well as the geographic and climatic conditions of the region or	Industry is a specified sector which should provide ‘an adequate contribution’ to the recovery of costs of water services. It is not part of the IPPC Directive to require cost recovery of water use by industry, but the WFD provision may contribute to the requirement under IPPC to examine resource use by IPPC installation, which may include water use.

	regions affected.	
Article 10	The combined approach for point and diffuse sources 1. Member States shall ensure that all discharges referred to in paragraph 2 into surface waters are controlled according to the combined approach set out in this Article. 2. Member States shall ensure the establishment and/or implementation of: (a) the emission controls based on best available techniques, or (b) the relevant emission limit values, or (c) in the case of diffuse impacts the controls including, as appropriate, best environmental practices set out in: • Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control, • Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment, • Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources, • the Directives adopted pursuant to Article 16 of this Directive, • the Directives listed in Annex IX, • any other relevant Community legislation at the latest 12 years after the date of entry into force of this Directive, unless otherwise specified in the legislation concerned. 3. Where a quality objective or quality standard, whether established pursuant to this Directive, in the Directives listed in Annex IX, or pursuant to any other Community legislation, requires stricter conditions than those which would result from the application of paragraph 2, more stringent emission controls shall be set accordingly.	The WFD refers to the concept of the combined approach, an approach underlying the IPPC Directive. For emissions, the WFD refers to emission controls based on BAT. The WFD does not define BAT, nor cross-refer to the IPPC definition of BAT (although it may be appropriate to base action on development of BAT under IPPC). However, this does not add any requirement to IPPC installations – which are already required to apply BAT. The IPPC Directive is referred to, but with specific reference to diffuse pollution, which, if such pollution is a problem, should be addressed in IPPC permitting. The WFD makes clear that any quality objectives established by the WFD (e.g. GES) may require stricter conditions that required by other legislation, including IPPC. Thus simply applying ELVs, etc., based on BAT may not ensure compliance with the WFD.
Article 11(1) to 11(3)	Programme of measures 1. Each Member State shall ensure the establishment for each river basin district, or for the part of an international river basin district within its territory, of a programme of measures, taking account of the results of the analyses required under Article 5, in order to achieve the objectives established under Article 4. Such programmes of measures	The measures to be taken to meet the WFD objectives shall be set out in the POM. This shall include basic measures including those derived from other Community law, including IPPC.

	may make reference to measures following from legislation adopted at national level and covering the whole of the territory of a Member State. Where appropriate, a Member State may adopt measures applicable to all river basin districts and/or the portions of international river basin districts falling within its territory. 2. Each programme of measures shall include the basic measures specified in paragraph 3 and, where necessary, supplementary measures. 3. Basic measures. are the minimum requirements to be complied with and shall consist of: (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; (b) measures deemed appropriate for the purposes of Article 9; (c) measures to promote an efficient and sustainable water use in order to avoid compromising the achievement of the objectives specified in Article 4; (d) measures to meet the requirements of Article 7, including measures to safeguard water quality in order to reduce the level of purification treatment required for the production of drinking water; (e) controls over the abstraction of fresh surface water and groundwater, and impoundment of fresh surface water, including a register or registers of water abstractions and a requirement of prior authorisation for abstraction and impoundment. These controls shall be periodically reviewed and, where necessary, updated. Member States can exempt from these controls, abstractions or impoundments which have no significant impact on water status; (f) controls, including a requirement for prior authorisation of artificial recharge or augmentation of groundwater bodies. The water used may be derived from any surface water or groundwater, provided that the use of the source does not compromise the achievement of the environmental objectives established for the source or the recharged or augmented body of groundwater. These controls shall be periodically reviewed and, where necessary, updated; (g) for point source discharges liable to cause pollution, a requirement for prior regulation, such as a prohibition on the entry of pollutants into water, or for prior authorisation, or registration based on general binding rules, laying down emission	Therefore, measures adopted to control discharges from IPPC installations that contribute to meeting WFD objectives should be identified in the POM. Most point source discharges from IPPC installation will be routinely subject to permitting. Note that Article 10 is referred

	controls for the pollutants concerned, including controls in accordance with Articles 10 and 16. These controls shall be periodically reviewed and, where necessary, updated; (h) for diffuse sources liable to cause pollution, measures to prevent or control the input of pollutants. Controls may take the form of a requirement for prior regulation, such as a prohibition on the entry of pollutants into water, prior authorisation or registration based on general binding rules where such a requirement is not otherwise provided for under Community legislation. These controls shall be periodically reviewed and, where necessary, updated; (i) for any other significant adverse impacts on the status of water identified under Article 5 and Annex II, in particular measures to ensure that the hydromorphological conditions of the bodies of water are consistent with the achievement of the required ecological status or good ecological potential for bodies of water designated as artificial or heavily modified. Controls for this purpose may take the form of a requirement for prior authorisation or registration based on general binding rules where such a requirement is not otherwise provided for under Community legislation. Such controls shall be periodically reviewed and, where necessary, updated;	to, so this provision includes any stricter conditions that may be applied to IPPC installations (beyond BAT). For diffuse pollution relevant to IPPC control, again such measures should be included in the POM.
Article 11(4)	4. .Supplementary measures are those measures designed and implemented in addition to the basic measures, with the aim of achieving the objectives established pursuant to Article 4. Part B of Annex VI contains a non-exclusive list of such measures. Member States may also adopt further supplementary measures in order to provide for additional protection or improvement of the waters covered by this Directive, including in implementation of the relevant international agreements referred to in Article 1.	Supplementary measures probably do not apply to issues covered by direct IPPC permitting (these being basic measures). However, supplementary measures may be applicable to activities linked to IPPC installations, but which are not included in permitting and which might affect the operation of an IPPC installation (e.g. manure spreading from an intensive animal unit).
Article 11(5)	5. Where monitoring or other data indicate that the objectives set under Article 4 for the body of water are unlikely to be achieved, the Member State shall ensure that: • the causes of the possible failure are investigated, • relevant permits and authorisations are examined and reviewed as appropriate, • the monitoring programmes are reviewed and adjusted as appropriate, and • additional measures as may be necessary in order to achieve those objectives are	If monitoring indicates objectives are not to be achieved, the causes must be investigated. This might require investigation of problems arising from IPPC installations. As one appropriate response is to review permits, identifying a

	established, including, as appropriate, the establishment of stricter environmental quality standards following the procedures laid down in Annex V. Where those causes are the result of circumstances of natural cause or force majeure which are exceptional and could not reasonably have been foreseen, in particular extreme floods and prolonged droughts, the Member State may determine that additional measures are not practicable, subject to Article 4(6).	problem under the WFD could result in the initiation of a permit review process and could require the operator to review the impacts of their installation. Otherwise the investigation would be by a relevant competent authority. Understanding cause and effect may require IPPC and water management authorities to work together.
Article 13	River basin management plans 1. Member States shall ensure that a river basin management plan is produced for each river basin district lying entirely within their territory. 2. In the case of an international river basin district falling entirely within the Community, Member States shall ensure coordination with the aim of producing a single international river basin management plan. Where such an international river basin management plan is not produced, Member States shall produce river basin management plans covering at least those parts of the international river basin district falling within their territory to achieve the objectives of this Directive. 3. In the case of an international river basin district extending beyond the boundaries of the Community, Member States shall endeavour to produce a single river basin management plan, and, where this is not possible, the plan shall at least cover the portion of the international river basin district lying within the territory of the Member State concerned. 4. The river basin management plan shall include the information detailed in Annex VII. 5. River basin management plans may be supplemented by the production of more detailed programmes and management plans for sub-basin, sector, issue, or water type, to deal with particular aspects of water management. Implementation of these measures shall not exempt Member States from any of their obligations under the rest of this Directive. 6. River basin management plans shall be published at the latest nine years after the date of entry into force of this Directive. 7. River basin management plans shall be reviewed and updated at the latest 15 years after the date of entry into force of this Directive and every six years thereafter.	The RBMP is the ‘heart’ of the WFD setting out the problems for each water body and what needs to be done to achieve the relevant good status. This will include information relevant to IPPC relating to assessment of pressures and measures within the POM.

Article 16(1) and 16(2)	Strategies against pollution of water 1. The European Parliament and the Council shall adopt specific measures against pollution of water by individual pollutants or groups of pollutants presenting a significant risk to or via the aquatic environment, including such risks to waters used for the abstraction of drinking water. For those pollutants measures shall be aimed at the progressive reduction and, for priority hazardous substances, as defined in Article 2(30), at the cessation or phasing-out of discharges, emissions and losses. Such measures shall be adopted acting on the proposals presented by the Commission in accordance with the procedures laid down in the Treaty. 2. The Commission shall submit a proposal setting out a list of priority substances selected amongst those which present a significant risk to or via the aquatic environment. Substances shall be prioritised for action on the basis of risk to or via the aquatic environment	These provisions are directed to the EU institutions, not the Member States. Note that the adoption of the EQS Directive meets the second of these tasks. The interaction of the EQS Directive with IPPC is dealt with in Annex IV of this report.
Article 17(1) and 17(2)	Strategies to prevent and control pollution of groundwater 1. The European Parliament and the Council shall adopt specific measures to prevent and control groundwater pollution. Such measures shall be aimed at achieving the objective of good groundwater chemical status in accordance with Article 4(1)(b) and shall be adopted, acting on the proposal presented within two years after the entry into force of this Directive, by the Commission in accordance with the procedures laid down in the Treaty. 2. In proposing measures the Commission shall have regard to the analysis carried out according to Article 5 and Annex II.	Similarly to above, these provisions are directed to the EU institutions, not the Member States. Such strategies may have relevance to controls on individual pollutants. Measures taken forward under the new Groundwater Directive take forward protection of groundwaters.
Annex II 1.4 and 1.5	1.4. Identification of Pressures Member States shall collect and maintain information on the type and magnitude of the significant anthropogenic pressures to which the surface water bodies in each river basin district are liable to be subject, in particular the following. Estimation and identification of significant point source pollution, in particular by substances listed in Annex VIII, from urban, industrial, agricultural and other installations and activities, based, inter alia, on information gathered under: (i) Articles 15 and 17 of Directive 91/271/EEC; (ii) Articles 9 and 15 of Directive 96/61/EC; and for the purposes of the initial river basin management plan:	The identification of pressures requires information on the type and magnitude of the significant anthropogenic pressures specifically derived from information from the IPPC Directive. Therefore, this information must be available for river basin authorities (the availability of which should already be required by the IPPC Directive).

	(iii) Article 11 of Directive 76/464/EEC; and (iv) Directives 75/440/EC, 76/160/EEC (2), 78/659/EEC and 79/923/EEC. Estimation and identification of significant diffuse source pollution, in particular by substances listed in Annex VIII, from urban, industrial, agricultural and other installations and activities; based, inter alia, on information gathered under: (i) Articles 3, 5 and 6 of Directive 91/676/EEC; (ii) Articles 7 and 17 of Directive 91/414/EEC; (iii) Directive 98/8/EC; and for the purposes of the first river basin management plan: (iv) Directives 75/440/EEC, 76/160/EEC, 76/464/EEC, 78/659/EEC and 79/923/EEC. Estimation and identification of significant water abstraction for urban, industrial, agricultural and other uses, including seasonal variations and total annual demand, and of loss of water in distribution systems. Estimation and identification of the impact of significant water flow regulation, including water transfer and diversion, on overall flow characteristics and water balances. Identification of significant morphological alterations to water bodies. Estimation and identification of other significant anthropogenic impacts on the status of surface waters. Estimation of land use patterns, including identification of the main urban, industrial and agricultural areas and, where relevant, fisheries and forests. 1.5. Assessment of Impact Member States shall carry out an assessment of the susceptibility of the surface water status of bodies to the pressures identified above. Member States shall use the information collected above, and any other relevant information including existing environmental monitoring data, to carry out an assessment of the likelihood that surface waters bodies within the river basin district will fail to meet the environmental quality objectives set for the bodies under Article 4. Member States may utilise modelling techniques to assist in such an assessment. For those bodies identified as being at risk of failing the environmental quality objectives, further characterisation shall, where relevant, be carried out to optimise the design of both the monitoring programmes required under Article 8, and the	The assessment of impact includes assessment of the susceptibility of water status to pressures specifically arising from IPPC installations. This may require new analysis, or information already obtained during the permitting process, including modelling.

	programmes of measures required under Article 11.	
Annex II 2.3,2.4 and 2.5	2.3. Review of the impact of human activity on groundwaters For those bodies of groundwater which cross the boundary between two or more Member States or are identified following the initial characterisation undertaken in accordance with paragraph 2.1 as being at risk of failing to meet the objectives set for each body under Article 4, the following information shall, where relevant, be collected and maintained for each groundwater body: (a) the location of points in the groundwater body used for the abstraction of water with the exception of: • points for the abstraction of water providing less than an average of 10 m3 per day, or, • points for the abstraction of water intended for human consumption providing less than an average of 10 m3 per day or serving less than 50 persons, (b) the annual average rates of abstraction from such points, (c) the chemical composition of water abstracted from the groundwater body, (d) the location of points in the groundwater body into which water is directly discharged, (e) the rates of discharge at such points, (f) the chemical composition of discharges to the groundwater body, and (g) land use in the catchment or catchments from which the groundwater body receives its recharge, including pollutant inputs and anthropogenic alterations to the recharge characteristics such as rainwater and run-off diversion through land sealing, artificial recharge, damming or drainage. 2.4. Review of the impact of changes in groundwater levels Member States shall also identify those bodies of groundwater for which lower objectives are to be specified under Article 4 including as a result of consideration of the effects of the status of the body on: (i) surface water and associated terrestrial ecosystems (ii) water regulation, flood protection and land drainage (iii) human development. 2.5. Review of the impact of pollution on groundwater quality Member States shall identify those bodies of groundwater for which lower objectives are to be specified	The review of impact on groundwaters includes information on chemical discharges to groundwater. This may include relevant information from IPPC installations.

	under Article 4(5) where, as a result of the impact of human activity, as determined in accordance with Article 5(1), the body of groundwater is so polluted that achieving good groundwater chemical status is infeasible or disproportionately expensive.	
Annex III	ECONOMIC ANALYSIS The economic analysis shall contain enough information in sufficient detail (taking account of the costs associated with collection of the relevant data) in order to: (a) make the relevant calculations necessary for taking into account under Article 9 the principle of recovery of the costs of water services, taking account of long term forecasts of supply and demand for water in the river basin district and, where necessary: • estimates of the volume, prices and costs associated with water services, and • estimates of relevant investment including forecasts of such investments; (b) make judgements about the most cost-effective combination of measures in respect of water uses to be included in the programme of measures under Article 11 based on estimates of the potential costs of such measures.	The economic analysis, as stated in Article 9, includes specific consideration of industry as a sector.
Annex IV	PROTECTED AREAS 1. The register of protected areas required under Article 6 shall include the following types of protected areas: (i) areas designated for the abstraction of water intended for human consumption under Article 7; (ii) areas designated for the protection of economically significant aquatic species; (iii) bodies of water designated as recreational waters, including areas designated as bathing waters under Directive 76/160/EEC; (iv) nutrient-sensitive areas, including areas designated as vulnerable zones under Directive 91/676/EEC and areas designated as sensitive areas under Directive 91/271/EEC; and (v) areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites designated under Directive 92/43/EEC (1) and Directive 79/409/EEC (2). 2. The summary of the register required as part of the river basin management plan shall include maps indicating the location of each protected area and a description of the	This Annex lists the protected areas included in Article 6 and the interaction with IPPC is described above for that Article.

	Community, national or local legislation under which they have been designated.	
Annex V 1.3	1.3. Monitoring of ecological status and chemical status for surface waters The surface water monitoring network shall be established in accordance with the requirements of Article 8. The monitoring network shall be designed so as to provide a coherent and comprehensive overview of ecological and chemical status within each river basin and shall permit classification of water bodies into five classes consistent with the normative definitions in section 1.2. Member States shall provide a map or maps showing the surface water monitoring network in the river basin management plan. On the basis of the characterisation and impact assessment carried out in accordance with Article 5 and Annex II, Member States shall for each period to which a river basin management plan applies, establish a surveillance monitoring programme and an operational monitoring programme. Member States may also need in some cases to establish programmes of investigative monitoring. Member States shall monitor parameters which are indicative of the status of each relevant quality element. In selecting parameters for biological quality elements Member States shall identify the appropriate taxonomic level required to achieve adequate confidence and precision in the classification of the quality elements. Estimates of the level of confidence and precision of the results provided by the monitoring programmes shall be given in the plan. 1.3.1. Design of surveillance monitoring Objective Member States shall establish surveillance monitoring programmes to provide information for: supplementing and validating the impact assessment procedure detailed in Annex II, • the efficient and effective design of future monitoring programmes, • the assessment of long-term changes in natural conditions, and • the assessment of long-term changes resulting from widespread anthropogenic activity. The results of such monitoring shall be reviewed and used, in combination with the impact assessment procedure described in Annex II, to determine requirements for monitoring programmes in the current and subsequent river basin management plans.	Monitoring networks under the WFD should provide a coherent and comprehensive overview of ecological and chemical status. Where there is any concern arising from IPPC installations, this programme should therefore include monitoring relevant to those discharges, etc. Surveillance monitoring has to assess long-term changes from 'widespread' anthropogenic activity. This might not be deemed to apply to isolated IPPC installations, but some categories of IPPC installations might be considered to be 'widespread', such as intensive animal units in some areas.

	Selection of monitoring points Surveillance monitoring shall be carried out of sufficient surface water bodies to provide an assessment of the overall surface water status within each catchment or subcatchments within the river basin district. In selecting these bodies Member States shall ensure that, where appropriate, monitoring is carried out at points where: • the rate of water flow is significant within the river basin district as a whole; including points on large rivers where the catchment area is greater than 2 500 km2, • the volume of water present is significant within the river basin district, including large lakes and reservoirs, • significant bodies of water cross a Member State boundary, • sites are identified under the Information Exchange Decision 77/795/EEC, and • at such other sites as are required to estimate the pollutant load which is transferred across Member State boundaries, and which is transferred into the marine environment. Selection of quality elements Surveillance monitoring shall be carried out for each monitoring site for a period of one year during the period covered by a river basin management plan for: • parameters indicative of all biological quality elements, • parameters indicative of all hydromorphological quality elements, • parameters indicative of all general physico-chemical quality elements, • priority list pollutants which are discharged into the river basin or sub-basin, and • other pollutants discharged in significant quantities in the river basin or sub-basin, unless the previous surveillance monitoring exercise showed that the body concerned reached good status and there is no evidence from the review of impact of human activity in Annex II that the impacts on the body have changed. In these cases, surveillance monitoring shall be carried out once every three river basin management plans 1.3.2. Design of operational monitoring Operational monitoring shall be undertaken in order to: • establish the status of those bodies identified as being at risk of failing to meet their environmental objectives, and • assess any changes in the status of such bodies resulting from the programmes of	Surveillance monitoring is also to include priority substances which are discharged. Such monitoring is now also required under the EQS Directive and the interaction with IPPC in this regard is best considered in relation to the new Directive (see Annex IV of this report). Other pollutants may also be discharged from IPPC installations and, therefore, monitoring under the WFD may inform permit reviews or need to be integrated with IPPC monitoring activities. Operational monitoring is required where water bodies are at risk of failure to meet environmental objectives. In some cases discharges from IPPC installations may be

	measures. The programme may be amended during the period of the river basin management plan in the light of information obtained as part of the requirements of Annex II or as part of this Annex, in particular to allow a reduction in frequency where an impact is found not to be significant or the relevant pressure is removed. Selection of monitoring sites Operational monitoring shall be carried out for all those bodies of water which on the basis of either the impact assessment carried out in accordance with Annex II or surveillance monitoring are identified as being at risk of failing to meet their environmental objectives under Article 4 and for those bodies of water into which priority list substances are discharged. Monitoring points shall be selected for priority list substances as specified in the legislation laying down the relevant environmental quality standard. In all other cases, including for priority list substances where no specific guidance is given in such legislation, monitoring points shall be selected as follows: • for bodies at risk from significant point source pressures, sufficient monitoring points within each body in order to assess the magnitude and impact of the point source. Where a body is subject to a number of point source pressures monitoring points may be selected to assess the magnitude and impact of these • pressures as a whole, • for bodies at risk from significant diffuse source pressures, sufficient monitoring points within a selection of the bodies in order to assess the magnitude and impact of the diffuse source pressures. The selection of bodies shall be made such that they are representative of the relative risks of the occurrence of the diffuse source pressures, and of the relative risks of the failure to achieve good surface water status, • for bodies at risk from significant hydromorphological pressure, sufficient monitoring points within a selection of the bodies in order to assess the magnitude and impact of the hydromorphological pressures. The selection of bodies shall be indicative of the overall impact of the hydromorphological pressure to which all the bodies are subject. Selection of quality elements	the cause of such a risk. Therefore, integration of operational monitoring and IPPC monitoring and linking results of WFD monitoring with permit reviews may be desirable. The WFD is clear that such monitoring should be designed to assess the magnitude and impact of point and diffuse pollution sources.

	In order to assess the magnitude of the pressure to which bodies of surface water are subject Member States shall monitor for those quality elements which are indicative of the pressures to which the body or bodies are subject. In order to assess the impact of these pressures, Member States shall monitor as relevant: • parameters indicative of the biological quality element, or elements, most sensitive to the pressures to which the water bodies are subject, • all priority substances discharged, and other pollutants discharged in significant quantities, • parameters indicative of the hydromorphological quality element most sensitive to the pressure identified. 1.3.3. Design of investigative monitoring Objective Investigative monitoring shall be carried out: • where the reason for any exceedances is unknown, • where surveillance monitoring indicates that the objectives set out in Article 4 for a body of water are not likely to be achieved and operational monitoring has not already been established, in order to ascertain the causes of a water body or water bodies failing to achieve the environmental objectives, or • to ascertain the magnitude and impacts of accidental pollution, and shall inform the establishment of a programme of measures for the achievement of the environmental objectives and specific measures necessary to remedy the effects of accidental pollution.	Investigate monitoring is required where exceedence of quality objectives occurs, etc. This should integrate with monitoring and investigation under IPPC, as operators should determine any possible link between the activity of an installation and failure to meet an environmental objective laid down in EU law.
Annex V 2.4.1, 2.4.2	2.4. Monitoring of groundwater chemical status 2.4.1. Groundwater monitoring network The groundwater monitoring network shall be established in accordance with the requirements of Articles 7 and 8. The monitoring network shall be designed so as to provide a coherent and comprehensive overview of groundwater chemical status within each river basin and to detect the presence of long-term anthropogenically induced upward trends in pollutants. On the basis of the characterisation and impact assessment carried out in accordance with Article 5 and Annex II, Member States shall for each period to which a river basin management plan applies, establish a surveillance monitoring programme. The results of this programme shall be used to establish an	Groundwater monitoring networks under the WFD should provide a coherent and comprehensive overview of chemical status. Where there is any concern arising from IPPC installations, this programme should therefore include monitoring relevant to those discharges, etc.

	operational monitoring programme to be applied for the remaining period of the plan. Estimates of the level of confidence and precision of the results provided by the monitoring programmes shall be given in the plan. 2.4.2. Surveillance monitoring Objective Surveillance monitoring shall be carried out in order to: • supplement and validate the impact assessment procedure, • provide information for use in the assessment of long term trends both as a result of changes in natural conditions and through anthropogenic activity. Selection of monitoring sites Sufficient monitoring sites shall be selected for each of the following: • bodies identified as being at risk following the characterisation exercise undertaken in accordance with Annex II, • bodies which cross a Member State boundary.	
Annex V 2.4.3, 2.4.4	2.4.3. Operational Monitoring Objective Operational monitoring shall be undertaken in the periods between surveillance monitoring programmes in order to: • establish the chemical status of all groundwater bodies or groups of bodies determined as being at risk, • establish the presence of any long term anthropogenically induced upward trend in the concentration of any pollutant. Selection of monitoring sites Operational monitoring shall be carried out for all those groundwater bodies or groups of bodies which on the basis of both the impact assessment carried out in accordance with Annex II and surveillance monitoring are identified as being at risk of failing to meet objectives under Article 4. The selection of monitoring sites shall also reflect an assessment of how representative monitoring data from that site is of the quality of the relevant groundwater body or bodies. Frequency of monitoring Operational monitoring shall be carried out for the periods between surveillance monitoring programmes at a frequency sufficient to detect the impacts of relevant pressures but at a minimum of once per annum.	Operational monitoring is required where groundwater bodies are at risk of failure to meet environmental objectives. In some cases discharges from IPPC installations may be the cause of such a risk. Therefore, integration of operational monitoring and IPPC monitoring and linking results of WFD monitoring with permit reviews may be desirable. The WFD is clear that such monitoring should be designed to assess the magnitude and impact of point and diffuse pollution sources.

	2.4.4. Identification of trends in pollutants Member States shall use data from both surveillance and operational monitoring in the identification of long term anthropogenically induced upward trends in pollutant concentrations and the reversal of such trends. The base year or period from which trend identification is to be calculated shall be identified. The calculation of trends shall be undertaken for a body or, where appropriate, group of bodies of groundwater. Reversal of a trend shall be demonstrated statistically and the level of confidence associated with the identification stated.	
Annex VI	LISTS OF MEASURES TO BE INCLUDED WITHIN THE PROGRAMMES OF MEASURES PART A Measures required under the following Directives: (i) The Bathing Water Directive (76/160/EEC); (ii) The Birds Directive (79/409/EEC); (iii) The Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC); (iv) The Major Accidents (Seveso) Directive (96/82/EC); (v) The Environmental Impact Assessment Directive (85/337/EEC) (3); (vi) The Sewage Sludge Directive (86/278/EEC); (vii) The Urban Waste-water Treatment Directive (91/271/EEC); (viii) The Plant Protection Products Directive (91/414/EEC); (ix) The Nitrates Directive (91/676/EEC); (x) The Habitats Directive (92/43/EEC); (xi) The Integrated Pollution Prevention Control Directive (96/61/EC). PART B The following is a non-exclusive list of supplementary measures which Member States within each river basin district may choose to adopt as part of the programme of measures required under Article 11(4): (i) legislative instruments (ii) administrative instruments (iii) economic or fiscal instruments (iv) negotiated environmental agreements	The WFD lists measures that are to be included in the POMs. These include specific reference to the IPPC Directive. Supplementary measures may include: • emission controls • abstraction controls • efficiency and reuse measures, inter alia, promotion of water-efficient technologies in industry These types of controls may be included as conditions in IPPC permits or otherwise addressed during the permitting process.

	(v) emission controls (vi) codes of good practice (vii) recreation and restoration of wetlands areas (viii) abstraction controls (ix) demand management measures, inter alia, promotion of adapted agricultural production such as low water requiring crops in areas affected by drought (x) efficiency and reuse measures, inter alia, promotion of water-efficient technologies in industry and water-saving irrigation techniques	
Annex VII	RIVER BASIN MANAGEMENT PLANS A. River basin management plans shall cover the following elements: 1. a general description of the characteristics of the river basin district required under Article 5 and Annex II. This shall include: 1.1. for surface waters: • mapping of the location and boundaries of water bodies, • mapping of the ecoregions and surface water body types within the river basin, • identification of reference conditions for the surface water body types; 1.2. for groundwaters: • mapping of the location and boundaries of groundwater bodies; 2. a summary of significant pressures and impact of human activity on the status of surface water and groundwater, including: • estimation of point source pollution, • estimation of diffuse source pollution, including a summary of land use, • estimation of pressures on the quantitative status of water including abstractions, • analysis of other impacts of human activity on the status of water; 3. identification and mapping of protected areas as required by Article 6 and Annex IV; 4. a map of the monitoring networks established for the purposes of Article 8 and Annex V, and a presentation in map form of the results of the monitoring programmes carried out under those provisions for the status of: 4.1. surface water (ecological and chemical); 4.2. groundwater (chemical and quantitative); 4.3. protected areas;	RBMPs should include a number of elements that should draw upon information developed through the implementation of IPPC: • estimation of point source pollution, • estimation of diffuse source pollution, including a summary of land use, • estimation of pressures on the quantitative status of water including abstractions. The map of monitoring networks may also include reference to monitoring derived from IPPC. The summaries required in the RBMPs include information concerning IPPC installations, such as: • a summary of the economic analysis of water use;

	5. a list of the environmental objectives established under Article 4 for surface waters, groundwaters and protected areas, including in particular identification of instances where use has been made of Article 4(4), (5), (6) and (7), and the associated information required under that Article; 6. a summary of the economic analysis of water use as required by Article 5 and Annex III; 7. a summary of the programme or programmes of measures adopted under Article 11, including the ways in which the objectives established under Article 4 are thereby to be achieved; 7.1. a summary of the measures required to implement Community legislation for the protection of water; 7.2. a report on the practical steps and measures taken to apply the principle of recovery of the costs of water use in accordance with Article 9; 7.3. a summary of the measures taken to meet the requirements of Article 7; 7.4. a summary of the controls on abstraction and impoundment of water, including reference to the registers and identifications of the cases where exemptions have been made under Article 11(3)(e); 7.5. a summary of the controls adopted for point source discharges and other activities with an impact on the status of water in accordance with the provisions of Article 11(3)(g) and 11(3)(i); 7.6. an identification of the cases where direct discharges to groundwater have been authorised in accordance with the provisions of Article 11(3)(j); 7.7. a summary of the measures taken in accordance with Article 16 on priority substances; 7.8. a summary of the measures taken to prevent or reduce the impact of accidental pollution incidents; 7.9. a summary of the measures taken under Article 11(5) for bodies of water which are unlikely to achieve the objectives set out under Article 4; 7.10. details of the supplementary measures identified as necessary in order to meet the environmental objectives established; 7.11. details of the measures taken to avoid increase in pollution of marine waters in accordance with Article 11(6); 8. a register of any more detailed programmes and management plans for the river basin	• a summary of the programme or programmes of measures adopted under Article 11, including the ways in which the objectives established under Article 4 are thereby to be achieved; • a summary of the measures required to implement Community legislation [such as IPPC] for the protection of water; • a summary of the controls on abstraction and impoundment of water; • a summary of the controls adopted for point source discharges and other activities with an impact on the status of water in accordance. In the first revision of the RBMP, the report on progress towards achieving environmental objectives and reasons for failure may need to include reference to impacts of IPPC installations.

	district dealing with particular sub-basins, sectors, issues or water types, together with a summary of their contents; 9. a summary of the public information and consultation measures taken, their results and the changes to the plan made as a consequence; 10. a list of competent authorities in accordance with Annex I; 11. the contact points and procedures for obtaining the background documentation and information referred to in Article 14(1), and in particular details of the control measures adopted in accordance with Article 11(3)(g) and 11(3)(i) and of the actual monitoring data gathered in accordance with Article 8 and Annex V. B. The first update of the river basin management plan and all subsequent updates shall also include: 1. a summary of any changes or updates since the publication of the previous version of the river basin management plan, including a summary of the reviews to be carried out under Article 4(4), (5), (6) and (7); 2. an assessment of the progress made towards the achievement of the environmental objectives, including presentation of the monitoring results for the period of the previous plan in map form, and an explanation for any environmental objectives which have not been reached; 3. a summary of, and an explanation for, any measures foreseen in the earlier version of the river basin management plan which have not been undertaken; 4. a summary of any additional interim measures adopted under Article 11(5) since the publication of the previous version of the river basin management plan.	

18. ANNEX IV. ANNOTATED OVERVIEW OF KEY ARTICLES IN THE EQS DIRECTIVE AND THEIR RELEVANCE TO THE IPPC DIRECTIVE

Article No	Text	Relevance to IPPC
Article 2	**Definitions** For the purposes of this Directive, the definitions laid down in Article 2 of Directive 2000/60/EC shall apply.	The context for the application of the EQS Directive is the obligations and definitions of the WFD. Therefore, the core interactions between IPPC and the WFD remain in place for implementation of the EQS Directive.
Article 3(1)	**Environmental quality standards** 1. In accordance with Article 1 of this Directive and Article 4 of Directive 2000/60/EC, Member States shall apply the EQS laid down in Part A of Annex I to this Directive for bodies of surface water.	The water column EQS set out in the Directive are EQS as referred to by the IPPC Directive and, therefore, permit conditions should not allow for a breach in the EQS (subject to the provision on mixing zones – Article 4 below).
Article 3(2)	2. Member States may opt to apply EQS for sediment and/or biota instead of those laid down in Part A of Annex I in certain categories of surface water.	The need for IPPC installation emissions not to lead to a breach of an EQS applies equally to EQS set for sediments or biota. However, if Member States choose this option, the causal link between discharge from an IPPC installation and concentrations of a substance in sediments or biota is more difficult to determine than with the concentration of a substance in the water column.
Article 3(3)	3. Member States shall arrange for the long-term trend analysis of concentrations of those priority substances listed in Part A of Annex I that tend to accumulate in sediment and/or biota, giving particular consideration to substances numbers 2, 5, 6, 7, 12, 15, 16, 17, 18, 20, 21, 26, 28 and 30, on the basis of monitoring of water status carried out in	Long-term analysis of concentrations of substances is to be undertaken within the broader monitoring context of the WFD. Thus the interaction between monitoring under IPPC and the WFD remains relevant as well as the need for trend information to inform permit revision.

	accordance with Article 8 of Directive 2000/60/EC. They shall take measures aimed at ensuring, subject to Article 4 of Directive 2000/60/EC that such concentrations do not significantly increase in sediment and/or relevant biota. Member States shall determine the frequency of monitoring in sediment and/or biota so as to provide sufficient data for a reliable long-term trend analysis. As a guideline, monitoring should take place every three years, unless technical knowledge and expert judgment justify another interval.	
Article 4	**Mixing zones** 1. Member States may designate mixing zones adjacent to points of discharge. Concentrations of one or more substances listed in Part A of Annex I may exceed the relevant EQS within such mixing zones if they do not affect the compliance of the rest of the body of surface water with those standards. 2. Member States that designate mixing zones shall include in river basin management plans produced in accordance with Article 13 of Directive 2000/60/EC a description of: (a) the approaches and methodologies applied to define such zones; and (b) measures taken with a view to reducing the extent of the mixing zones in the future, such as those pursuant to Article 11(3)(k) of Directive 2000/60/EC or by reviewing permits referred to in Directive 2008/1/EC or prior regulations referred to in Article 11(3)(g) of Directive 2000/60/EC.	The practical application of mixing zones has some flexibility in the implementation of the EQS Directive and would allow for discharges from IPPC installations to lead to an EQS being exceeded within the mixing zone. However, authorities must ensure that the principles of proximity and proportionality are applied (although these are not defined). IPPC permit conditions would, therefore, need to respect these. The EQS Directive requires that BAT is applied (although this is already a requirement under IPPC). The EQS Directive includes provision for reduction in the extent of mixing zones over time. This implies a change to the level of discharges from IPPC installations and this would need to be taken account of within the permit conditions or review of permits, the latter being a specific measure that would need to be described with a RBMP.

	3. Member States that designate mixing zones shall ensure that the extent of any such zone is: (a) restricted to the proximity of the point of discharge; (b) proportionate, having regard to the concentrations of pollutants at the point of discharge and to the conditions on emissions of pollutants contained in the prior regulations, such as authorisations and/or permits, referred to in Article 11(3)(g) of Directive 2000/60/EC and any other relevant Community law, in accordance with the application of best available techniques and Article 10 of Directive 2000/60/EC, in particular after those prior regulations are reviewed.	
Article 5	**Inventory of emissions, discharges and losses** 1. On the basis of the information collected in accordance with Articles 5 and 8 of Directive 2000/60/EC, under Regulation (EC) No 166/2006 and other available data, Member States shall establish an inventory, including maps, if available, of emissions, discharges and losses of all priority substances and pollutants listed in Part A of Annex I to this Directive for each river basin district or part of a river basin district lying within their territory including their concentrations in sediment and biota, as appropriate. 2. The reference period for the estimation of pollutant values to be entered in the inventories referred to in paragraph 1 shall be one year between 2008 and 2010. However, for priority substances or pollutants	The inventory of discharges is primarily linked in the EQS Directive with the assessment of pressures within RBMPs under the WFD. However, it also includes emission information gathered according to E-PRTR, which includes significant emissions from IPPC installations. Authorities may need to review the information required on monitoring of discharges and their inclusion within E-PRTR to ensure that these meet all of the requirements for the inventory of emissions of substances included in the EQS Directive.

	covered by Directive 91/414/EEC, the entries may be calculated as the average of the years 2008, 2009 and 2010. 3. Member States shall communicate the inventories established pursuant to paragraph 1 of this Article, including the respective reference periods, to the Commission in accordance with the reporting requirements under Article 15(1) of Directive 2000/60/EC. 4. Member States shall update their inventories as part of the reviews of the analyses specified in Article 5(2) of Directive 2000/60/EC. The reference period for the establishment of values in the updated inventories shall be the year before that analysis is to be completed. For priority substances or pollutants covered by Directive 91/414/EEC, the entries may be calculated as the average of the three years before the completion of that analysis. Member States shall publish the updated inventories in their updated river basin management plans as laid down in Article 13(7) of Directive 2000/60/EC.	

19. ANNEX IV. ANNOTATED OVERVIEW OF KEY ARTICLES IN THE GROUNDWATER DIRECTIVE AND THEIR RELEVANCE TO THE IPPC DIRECTIVE

Article	Text	Relevance to IPPC
Article 1	1. This Directive establishes specific measures as provided for in Article 17(1) and (2) of Directive 2000/60/EC in order to prevent and control groundwater pollution. These measures include in particular: (a) criteria for the assessment of good groundwater chemical status; and (b) criteria for the identification and reversal of significant and sustained upward trends and for the definition of starting points for trend reversals. 2. This Directive also complements the provisions preventing or limiting inputs of pollutants into groundwater already contained in Directive 2000/60/EC, and aims to prevent the deterioration of the status of all bodies of groundwater.	The GWD is a daughter Directive of the WFD. It sets out specific measures to contribute towards objectives of the WFD and, therefore, actions taken under IPPC to contribute towards the objectives of the WFD should integrate the requirements of the GWD where these address groundwater protection.
Article 2	For the purposes of this Directive, the following definitions shall apply in addition to those laid down in Article 2 of Directive 2000/60/EC: 1) 'groundwater quality standard' means an environmental quality standard expressed as the concentration of a particular pollutant, group of pollutants or indicator of pollution in groundwater, which should not be exceeded in order to protect human health and the environment; 2) 'threshold value' means a groundwater quality standard set by Member States in accordance with Article 3; 3) 'significant and sustained upward trend' means any statistically and environmentally significant increase of concentration of a pollutant, group of pollutants, or indicator of pollution in groundwater for which trend reversal is identified as being necessary in accordance with Article 5; 4) 'input of pollutants into groundwater' means the direct or indirect introduction of pollutants into groundwater as a result of human activity; 5) 'background level' means the concentration of a substance or the value of an indicator in a body of groundwater corresponding to no, or only very minor, anthropogenic alterations to undisturbed conditions; 6) 'baseline level' means the average value measured at least during the reference	The definitions of the GWD compliment those of the WFD. They do not include definitions already included in IPPC. Groundwater standard is explicitly referred to as an EQS and, therefore, is an EQS as referred to by IPPC. Inputs of pollutants explicitly includes direct and indirect inputs. For IPPC this would therefore include not only direct discharges but also any indirect inputs, such as via surface waters, soil contamination (e.g. from storage facilities) or via atmospheric

	years 2007 and 2008 on the basis of monitoring programmes implemented under Article 8 of Directive 2000/60/EC or, in the case of substances identified after these reference years, during the first period for which a representative period of monitoring data is available.	emissions.
Article 3	1. For the purposes of the assessment of the chemical status of a body or a group of bodies of groundwater pursuant to Section 2.3 of Annex V to Directive 2000/60/EC, Member States shall use the following criteria: (a) groundwater quality standards as referred to in Annex I; (b) threshold values to be established by Member States in accordance with the procedure set out in Part A of Annex II for the pollutants, groups of pollutants and indicators of pollution which, within the territory of a Member State, have been identified as contributing to the characterisation of bodies or groups of bodies of groundwater as being at risk, taking into account at least the list contained in Part B of Annex II. The threshold values applicable to good chemical status shall be based on the protection of the body of groundwater in accordance with Part A, points 1, 2 and 3 of Annex II, having particular regard to its impact on, and interrelationship with, associated surface waters and directly dependent terrestrial ecosystems and wetlands and shall *inter alia* take into account human toxicology and ecotoxicology knowledge. 2. Threshold values can be established at the national level, at the level of the river basin district or the part of the international river basin district falling within the territory of a Member State, or at the level of a body or a group of bodies of groundwater. 3. Member States shall ensure that, for bodies of groundwater shared by two or more Member States and for bodies of groundwater within which groundwater flows across a Member State's boundary, the establishment of threshold values is subject to coordination between the Member States concerned, in accordance with Article 3(4) of Directive 2000/60/EC. 4. Where a body or a group of bodies of groundwater extends beyond the territory of the Community, the Member State(s) concerned shall endeavour to establish threshold values in coordination with the non-Member State(s) concerned, in	Annex I includes the quality standards referred to above and to be addressed by IPPC where relevant. The threshold values are to be developed by Member States and, therefore, this Article sets out details of how these are to be developed. Although these are to be developed by Member States, their purpose is to meet WFD objectives and, therefore, should still be drivers for consideration in IPPC permit determinations. For transboundary waters Member States must co-ordinate the setting of threshold values. These values should still meet the objectives of the WFD for those water bodies and the impacts of relevant IPPC installations may need to consider transboundary effects.

	accordance with Article 3(5) of Directive 2000/60/EC. 5. Member States shall establish threshold values pursuant to paragraph 1(b) for the first time by 22 December 2008. All threshold values established shall be published in the river basin management plans to be submitted in accordance with Article 13 of Directive 2000/60/EC, and including a summary of the information set out in Part C of Annex II to this Directive. 6. Member States shall amend the list of threshold values whenever new information on pollutants, groups of pollutants, or indicators of pollution indicates that a threshold value should be set for an additional substance, that an existing threshold value should be amended, or that a threshold value previously removed from the list should be re-inserted, in order to protect human health and the environment. Threshold values can be removed from the list when the body of groundwater concerned is no longer at risk from the corresponding pollutants, groups of pollutants, or indicators of pollution. Any such changes to the list of threshold values shall be reported in the context of the periodic review of the river basin management plans. 7. The Commission shall publish a report by 22 December 2009 on the basis of the information provided by Member States in accordance with paragraph 5.	One of the triggers for reviewing, or adding to, the threshold values is identifying new pollutants posing a risk to groundwaters. This might arise from monitoring information from IPPC installations (although pollutants at risk are likely to be identified through groundwater monitoring, etc.).
Article 4	**Procedure for assessing groundwater chemical status** 1. Member States shall use the procedure described in paragraph 2 to assess the chemical status of a body of groundwater. Where appropriate, Member States may group bodies of groundwater in accordance with Annex V to Directive 2000/60/EC when carrying out this procedure. 2. A body or a group of bodies of groundwater shall be considered to be of good chemical status when: (a) the relevant monitoring demonstrates that the conditions set out in Table 2.3.2 of Annex V to Directive 2000/60/EC are being met; or (b) the values for the groundwater quality standards listed in Annex I and the relevant threshold values established in accordance with Article 3 and Annex II are not exceeded at any monitoring point in that body or group of bodies of groundwater; or	Article 4 sets out a definition of good status for groundwaters as required by the WFD. This clarifies that this includes the meeting of the groundwater quality standards and threshold values. This, therefore, clarifies the requirement for good status, to be taken account of in IPPC permitting, to include meeting threshold values developed by Member States.

	(c) the value for a groundwater quality standard or threshold value is exceeded at one or more monitoring points but an appropriate investigation in accordance with Annex III confirms that: (i) on the basis of the assessment referred to in paragraph 3 of Annex III, the concentrations of pollutants exceeding the groundwater quality standards or threshold values are not considered to present a significant environmental risk, taking into account, where appropriate, the extent of the body of groundwater which is affected; (ii) the other conditions for good groundwater chemical status set out in Table 2.3.2 in Annex V to Directive 2000/60/EC are being met, in accordance with paragraph 4 of Annex III to this Directive; (iii) for bodies of groundwater identified in accordance with Article 7(1) of Directive 2000/60/EC, the requirements of Article 7(3) of that Directive are being met, in accordance with paragraph 4 of Annex III to this Directive; (iv) the ability of the body of groundwater or of any of the bodies in the group of bodies of groundwater to support human uses has not been significantly impaired by pollution.	
	3. Choice of the groundwater monitoring sites has to satisfy the requirements of Section 2.4 of Annex V to Directive 2000/60/EC on being designed so as to provide a coherent and comprehensive overview of groundwater chemical status and to provide representative monitoring data.	Monitoring requirements draw on the WFD and, therefore, the interaction with IPPC found with this Directive.
	4. Member States shall publish a summary of the assessment of groundwater chemical status in the river basin management plans in accordance with Article 13 of Directive 2000/60/EC. This summary, established at the level of the river basin district or the part of the international river basin district falling within the territory of a Member State, shall also include an explanation as to the manner in which exceedances of groundwater quality standards or threshold values at individual monitoring points have been taken into account in the final assessment.	Reporting on groundwater status should include reasons for any failures to meet standards. If relevant, this would need to refer to impacts of IPPC installations (e.g. examples of non-compliance).
	5. If a body of groundwater is classified as being of good chemical status in accordance with paragraph 2(c), Member States, in accordance with Article 11 of Directive2000/60/EC, shall take such measures as may be necessary to protect	

	aquatic ecosystems, terrestrial ecosystems and human uses of groundwater dependent on the part of the body of groundwater represented by the monitoring point or points at which the value for a groundwater quality standard or the threshold value has been exceeded.	
Article 5	**Identification of significant and sustained upward trends and the definition of starting points for trend reversals** 1. Member States shall identify any significant and sustained upward trend in concentrations of pollutants, groups of pollutants or indicators of pollution found in bodies or groups of bodies of groundwater identified as being at risk and define the starting point for reversing that trend, in accordance with Annex IV. 2. Member States shall, in accordance with Part B of Annex IV, reverse trends which present a significant risk of harm to the quality of aquatic ecosystems or terrestrial ecosystems, to human health, or to actual or potential legitimate uses of the water environment, through the programme of measures referred to in Article 11 of Directive 2000/60/EC, in order progressively to reduce pollution and prevent deterioration of groundwater. 3. Member States shall define the starting point for trend reversal as a percentage of the level of the groundwater quality standards set out in Annex I and of the threshold values established pursuant to Article 3, on the basis of the identified trend and the environmental risk associated therewith, in accordance with Part B, point 1 of Annex IV. 4. In the river basin management plans to be submitted in accordance with Article 13 of Directive 2000/60/EC, Member States shall summarise: (a) the way in which the trend assessment from individual monitoring points within a body or a group of bodies of groundwater has contributed to identifying, in accordance with Section 2.5 of Annex V to that Directive, that those bodies are subject to a significant and sustained upward trend in concentration of any pollutant or a reversal of that trend; and (b) the reasons for the starting points defined pursuant to paragraph 3. 5. Where necessary to assess the impact of existing plumes of pollution in bodies of groundwater that may threaten the achievement of the objectives in Article 4 of Directive 2000/60/ EC, and in particular, those plumes resulting from point sources	Article 5 concerns significant and sustained upward trends in pollutants. Significant trends should be reversed through the POMs under the WFD. These may include measures under IPPC. Monitoring and assessment may focus on individual plumes from point sources. This might include discharges from IPPC

	and contaminated land, Member States shall carry out additional trend assessments for identified pollutants in order to verify that plumes from contaminated sites do not expand, do not deteriorate the chemical status of the body or group of bodies of groundwater, and do not present a risk for human health and the environment. The results of these assessments shall be summarised in the river basin management plans to be submitted in accordance with Article 13 of Directive 2000/60/ EC.	installations and such assessment and monitoring may be included as a requirement in IPPC permit conditions and the results used in IPPC permit reviews.
Article 6	**Measures to prevent or limit inputs of pollutants into groundwater** 1. In order to achieve the objective of preventing or limiting inputs of pollutants into groundwater, established in accordance with Article 4(1)(b)(i) of Directive 2000/60/EC, Member States shall ensure that the programme of measures established in accordance with Article 11 of that Directive includes: (a) all measures necessary to prevent inputs into groundwater of any hazardous substances, without prejudice to paragraphs 2 and 3. In identifying such substances, Member States shall in particular take account of hazardous substances belonging to the families or groups of pollutants referred to in points 1 to 6 of Annex VIII to Directive 2000/ 60/EC, as well as of substances belonging to the families or groups of pollutants referred to in points 7 to 9 of that Annex, where these are considered to be hazardous; (b) for pollutants listed in Annex VIII to Directive 2000/60/EC which are not considered hazardous, and any other nonhazardous pollutants not listed in that Annex considered by Member States to present an existing or potential risk of pollution, all measures necessary to limit inputs into groundwater so as to ensure that such inputs do not cause deterioration or significant and sustained upward trends in the concentrations of pollutants in groundwater. Such measures shall take account, at least, of established best practice, including the Best Environmental Practice and Best Available Techniques specified in the relevant Community legislation. For the purpose of establishing measures referred to in points (a) or (b), Member States may, as a first step, identify the circumstances under which the pollutants listed in Annex VIII to Directive 2000/60/EC, in particular essential metals and their compounds referred to in point 7 of that Annex, are to be considered hazardous or non-hazardous.	Measures to prevent or limit inputs of pollutants include relevant measures under IPPC – whether these address the prevention of hazardous (a) or limiting non-hazardous (b) pollutants. The degree of control of emissions would vary according to the hazardous of the substances. The GWD makes explicit reference to the application of BAT ‘in relevant Community legislation’. This includes IPPC. For IPPC installations this, of course, is already a requirement.

	2. Inputs of pollutants from diffuse sources of pollution having an impact on the groundwater chemical status shall be taken into account whenever technically possible. 3. Without prejudice to any more stringent requirements in other Community legislation, Member States may exempt from the measures required by paragraph 1 inputs of pollutants that are: (a) the result of direct discharges authorised in accordance with Article 11(3)(j) of Directive 2000/60/EC; (b) considered by the competent authorities to be of a quantity and concentration so small as to obviate any present or 27.12.2006 EN Official Journal of the European Union L 372/23 future danger of deterioration in the quality of the receiving groundwater; (c) the consequences of accidents or exceptional circumstances of natural cause that could not reasonably have been foreseen, avoided or mitigated; (d) the result of artificial recharge or augmentation of bodies of groundwater authorised in accordance with Article 11(3)(f) of Directive 2000/60/EC; (e) in the view of the competent authorities incapable, for technical reasons, of being prevented or limited without using: (i) measures that would increase risks to human health or to the quality of the environment as a whole; or (ii) disproportionately costly measures to remove quantities of pollutants from, or otherwise control their percolation in, contaminated ground or subsoil; or (f) the result of interventions in surface waters for the purposes, amongst others, of mitigating the effects of floods and droughts, and for the management of waters and waterways, including at international level. Such activities, including cutting, dredging, relocation and deposition of sediments in surface water, shall be conducted in accordance with general binding rules, and, where applicable, with permits and authorisations issued on the basis of such rules, developed by the Member States for that purpose, provided that such inputs do not compromise the achievement of the environmental objectives established for the water bodies concerned in accordance with Article 4(1) (b) of Directive 2000/60/EC. The exemptions provided for in points (a) to (f) may be used only where the	The GWD includes explicit requirements to control diffuse sources 'whenever technically possible'. IPPC installations may result in a number of diffuse inputs to groundwater (e.g. site contamination) which can be addressed through technical and management techniques. Exemptions include very small quantities, which may be applicable to some IPPC installations. Accidental inputs are exempt, although requirements for accident management under IPPC remain applicable. An exemption is allowed for disproportionate cost. This is addressed under the WFD and the IPPC Directive includes its own consideration of cost issues in BAT determination and whether more stringent measures are applicable. The exemptions are only possible if

	Member States' competent authorities have established that efficient monitoring of the bodies of groundwater concerned, in accordance with point 2.4.2 of Annex V to Directive 2000/60/EC, or other appropriate monitoring, is being carried out. 4. The competent authorities of the Member States shall keep an inventory of the exemptions referred to in paragraph 3 for the purpose of notification, upon request, to the Commission.	groundwater monitoring is in place. Therefore, IPPC authorities need to ensure that this is indeed the case before applying such exemptions.
Annex III	**ASSESSMENT OF GROUNDWATER CHEMICAL STATUS** 1. The assessment procedure for determining the chemical status of a body or a group of bodies of groundwater will be carried out in relation to all bodies or groups of bodies of groundwater characterised as being at risk and in relation to each of the pollutants which contribute to the body or group of bodies of groundwater being so characterised. 2. In undertaking any investigations referred to in Article 4(2)(c), Member States will take into account: (a) the information collected as part of the characterisation to be carried out in accordance with Article 5 of Directive 2000/60/EC and with Sections 2.1, 2.2 and 2.3 of Annex II thereto; (b) the results of the groundwater monitoring network obtained in accordance with Section 2.4 of Annex V to Directive 2000/60/EC; and (c) any other relevant information including a comparison of the annual arithmetic mean concentration of the relevant pollutants at a monitoring point with the groundwater quality standards set out in Annex I and the threshold values set by Member States in accordance with Article 3 and Annex II. 3. For the purposes of investigating whether the conditions for good groundwater chemical status referred to in Article 4 (2)(c)(i) and (iv) are met, Member States will, where relevant and necessary, and on the basis of appropriate aggregations of the monitoring results, supported where necessary by concentration estimations based on a conceptual model of the body or group of bodies of groundwater, estimate the extent of the body of groundwater having an annual arithmetic mean concentration of a pollutant higher than a groundwater quality standard or a threshold value. 4. For the purposes of investigating whether the conditions for good groundwater	This Annex addresses the assessment of chemical status. The first part concerns direct monitoring of groundwater, independent of IPPC installations. However, the assessment also requires an assessment of the impact of pollutants. This would need to include estimates of discharges (direct, indirect, point, diffuse, etc), which may rely on information on discharges arising from IPPC monitoring and modelling of dispersion.

	chemical status referred to in Article 4 (2)(c)(ii) and (iii) are met, Member States will, where relevant and necessary, and on the basis of relevant monitoring results and of a suitable conceptual model of the body of groundwater, assess: (a) the impact of the pollutants in the body of groundwater; (b) the amounts and the concentrations of the pollutants being, or likely to be, transferred from the body of groundwater to the associated surface waters or directly dependent terrestrial ecosystems; (c) the likely impact of the amounts and concentrations of the pollutants transferred to the associated surface waters and directly dependent terrestrial ecosystems; (d) the extent of any saline or other intrusions into the body of groundwater; and (e) the risk from pollutants in the body of groundwater to the quality of water abstracted, or intended to be abstracted, from the body of groundwater for human consumption. 5. Member States will present the groundwater chemical status of a body or a group of bodies of groundwater on maps in accordance with Sections 2.4.5 and 2.5 of Annex V to Directive 2000/60/EC. In addition, Member States will indicate on these maps all monitoring points where groundwater quality standards and/or threshold values are exceeded, where relevant and feasible.	
Annex IV	**IDENTIFICATION AND REVERSAL OF SIGNIFICANT AND SUSTAINED UPWARD TRENDS** *Part A* **Identification of significant and sustained upward trends** Member States will identify significant and sustained upward trends in all bodies or groups of bodies of groundwater that are characterised as being at risk in accordance with Annex II to Directive 2000/60/EC, taking into account the following requirements: 1) in accordance with Section 2.4 of Annex V to Directive 2000/60/EC, the monitoring programme will be so designed as to detect significant and sustained upward trends in concentrations of the pollutants identified pursuant to Article 3 of this Directive; 2) the procedure for the identification of significant and sustained upward trends will be based on the following elements:	The identification of trends in groundwater pollution will, as with Annex III, draw on monitoring information from IPPC installations, where relevant.

	(a) monitoring frequencies and monitoring locations will be selected such as are sufficient to: (i) provide the information necessary to ensure that such upward trends can be distinguished from natural variation with an adequate level of confidence and precision; (ii) enable such upward trends to be identified in sufficient time to allow measures to be implemented in order to prevent, or at least mitigate as far as practicable, environmentally significant detrimental changes in groundwater quality. This identification will be carried out for the first time by 2009, if possible, and will take into account existing data, in the context of the report on trend identification within the first river basin management plan referred to in Article 13 of Directive 2000/60/EC, and at least every six years thereafter; (iii) take into account the physical and chemical temporal characteristics of the body of groundwater, including groundwater flow conditions and recharge rates and percolation time through soil or subsoil; (b) the methods of monitoring and analysis used will conform to international quality control principles, including, if relevant, CEN or national standardised methods, to ensure equivalent scientific quality and comparability of the data provided; (c) the assessment will be based on a statistical method, such as regression analysis, for trend analysis in time series of individual monitoring points; (d) in order to avoid bias in trend identification, all measurements below the quantification limit will be set to half of the value of the highest quantification limit occurring in time series, except for total pesticides; 3) the identification of significant and sustained upward trends in the concentrations of substances which occur both naturally and as a result of human activities will consider the baseline levels and, where such data are available, the data collected before the start of the monitoring programme in order to report on trend identification within the first river basin management plan referred to in Article 13 of Directive 2000/60/EC. *Part B* **Starting points for trend reversals**	

	Member States will reverse identified significant and sustained upward trends, in accordance with Article 5, taking into account the following requirements: 1) the starting point for implementing measures to reverse significant and sustained upward trends will be when the concentration of the pollutant reaches 75 % of the parametric values of the groundwater quality standards set out in Annex I and of the threshold values established pursuant to Article 3, unless: (a) an earlier starting point is required to enable trend reversal measures to prevent most cost-effectively, or at least mitigate as far as possible, any environmentally significant detrimental changes in groundwater quality; (b) a different starting point is justified where the detection limit does not allow for establishing the presence of a trend at 75 % of the parametric values; or (c) the rate of increase and the reversibility of the trend are such that a later starting point for trend reversal measures would still enable such measures to prevent most cost-effectively, or at least mitigate as far as possible, any environmentally significant detrimental changes in groundwater quality. Such later starting point may not lead to any delay in achieving the deadline for the environmental objectives. For activities falling within the scope of Directive 91/676/EEC, the starting point for implementing measures to reverse significant and sustained upward trends will be established in accordance with that Directive and with Directive 2000/60/EC and, in particular, adhering to environmental objectives for water protection as set out in Article 4 of Directive 2000/60/EC; 2) once a starting point has been established for a body of groundwater characterised as being at risk in accordance with Section 2.4.4 of Annex V to Directive 2000/60/EC and pursuant to point 1 above, it will not be changed during the six-year cycle of the river basin management plan required in accordance with Article 13 of Directive 2000/60/EC; 3) trend reversals will be demonstrated, taking into account relevant monitoring provisions contained in Part A, point 2.	The starting point for taking measures to reverse an upward trend is 75% of a groundwater standard. Therefore, the trigger for action under IPPC, where relevant, is not the groundwater standard itself, but 75% of it, if the pollutant trend is upward.