THE NATIONAL RIVERS AUTHORITY'S RESPONSE TO THE SIXTEENTH REPORT OF THE ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION ON FRESHWATER QUALITY

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1.0 INTRODUCTION

Over the last few years, fundamental changes have taken place in the arrangements for the management of the water environment, not least of which has been the creation of the National Rivers Authority (NRA). There have also been significant changes in the pattern of those activities which impact upon freshwater quality, particularly those relating to urbanisation and to intensification in rural land use; the consequences of these changes are to some extent reflected in the results of the recent survey of water quality in England and Wales carried out during 1990 which indicated a reversal in the trend of steadily improving quality recorded over the previous two decades. Finally, and perhaps most importantly, there have been major changes in the attitudes of the general public towards the environment; it is both more aware and more interested in environmental pollution issues. This has resulted in increasing public involvement in the debate over the need for environmental improvements, how they can be achieved, and who should pay for them.

At a time when such great changes are taking place, this Royal Commission on Environmental Pollution (RCEP) report on Freshwater Quality is most timely and provides an important contribution to this debate. The NRA is impressed by the breadth and the depth of the report, and the comprehensive way in which the wide ranging issues related to freshwater quality have been dealt with. It is a substantial work and will be a valuable reference for many years to come. By drawing upon the available evidence and information brought together through detailed studies, its recommendations have a firm factual foundation and will undoubtedly have a significant impact on future policy development in pollution control and the management of the freshwater environment.

2.0 THE NRA'S RESPONSE

In responding to this report, the NRA does not consider it necessary to pass detailed comment on all of its 108 recommendations: a more selective approach has been taken to provide views on the issues and recommendations which have the most important bearing on the NRA's duties and responsibilities. The Government will in due course be publishing its own formal response to the RCEP's recommendations which will no doubt deal with those issues which relate to national policy. Of particular relevance in this context was the publication in December 1992 of the Government's consultation document, "River Quality", which sets out a strategy for maintaining and improving river quality and for the introduction of statutory Water Quality Objectives.

This response is structured according to the headings in Chapter 10 of the report with comments provided on the relevant recommendations.

2.1 How Water Quality is assessed

Recommendation 1

We recommend that the regulatory authorities should endeavour to develop a general classification scheme based on biological assessment for use throughout the UK in 1995 and subsequent river quality surveys.

The NRA welcomes the RCEP's recommendation that biological parameters should be included in the national general classification scheme for forthcoming river quality surveys. The NRA has invested much time, effort and public money in the promotion of biological assessment as an integral part of river quality management. During 1990 it assessed the biological state of rivers at thousands of different sites across England and Wales. It is currently analysing this information and considering options for a biological quality classification system which would be applied in parallel with other chemical and aesthetic criteria as the basis for the next major river quality survey in 1995.

Recommendation 2

We also recommend that the regulatory authorities should move towards a system of reporting results volumetrically as well as by length.

The NRA understands why the RCEP recommends that reporting of river quality should be done by volume as well as length. There are obvious advantages to doing this, but it is not without practical difficulties. The problem with the use of river volume is that it is inherently variable and will fluctuate both seasonally and episodically according to local patterns of rainfall; careful attention would therefore need to be given to how volume should be defined and standardised throughout the country. Nevertheless, some expression of river size where samples are taken - such as annual average flow at reporting points - would be a useful adjunct to water quality information, and thought will be given as to how this might be accommodated.

Recommendation 3

To explain changes in the biological state of a river, we recommend that a wider set of determinands should be developed than the three main ones in the NWC and NRA classification schemes. They should include data on nitrate and phosphate, on microbiological indicators, and on the presence of heavy metals and key pollutants such as pesticides.

The NRA supports the recommendation that a wider set of determinands should be included in water quality classification systems in addition to the three 'sanitary' determinands of the existing scheme. Following the consultation on "Proposals for Statutory Water Quality Objectives" (NRA Water Quality Series No 5), much thought has been given to the structure of the water quality classification system and to which determinands are most relevant. The NRA's conclusions, having taken full account of the views expressed by consultees, have been publicised in its final

recommendations to the Secretaries of State. These recommendations have made clear which determinands and standards are relevant for setting statutory targets for water quality according to a range of possible water uses, and those which are more appropriate for the general assessment of the state of the water environment. It is recommended that the use-related classes should include standards for dangerous substances including metals and pesticides, and microbiological criteria. It is also proposed that criteria for nutrients should be included both for the protection of sites of nature conservation value and for assessment and reporting of trends in a General Classification Scheme.

Recommendation 4

We recommend that the Government should convene a working party which includes representatives of the NRA and RPAs to consider the objectives of the Harmonised Monitoring scheme and to develop means of achieving these aims. The working party should also review the coverage of sites and determinands and the addition of biological monitoring and should consider the best way of presenting the information to the public.

The NRA would be pleased to contribute to any review of the Harmonised Monitoring Scheme that the Government may wish to undertake. Considerable resources have been, and still are, invested in maintaining this monitoring network, yet little of the information collected has been analysed and published. A comprehensive analysis of the historic database might usefully be carried out to assess what has been learned to date, what have been the benefits of the investment in the scheme, and how we should proceed in the future. This could include, as the RCEP suggest, an assessment of the coverage of sites, the determinands to be measured, and the addition of biological monitoring.

Recommendation 5

We recommend that small watercourses should be monitored from time to time (perhaps using rapid biological screening methods) and action taken to remedy any problems revealed.

The recommendation that small watercourses should be monitored from time to time is an issue to which the NRA has given much consideration. Small headwater streams and lowland ditches provide essential habitats for aquatic life, yet are often affected by pollution from farming, forestry and other rural land use activities. The extent of the monitoring network and the frequency of sampling will obviously be constrained by the resources available to cover the thousands of kilometres of small watercourses in the UK. The NRA favours a targeted approach based on the assessment of pollution risk and is currently developing the necessary tools through its Research and Development programme. The use of rapid biological screening methods, which the RCEP recommends for the monitoring of small headwaters streams, has already proved to be highly successful in some parts of the country affected by pollution from farm wastes.

Recommendations 6 and 7

We recommend that UK standing waters of 0.4 hectares and above should be surveyed and classified on a regular basis and that as far as possible the classification should adopt an internally recognised system such as the OECD one. We recommend that Government should encourage research into development of biological indicators using similar principles to RIVPACS.

The development of a water quality classification system for standing waters was considered in the NRA's consultation document on Statutory Water Quality Objectives. Research is in progress to develop predictive approaches for assessing trophic status which take account of the important natural characteristics of lakes and their surrounding catchment areas. It would not at this stage be prudent to pre-judge the outcome of this research programme, but it is expected that the development of a lake classification system which incorporates both physico-chemical and biological criteria should be possible in the near future. This system should be more appropriate for the varied and diverse lake types throughout the UK than that adopted by the OECD, which was intended for more global application.

The extent of application of a water quality classification system for standing waters will need to be given careful consideration. The establishment of a regular monitoring programme for the hundreds of lakes and reservoirs with an area of 0.4 hectares or more will clearly be a major undertaking, with significant resource implications.

Recommendation 8

We recommend that the general biological classification scheme should be used to set a biological SWQO.

It is noted that the RCEP have recommended that a biological classification scheme should be used to establish Statutory Water Quality Objectives. Since the publication of the NRA's consultation document, this issue has been the subject of considerable debate both within the NRA and between it and other organisations. One of the options originally put forward by the NRA was that biological criteria could be set within a Use-related Class, termed "General Ecosystem", and that this classification could be used for setting biologically-based targets. However, there are a number of potential problems with this option. It would be difficult in practice to translate biological targets into the requirements of discharge consents which would inevitably have to be set primarily in physico-chemical terms. Even if biological targets were set, there would be no guarantee that they would be achieved through discharge control alone because water quality is only one of the factors which influences the status of biological communities; there are many others, some man-made, and some entirely natural, which are not amenable to control through the powers available to the NRA. The NRA therefore considers that a more appropriate application of biological criteria is within the context of a general classification scheme to be used for the regular assessment and reporting of environmental quality.

2.2 Groundwater

Recommendation 12

We recommend that the NRA and its counterparts in Scotland and Northern Ireland seek to define SWQOs to safeguard the quality of rivers and lakes fed by groundwater and ensure maintenance of groundwaters free of polluting inputs.

The NRA fully recognises the need to protect groundwaters and has set out the means by which it intends to do so in a recent document, "Policy and Practice for the Protection of Groundwater", which was published in December 1992 following widespread consultation. This policy establishes a technical framework for the protection of groundwater resources and their quality using the NRA's existing powers. It is for the Secretaries of State, and not the NRA, to determine whether the introduction of SWQOs should be extended to groundwaters. The NRA would, however, expect to provide the Secretaries of State with the necessary advice and information on an appropriate scheme for groundwater should it be requested to do so.

2.3 Eutrophication

Recommendation 16

We recommend that the NRA should ensure that the objectives are defined in ways which enable the ecological impact of nutrient enrichment to receive attention.

The NRA fully supports the RCEP's view that quality objectives are defined in ways which take fuller account of the conservation and amenity issues raised by nutrient enrichment and which enable ecological impact of nutrient enrichment to receive attention. The NRA recommends that this is achieved in two different ways. Firstly, a separate Use-Related Class, termed "Special Ecosystem", should be established as part of the classification system for setting SWQOs. This should include criteria for nutrients which would protect sites of nature conservation value against the adverse effects of nutrient enrichment. Secondly, criteria for nutrients should be included in a general classification scheme which would apply to all waters such that trends in nutrient status over time and from place to place can be assessed, enabling the appropriate catchment management measures to be taken. The desirability of including nutrient status in a General Quality Assessment scheme for periodic assessment and reporting of water quality is addressed in the Government's recent consultation paper on "River Quality".

2.4 Acidification

Recommendations 25-28

We consider that it may be necessary to restrict planting in some sensitive catchments and we recommend that the Forestry Commission incorporate advice to that effect within its guidelines.

We also recommend that water regulatory authorities, in developing their catchment management plans, should incorporate appropriate policies for afforestation on sensitive catchments including guidance on locations where it might be necessary to restrict planting.

We further recommend that local authorities and national park authorities reflect such policies in their indicative forestry strategies.

We recommend that liming programmes should incorporate arrangements to monitor their impact.

Although there have been recent and welcome changes in the guidelines and procedures covering forest planting and management, the NRA supports the RCEP's recommendations that further provisions could be made for those catchments which, because of their location and geology, are prone to acidification and its adverse consequences. The practice of liming of catchments can only be considered as a short-term ameliorative measure and may in itself induce adverse ecological side-effects. The RCEP has noted that it is the NRA's view that liming should only take place selectively in those areas which will derive the maximum benefit. Where liming does take place, adequate monitoring programmes should be put in place to determine the extent and rate of ecological change which results and any potential adverse effects which might occur. However, the NRA believes that more proactive strategies are required to tackle the problem at source. In this respect it generally supports the RCEP's conclusions that planting of forests should be restricted within those catchment areas which are particularly susceptible to acidification. The definition of these areas and the identification of measures needed for their protection has and will continue to be taken into account in the development of catchment management plans. Land management activities other than forestry may also exacerbate the process of acidification of waters draining base-deficient moorland areas. Where this is known to be the case, remedial measures including moorland restoration programmes should also be incorporated into catchment management plans.

2.5 Waste Water Production and Treatment

Recommendation 33

We recommend that, where receiving waters are sensitive to pollution, the regulatory authorities should replace the descriptive consents for effluent from small sewage treatment works (STWs) with numerical ones.

The recommended replacement of descriptive with numerical consents for small sewage treatment works which discharge effluent into sensitive waters is supported. The NRA has, and will continue to, carry out its programme of replacing descriptive consents for those works situated upstream of abstractions for potable supply, or discharging into waters which may be considered sensitive for any other valid reason.

Recommendation 40

We recommend that a radical reappraisal be undertaken of the polluting effects of untreated, intermittent surface water discharges from highways and paved areas.

The NRA agrees with the recommendation that the polluting effects of discharges from urban drainage systems should be assessed. Research has been commissioned to investigate the impact of intermittent discharges from such systems upon the aquatic environment with the objective of developing remedial strategies to address this problem. A forum for identifying research needs to underpin the development of commonly-agreed tools and procedures to address pollution problems caused by urban drainage known as the Urban Pollution Management programme, has been in existence for some time.

2.6 Contaminated Land

Recommendations 44-46

We recommend that the regulatory authorities should review all consents for operational mines to ensure that, where possible, conditions are imposed requiring action to be taken in the event of closure to safeguard water from pollution. The authorities should also review mines which have already been abandoned, identify any which pose a water pollution risk and develop a programme of action to reduce the risk.

We recommend that the Government consider ways of remedying the apparent absence of legal powers to require owners or former operators of abandoned mines to prevent pollution.

We further recommend that, where the owners of the sites are unwilling or unable to carry out work to reduce the risk of pollution, the authorities should seek from the Government the support and the necessary funds to have the work carried out.

The recommendations made by the RCEP on the provisions for the prevention of pollution from abandoned mines are most timely following the flooding event at the Wheal Jane mine in Cornwall and the pollution of the River Carnon. The NRA is seeking a change in the law with respect to the abandoning of mines; and is currently carrying out a nationwide investigation of actual or potential pollution problems associated with contaminated land and abandoned mines. The results of this study will be published in due course. The resolution of these long-standing problems will

need to be addressed through the development and implementation of a national policy which makes clear the responsibilities and liabilities of all parties and takes full account of the associated resource requirements.

Recommendation 47

We recommend that the NRA continue to seek improvements in the quality of discharges from the china clay industry.

The RCEP's recommendations regarding the control of discharges from china clay quarries are supported. Considerable improvements have already taken place through the use of settlement lagoons and the NRA will continue to seek improvements where they are considered to be necessary.

2.7 Transport

Recommendation 52

We recommend that the water regulatory authorities encourage users of aircraft and runway de-icing agents to carry out trials of alternative products which are claimed to be less polluting. If the trials are successful we recommend the authorities require the use of these alternatives in place of more damaging formulations. The authorities should also ensure that run-off is properly collected and, where appropriate, treated before discharge.

The NRA already controls the use of de-icing agents at airports by means of agreed operating procedures which form part of the discharge consent. Trials of acetate based alternatives to glycol and urea have been successful and they are being introduced at many military and civilian sites.

Where unacceptable pollution of controlled waters could result from the use of a particular agent, alternative products are being introduced, or the provision of treatment (either at a sewage treatment works or on site) and flow balancing has been required by the NRA. Negotiations to this end are currently in progress at several major airports and programmes of improvements are being drawn up at the insistence of the NRA.

2.8 Farming

Recommendations 53-57

We recommend that operators of intensive livestock units above a specified size should be subject to an authorisation system operated by the agriculture departments. Authorisation should be granted only where the operator has adequate storage and disposal arrangements. Advice on disposal techniques should be provided by ADAS. We recommend that, in considering applications for authorisation, the agriculture departments should act in consultation with the NRA/RPAs but should also take account of all risks of nuisance and environmental

pollution, not only those relating to water. The Government should periodically review the workings of the authorisation scheme and consider reducing the size qualification if problems still occur with smaller units. The scheme should be complemented by flexible powers enabling the pollution control authorities to require, at the expense of the potential polluter, preventive action to be taken to reduce the risk of water pollution. We recommend that such a plan should be a requirement of the authorisation scheme proposed above for large livestock farms. We recommend that the Government should take the lead in investigating with farming interests the scope for encouraging technology for converting slurry into gas and fertiliser or sanitised slurry, and should make financial support available for suitable projects. We recommend that the Government should ensure that ADAS actively seeks opportunities to offer advice on pollution control, free of charge wherever possible, and that it has sufficient resources to do so. The Government should ensure that the Farm and Conservation Grants Scheme provides an adequate incentive to improve waste management systems in Less Favoured Areas since these contain many vulnerable waters; and that livestock slurry treatment plant should be eligible for grant in aid when proposed by co-operatives.

The recommendations set out on the authorisation and monitoring of livestock units are generally supported by the NRA. They are very much in line with its own views published in its report "The Influence of Agriculture on the Quality of Natural Waters in England and Wales" (NRA Water Quality Series No 6). The requirement that the operators of livestock units should make adequate provisions for the storage and disposal of wastes according to an approved farm waste management plan is seen as an essential step in the authorisation process. The NRA is pleased to see that progress on pilot farm waste management plans initiated by MAFF has already been made. The success of such a system will, of course, be dependent upon the degree to which it is monitored. The NRA will continue with its programme of targeted farm visits and catchment investigations to ensure that actual or potential problems are resolved before they result in pollution incidents.

Recommendation 59

We recommend that the long term fate and environmental effects of veterinary medicines should be more extensively studied. We recommend that consent conditions should be set for antibiotics and other biologically active chemicals in effluents from fish farms.

The NRA agrees with the recommendation that the long-term fate and environmental effects of veterinary medicines should be more extensively studied. Very little is known of the persistence, environmental behaviour and ecotoxicity of these substances. Steps have, however, already been taken by MAFF to address this issue. The NRA does set conditions for the discharge of these substances from fish farms in consents. Research is in progress to define standards to be met in the receiving waters which would safeguard the aquatic environment. This will greatly assist the process of setting protective consent conditions for the discharge of veterinary medicines.

2.9 Pesticides

Recommendation 62

We recommend that regulatory authorities and the water undertakers should extend and improve their monitoring programmes for pesticides in surface and groundwaters and should periodically analyse and publish the results.

The recommendation that regulatory authorities should extend and improve their monitoring programmes for pesticides in surface and groundwaters is supported, but it is not without practical difficulties. It also has significant resource implications. The NRA already carries out an extensive monitoring programme for those pesticides, such as certain organochlorine insecticides, which are covered by the existing dangerous substances legislation arising from EC Directives and other international agreements including the 3rd North Sea Conference Declaration. National standards also exist for certain other pesticides of concern to the aquatic environment, such as those used in the mothproofing industry and the triorganotin compounds. The NRA will carry out the necessary monitoring for those pesticides where they are thought likely to occur to assess compliance with the standards. In November 1991, the Government issued a consultation paper which set out proposed standards for a further series of pesticides on its 'Red List'. When formally implemented, the necessary monitoring programmes will need to be put in place to assess compliance with these standards. Thus an extensive monitoring network is already in place and will shortly be increased for certain priority pesticides.

The NRA is of course aware that there are hundreds of different pesticide formulations currently in use, with numerous active ingredients. Many are difficult to detect with current analytical technology at the low concentrations at which they are present in the environment. This is no reason for complacency, however; the NRA is currently developing the necessary tools and procedures for pesticide monitoring and the assessment of their impact on the aquatic environment through its R&D programme. Current projects include analytical method development, the application of immunoassay techniques, the use of bioaccumulation techniques, the development of ecotoxicological approaches, studies on the fate and behaviour of pesticides in surface and groundwaters, and the assessment of the impact of pesticides on river ecology.

2.10 Pathogenic micro-organisms in freshwater

Recommendations 73-75

We recommend that appropriate microbiological standards be developed for freshwaters and that these standards be used in setting statutory water quality objectives for places in which water contact activities are reasonably common.

We recommend that the regulatory authorities, in conjunction with the owners and managers of inland waters, should identify sites used intensively or on an organised

basis for bathing and other sports and recreations which involve significant contact with water.

We also recommend that the microbiological quality of these waters should be monitored, the results of the monitoring entered in public registers and the public made aware of any cases where EC standards are not achieved. Similarly, when improved standards have been developed for freshwaters, the public should be informed of any failure to achieve them.

The RCEP's recommendations on the development of microbiological standards for water contact activities echo the NRA's own proposals for a classification scheme to be developed and applied for setting Statutory Water Quality Objectives which is based on the health risks associated with different activities. Research is already underway in the UK on the health effects of bathing and different types of canoeing activity. This work will need to be extended to examine a range of different activities and exposure situations.

It is not for the NRA to set the standards; this is the responsibility of the Secretaries of State. Nor is it the responsibility of the NRA to provide advice to the public on health-related matters; this is for the public health authorities who are equipped with the necessary expertise to do so. It is, however, the NRA's job to monitor water quality to assess compliance with standards in those waters where they apply. At present the only prescribed microbiological standards applied in the UK are those of the EC Bathing Water Directive. The Government has not designated any inland waters under the conditions of this Directive to date. The NRA therefore has certain difficulties with the RCEP's recommendation that freshwater sites should be monitored and results reported against the standards of the Bathing Water Directive. Firstly, because no freshwater sites have been designated under this Directive there is no formal requirement for it to do so. If monitoring is carried out it will therefore need to be justified according to the health risks posed by water quality. The NRA does carry out sampling at certain freshwater sites for precautionary reasons and will of course conduct the necessary investigations where problems are known to occur. Secondly, there is now a consensus of scientific opinion that the standards in the Bathing Water Directive are outdated, have no obvious epidemiological basis and consequently require revision. This has been recognised in the RCEP's own report. It would not therefore be prudent to carry out extensive monitoring and reporting of results against the standards laid down in this Directive. It is for this reason that the NRA has recommended that a Use-related Class is incorporated into the water quality classification scheme for setting Statutory Water Quality Objectives which would allow a set of national standards to be introduced based upon sound scientific evidence with determinands and values which would more accurately reflect the health risks associated with a range of water contact activities.

2.11 Economic Instruments

Recommendations 76-80

We recommend that a charging scheme for point discharges to water should be adopted in the UK. It should replace the cost-recovery schemes operating in Great Britain. It should cover all point source discharges which are subject to consent, the charge being based on the volume and content of the effluent as specified in the discharge consent.

We recommend that the level of the charge should be comparable to those in the Netherlands and Germany. It should be set initially such that the total income generated should be roughly similar to that generated under the NRA's cost recovery scheme, then increased in annual steps according to a published, pre-determined programme to reach the desired level over a period of about 5 years.

We recommend that the Government encourage the EC Commission to explore the possibilities for innovative charging schemes as a means of reducing water pollution from diffuse sources.

We recommend that the NRA, the RPAs and DOE (NI) should be responsible for the calculation and collection of charges and for paying out any grants associated with the scheme. The revenue should be available to them not only to cover the costs of regulation but also to fund pollution prevention measures and programmes and research to improve water quality. The Government should also consider introducing a scheme to provide grants to industry for investment in pollution abatement, funded by the income from the charges.

We recommend that sewage disposal should be covered by the charging and any grants schemes in the same was as other point discharges.

The NRA welcomes this series of recommendations on alternative charging schemes for discharges into the aquatic environment. The NRA has been developing its own ideas on this issue, assisted by R&D studies, and has come to similar conclusions. The transition from a scheme based on cost recovery to one which promotes incentives for reducing pollution loads will require a change in the existing legislation. Any fundamental changes should take place according to a clear strategy for the introduction of economic instruments into pollution control practice in the UK. Careful consideration will need to be given to the integration of two quite distinct philosophical approaches to pollution control: that based on the use of strict regulation with standards and formal targets to be achieved, and that based on economic incentives.

2.12 Inheritance from the past and legacy for the future

Recommendations 82 and 83

We recommend that the Government ensure that future arrangements for the control of freshwater pollution in England and Wales will enable the integration of water quality and quantity regulation to be maintained and enhanced.

The NRA is identifying minimum acceptable flows in its catchment planning process and we recommend that it should develop the concept further. It should consider whether the use of statutory minimum acceptable flows might help to strengthen control over activities affecting quantity and quality.

The NRA fully supports the RCEP's recommendation that future arrangements for the control of freshwater pollution in England and Wales should enable the integration of water quality and quantity regulation to be maintained and enhanced. The Government's recent confirmation of its intention to establish an Environment Agency which would retain all of the NRA's existing responsibilities is most welcome in this respect. There are clear advantages to the integrated catchment management approach that the NRA has advocated, particularly in cases where potential conflicts in quality and quantity needs arise. The retention of management responsibilities for water resources and water quality within the same organisation allows the necessary flexibility for striking the right balance in resolving problems where conflicting needs arise; such an integration should not, however, be constrained by separate financial arrangements for the different Functional areas.

On the use of statutory minimum acceptable flows, the NRA has been giving careful consideration to the benefits that they would bring to water resource management. The practical issues including the criteria upon which they should be established, how they should be put into place and the operational implications once set, are currently being assessed, supported by a relevant R&D programme, with a view to developing a consistent policy on this matter.

Recommendation 107

We recommend that the water quality objectives approach should increasingly be supplemented by technology-based emission limits, tightened progressively in accordance with BATNEEC. Also, the objectives themselves should be tightened progressively, to reflect increasingly ambitious targets for water quality, and consented discharge levels be reduced accordingly.

The progressive development of a discharge control system which imposes both technology-based emission limits to reduce pollution at source, as well as requiring specific water quality objectives in receiving waters to be met, has the support of the NRA. The Government's announcement of its intention to integrate the responsibilities of Her Majesty's Inspectorate of Pollution and the NRA within a single Environment Agency should facilitate the process of bringing both approaches together. Exactly how this should be done will be a major consideration in making

arrangements for the new Agency; there is still much to be done, particularly with regard to the scientific, technical and economic bases of these complementary approaches to pollution control and environmental management.

With regard to the recommendation for progressive tightening of water quality objectives, there will no doubt be considerable debate as to how ambitious the targets should be when introduced in the first place. The targets will need to be set with respect to the protection of the various water uses applicable to each stretch and taking account of technical, financial and economic constraints. There will be cases, particularly where the solutions are complex and will take some time to achieve, where the setting of short-term targets, progressively tightened over time, as a series of 'stepping stones' to an ultimate goal, will be appropriate. Improvements in water quality through the establishment of quality objectives will need to be properly planned for against a pre-determined national strategy which will need to take full account of the investment required to achieve them. This is a matter for the Secretaries of State who are responsible for setting the objectives, although the NRA will provide the necessary advice where appropriate.

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