

Bathing water quality

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In February 1995, the European Commission published a proposal for amending the current bathing water directive. This paper examines these proposals together with a discussion of the health effects of sea bathing and compliance with the current directive by the UK and other EU countries.

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I. Introduction

There are a wide variety of human pathogens or disease causing agents which can be transmitted via water including bacteria, viruses and protozoa. The probability of their being found will depend on their prevalence in the community, on the nature of sewage treatment in the locality, and on their ability to survive in sea water. In most cases it is viruses, as opposed to bacteria, which are most likely to be responsible for causing infection and disease from bathing in contaminated sea water. Significant viruses include: adenoviruses (respiratory disease, conjunctivitis, gastroenteritis); enteroviruses (many different diseases); some hepatitis viruses; Norwalk-like viruses (epidemic vomiting, diarrhoea, fever); rotaviruses (diarrhoea and gastroenteritis); and small round viruses¹.

It is very difficult to detect some of these pathogens in water, particularly the viruses, so "microbial indicators" are usually used to determine whether a particular water sample is contaminated. In most cases these indicator organisms do not cause disease, but because they are present in high numbers in the faeces of humans and warm-blooded animals and their persistence in water is similar to other pathogens, their presence in bathing water is a good indication that the water has been contaminated with sewage. There is a considerable scientific debate about which organisms are the best indicators, but generally faecal bacteria - faecal coliforms and faecal streptococci have been used together with total coliforms.

The EC bathing water directive - 76/160/EEC - sets mandatory standards for a number of microbiological parameters: total coliforms; faecal coliforms; faecal streptococci; salmonella; and enteroviruses. It is implemented in the UK under the bathing water regulations^{2,3,4}. The directive was published in February 1976 and Member States had to "take all necessary measures to ensure that within ten years... the quality of bathing water" conformed to these mandatory standards⁵. In addition to microbiological parameters the directive also set limits for "physico-chemical" parameters such as transparency and acidity/alkalinity. The directive also specified stricter guide values which Member States should "endeavour... to observe... as guidelines". Bathing waters which meet these guideline values are eligible to apply for European Blue Flag Awards.

Details of the mandatory and guideline standards are shown in the table overleaf. For a bathing water to comply with the directive 95% of all samples must meet the mandatory standards. A bathing water is deemed to have met the guidelines if 80% of total and faecal coliform samples and 90% of all other samples meet the relevant guide values. However, samples which do not meet the standards as a result "of floods, other national disasters or abnormal weather conditions" can be disregarded.

¹ World Health Organisation *Guidelines for drinking-water quality* 2nd ed. 1993

² *The Bathing Waters (Classification) Regulations 1991* SI 1991/1597

³ *The Bathing Waters (Classification) (Scotland) Regulations 1991* SI 1991/1609

⁴ *The Quality of Bathing Water Regulations (Northern Ireland) 1993* SR 1993/205

⁵ *OJL* 31 5 February 1976 pp 1-7

EC bathing water directive microbiological standards				
Parameters	Units	Mandatory "T" value	Guide "G" value	Minimum sampling frequency
Total coliforms	number per 100 ml	10,000	500	Fortnightly (1)
Faecal coliforms	number per 100 ml	2,000	100	Fortnightly (1)
Faecal streptococci	number per 100 ml	-	100	(2)
Salmonella	number per 1 litre	0	-	(2)
Enteroviruses	PFU per 10 litres	0	-	(2)

PFU = Plaque Forming Units

- (1) When a sampling taken in previous years produced results which are appreciably better than those in this Annex and when no new factor likely to lower the quality of water has appeared, the competent authorities may reduce the sampling frequency by a factor of 2.
- (2) Concentrations to be checked by the competent authorities when an inspection in the bathing area shows that the substance may be present or that the quality of the water has deteriorated.

The directive is of importance both because of the public interest in bathing water quality and because of the costs involved in upgrading sewage treatment works to ensure compliance with the directive. In its *Annual Report 1992*, Ofwat stated that the cost of improvement schemes by the eight affected water companies in England and Wales amounted to £1.53 billion in the period 1989/90 to 1994/95 (although these costs include some related parts of the urban waste water treatment directive). A subsequent report in July 1993, *Paying for Quality: The Political Perspective* estimated that a further £0.26 billion would be required in the period 1995/96 to 1999/2000.

At the European Council Summit in Edinburgh in December 1992 the EC Commission was given a mandate to review the existing water quality directives "in the light of scientific knowledge and technical progress". As part of this review, it published proposals for a new bathing water directive in February 1994⁶. The proposals streamline the existing directive, dropping certain standards which were not felt to be particularly useful. The proposal would essentially leave the standard for faecal coliform unchanged but proposes a mandatory standard for faecal streptococci of 400 per 100 ml and would require more rigorous monitoring and compliance with the enterovirus standard. These changes have provoked controversy not least in the cost implications they might have in upgrading sewage treatment works.

⁶ EC draft 6177/94

II. Health effects of bathing water

There has been a number of scientific studies which have sought to establish whether there is a direct link between poor bathing water quality and increased levels of illness in bathers. Studies have been affected by a number of problems which have cast doubt on their accuracy. In order to overcome these problems, and following recommendations made in the 10th Report of the Royal Commission on Environmental Pollution⁷, the Department of the Environment commissioned research to investigate the Health Effects of Sea Bathing. The research contract was awarded to WRc, the water industry's Water Research Council with individual parts of the study being conducted by the Institute of Public Health at the University of Surrey, and the Centre for Research into Environment and Health (CREH) at the University of Wales, Lampeter. The overall study was conducted in three phases, commencing in June 1989 and completed in October 1993 with the final report being submitted in January 1994⁸. It is believed that the complete study is one of the largest and certainly the most comprehensive in scope yet to be undertaken [ibid].

The research was split into two main parts: a cohort study and a beach survey. In the cohort study, adult volunteers were recruited in advance and randomly divided into bathing and non-bathing groups. The bathing group was required to enter a pre-defined area of water for at least ten minutes, completely immersing their heads at least 3 times. Both bathers and non-bathers were given extensive medical interviews prior to the experiment and for the following 3 weeks. These interviews covered health, diet, water activities and other non-water related risk factors. Four separate studies were undertaken at four separate locations on four successive years (1989-1992) involving a total of 1,112 volunteers. For ethical reasons all four beaches involved were selected on the basis that they had met the mandatory standards of the bathing water directive.

The beach surveys took place at ten beaches where a total of 10,569 holidaymakers were interviewed about their bathing activities and other risk factors and then subsequently interviewed by telephone a week later. The beaches were selected to give a wide range of bathing water quality.

The final report of these studies contains a mass of detailed results but the most important findings were brought together in the conclusion. Some of these conclusions are reproduced below.

⁷ *Tackling Pollution - Experience and Prospects* Cmnd 9149 February 1984

⁸ WRc *Health Effects of Sea Bathing (WMI9021) - Phase 111: Final Report to the Department of the Environment* January 1994

3. In the case of the Beach Surveys, those participating in water activities reported more frequently than non-participants a number of categories of symptoms. These categories were eye; ear, nose and throat; skin and one or more symptoms. The relative likelihood (odds ratio) of participants doing so did not correlate with the concentrations of any microbial indicator of faecal pollution, but did correlate with increasing degree of water contact by those reporting the symptoms. It must be assumed that these symptoms result from prolonged contact with water and not from contact with waterborne pathogens.
6. In the Beach Surveys there were significant correlations between the number (geometric mean) of total coliform bacteria in the water and the likelihood of diarrhoea being recorded by those subjects who entered the water or waded in it, compared with the likelihood for those not having contact with water. In the case of enteroviruses, the correlation was highly significant. However, the likelihood of diarrhoea did not become statistically significant until total coliform counts reached or exceeded the imperative (mandatory) standards of the Bathing Water Directive or the average counts of enteroviruses were 10-40 times greater than implied by its imperative standard.
7. Data for objective and subjective gastro-intestinal symptoms from all four Cohort Studies were pooled and each category of symptoms was examined by logistic regression analysis. The only consistent relationship between water quality and the rates of gastro-intestinal symptoms occurred with faecal streptococci when measured at chest depth and when counts exceeded 35-40 per 100 ml.
8. The results of the Beach Survey studies for diarrhoea in those using the water and wading in it and of the Cohort Studies for objective gastro-intestinal symptoms in bathers, suggest that the Imperative standards of the Directive for total coliform bacteria and enteroviruses, and by implication for faecal coliform bacteria, give adequate protection to health and do not support the introduction of more stringent standards.

The then Minister of State for the Environment, Robert Atkins, gave details of the results of the studies in a written answer in January 1994⁹:

"The work has demonstrated for the first time that sea water itself has effects on sea bathers, causing an increase in reported symptoms such as eye irritations, sore ears and skin rashes. It has also confirmed the relationship which was already known between the level of particular micro-organisms in sea water and the reporting of gastro-intestinal symptoms and diarrhoea. However, the report concludes that the current mandatory EC standards give adequate health protection.

"I and colleagues in the other Departments agree with this assessment and believe that any additional benefit to be gained by tightening EC standards is likely to be insignificant.

"The Government is committed to securing improvements in our bathing waters. A £2 billion programme is in hand to bring virtually all UK bathing waters up to the mandatory standards of the EC Bathing Water Directive by the end of 1995. Already 80% of our 458 bathing waters meet or exceed these standards. The forthcoming very large expenditures to implement the Urban Waste Water Treatment Directive will improve further the quality of our coastal waters."

⁹ HC Deb 31 January 1994 478-9W

The results of these studies were used extensively by the Government in evidence to an inquiry by the House of Lords Select Committee on the European Committees into *Bathing Water* in the latter half of 1994¹⁰. In evidence, Dr Judith Hilton, a Senior Medical Officer at the Department of Health commented:

"...the United Kingdom bathing water study demonstrates that at the current level at which pollution is allowed [by the bathing water directive], there is no evidence of any significant increase in the risk of gastro-intestinal symptoms. So if you clean up your waters further, you are not actually going to get any additional benefits from it, because you cannot reduce the risk beyond the background risks of everybody who is on the beach doing other things."

However, the Committee's Specialist Adviser, Professor David Kay, who had been involved in the studies, produced a note on the *Summary of Epidemiological Evidence from the UK Sea Bathing Research Programme* which questioned the validity of the Government's conclusions on the report. He concluded that:

"...the WRc analysis represents a very preliminary assessment which should not be over interpreted. **It does not provide sufficient scientific foundation to sustain public policy formulation in the United Kingdom.**"

Professor Kay then went on to suggest that conclusion 9 of the WRc final report - that the results suggest that the imperative (mandatory) standards of the directive give adequate protection to health - were based on an incorrect interpretation of results. He concluded:

5.1 In scientific terms, the CREH results imply that total coliform organisms are an inappropriate predictor of health outcome and should therefore not be used in compliance assessment (as recognised by the Commission in removing it from the parameter suite of the proposed Directive and supported by many UK groups presenting evidence to the Committee). Furthermore, this interpretation fails to note that all four beaches examined by CREH had traditionally passed the EC *Imperative* standards for faecal and total coliform bacteria. Hence the CREH results indicate that faecal streptococci might be a better indicator of health outcome. They say less about the appropriateness or otherwise of existing coliform standards but do indicate that significant levels of symptom transmission might be expected at bathing beaches which currently pass these standards.

The results of further analysis of the studies by Professor Kay and his colleagues were published in *The Lancet* in October 1994¹¹. Their paper found a significant relationship between the levels of faecal streptococci and the rate of gastroenteritis in bathers. They found that the threshold for this increased risk was at a level of 32 faecal streptococci per 100 ml. Above this threshold the risk of gastroenteritis increased continuously. The discussion section of the paper commented:

¹⁰ HL 6 1994/5

¹¹ D Kay et al. "Predicting likelihood of gastroenteritis from sea bathing: results from randomised exposure" *The Lancet* 1 October 1994 pp 905-909

"This is the first time that the methods of a randomised controlled clinical trial have been applied to an environmental exposure. The relation between faecal streptococci concentration measured at chest depth and gastroenteritis is robust. No other microbiological indicator at any sampling depth displayed a significant trend relating concentration to gastroenteritis rate. The biological basis of this observation is unknown and there is no suggestion that faecal streptococci was the aetiological agent involved. However, it would be logical to presume that whatever causes gastroenteritis co-partitions in sea water with faecal streptococci. A Norwalk-like virus is one possibility. The case definition of gastroenteritis used gave relative prominence to upper gastrointestinal symptoms which frequently predominate in outbreaks of viral gastroenteritis. These viruses cannot be isolated from surface waters with current techniques...

"Our findings are not applicable to younger bathers or special interest groups such as surfers, sailboarders, and divers; nor can they be extrapolated to freshwater recreation sites. They do show that existing EC standards have very little public health significance to coastal bathing waters in temperate north-west Europe. Indeed coliforms seem to have little value as indicators of the risks of gastroenteritis from sewage pollution of coastal waters. Faecal streptococci concentrations are a better microbiological indicator of whether sea water is fit for bathing in and should replace coliform concentrations as the basis of official standards. Some movement in this direction is evident in proposed amendments to EC bathing water standards. Information of faecal streptococci concentrations, resort-by-resort and day-by-day, may have an important role in helping people decide whether to bathe or not."

In their report, the House of Lords Select Committee on the European Committees made the following comments about the scientific evidence:

25. The research evidence shows that the relationships between water quality and gastrointestinal symptoms are continuous above a threshold of 35-40/100ml for faecal streptococci. Above that level no further thresholds have been found: there is no known level of the parameter above which the health risks show a step increase or a steeper rate of increase. For adults the level of risk of diarrhoea lasting on average four days from bathing in waters with faecal streptococci concentration of about 80/100ml seems to fall between the lesser risk from eating certain common foods (for example, mayonnaise, bought sandwiches or hamburgers) and the greater risk of living with a family member with a gastro-intestinal illness. For children the risks are likely to be of greater significance because of children's greater susceptibility to debilitation from persistent diarrhoea. The risks to children might be more fully established by a full analysis of the data already gathered as part of the WRC survey. We endorse the WRC Report's recommendation that this further analysis should be carried out.

As far as the Government's response to the WRC report was concerned, the Lords' Committee stated:

21. The Committee regrets as unjustified by the latest scientific evidence that the Department is here not yet giving sufficient weight to what the Committee regards as one of the key findings of the most recent research, which they, with others, commissioned. Conclusion 7 of the WRC report states that "...the only consistent relationship between water quality and the rates of gastrointestinal symptoms occurred with faecal streptococci when measured at chest depth and when counts exceeded 35-40/100 ml." The reference to chest depth is crucial: the

linkage between increased symptoms and increased faecal streptococci counts was found where the samples were taken just below the surface in water of 1.3-1.4m depth, but not where the samples were taken 30 cm below the surface in water of 1m depth, as required by the current directive. The Committee heard in evidence no justification for the depth at which sampling is prescribed by the current directive. We recommend that the Government should carry out further research into the most appropriate sampling depth, taking full account of the findings of the WRc Report. We think the WRc Report has made a valuable contribution to the evaluation of the health risks of sea bathing and commend the Government for commissioning the only comprehensive study of this issue in Europe. We think that the relationship found in samples taken at chest depth which was replicated at three different beaches is important: chest depth is, after all, the depth at which bathers start to swim, suffer thermal shock and are most likely to ingest water. This relationship must be taken fully into account.

In their response to the Committee's report, the Government stated¹²:

Significant correlation was found in the WRc study between bacterial and viral indicators in samples taken in accordance with current routine monitoring at depths specified by the Directive and diarrhoea in subjects entering waters which failed the Directive's standards. However, the Committee's reservation about the current sampling depth is noted and it will be discussed with the Regulatory Authorities.

In relation to health effects, the WRc study was conceived as a single piece of research involving two complementary methods. Rather than taking a view of individual conclusions from one part of the study, findings from the study as a whole should be taken into consideration. The Government has sought to do this.

The relationship demonstrated between faecal streptococci and symptoms in the cohort study should be seen in the context of the absence of such a relationship in the much larger beach study. This study involved over 16,000 participants of all ages, compared with just over 1,000 adults in the cohort study. It covered beaches with a wide range of different water qualities including some that did not meet current standards. Activities included not only swimming but wading, diving and surfing.

Whilst the findings of the cohort study support the use of faecal streptococci as an indicator of bathing water quality, particularly in water of good quality, they do not help in setting a health-related standard. The robustness of the model used to predict a dose-response relationship and the extent to which it can be applied to other beaches and generalised for all water users, are questionable.

The draft WRc report was reviewed by independent experts who concluded, in the context of the full report, that the data did not support the dose-response relationship proposed. In particular, they noted the great variability in bacterial counts in samples taken from the same site and the resulting uncertainty in the measurement of the relationship between bacterial counts and health effects.

The model was developed from the particular data collected during the study. It has not been

¹² Select Committee on the European Communities *Correspondence with Ministers* HL 83 1994/95
11 July 1995 pp. 31-38

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validated for other beaches nor is it apparent that a standard based on adult swimmers is appropriate for the protection of the health of the generality of water users. The Government therefore does not consider that a sufficiently clear threshold for health effects has been established.

III. Current directive and compliance

In assessing compliance with the current directive attention needs to be paid not just to the results of monitoring but also to adequate sampling regimes and the proper identification of bathing waters.

A. Identification of bathing waters

Following the introduction of the bathing water directive the UK Government initially identified only 27 beaches as coming within its scope. Further details of the whole issue of identification were discussed in the NRA's report on *Bathing Water Quality in England and Wales - 1990*:

Article 1 of the Directive defines bathing water as "*all running or still fresh waters or parts thereof and sea water, in which:*

- *bathing is explicitly authorised by the competent authorities of each Member State; or*
- *bathing is not prohibited and is traditionally practised by a large number of bathers."*

The initial view of the UK Government was that there were no statutory provisions by which any public body could explicitly authorise bathing, and that the entitlement to bathe derived from custom. The provision by which byelaws can be made under Section 231 of the Public Health Act 1936 regulating the areas in which public bathing is permitted, allows local authorities to limit an existing entitlement and does not create one.

The Government therefore designated UK bathing waters on the basis of where "bathing is not prohibited and is traditionally practised by a large number of bathers". Water Authorities and District Councils were required to carry out an identification exercise in August 1979 according to the criteria set out in a Government Advice Note of 9 July 1979. Bathing waters were to be designated on the basis of the density of bathers such that:

- bathing waters with fewer than 500 people in the water at any one time would not be designated;
- stretches of bathing waters would be designated where the number of bathers exceeded 1500 per mile; and
- bathing waters with between 750 and 1500 bathers per mile would be open to negotiation between the Water Authorities and District Councils.

This policy resulted in the initial designation of only twenty seven bathing waters for the UK, of which none were in Scotland or Northern Ireland. The exercise excluded the consideration of inland, freshwater bathing areas.

This minimal list caused a great concern and debate, particularly as premier seaside resorts such as Blackpool and Brighton were not designated. Other reports have subsequently claimed that bathing was traditionally practised at over 600 beaches in England and Wales...

The criticism by the Royal Commission on Environmental Pollution on the limited number

of designated bathing waters, and the issuing of a Reasoned Opinion by the Commission that the UK Government had failed to take all necessary steps to comply with the Directive, with the threat to start infringement procedures, led to the Government announcing on 3 February 1987 that an additional 362 bathing waters had been identified for the purposes of the Directive, in addition to the initial twenty seven designated waters...

The number of bathing waters identified in the UK since the introduction of the directive are shown in the table below:

History of identification of bathing waters in the UK				
Year(s)	England & Wales	Scotland	Northern Ireland	UK
1979-86	27	0	0	27
1987	360	23	14	397
1988	364	23	16	403
1989	401	23	16	440
1990	407	23	16	446
1991	414	23	16	453
1992	416	23	16	455
1993	418	23	16	457
1994	418	23	16	457
1995	425	23	16	464

B. Identification of freshwaters

The UK has not identified any freshwaters as bathing waters under the terms of the directive. This is in contrast to all other EU countries some of whom have identified large numbers (France - 1,666 and Germany - 1,915) whilst others have identified less (Greece - 4)¹³. The fact that the UK had not identified any freshwater sites was remarked upon by the House of Commons Select Committee on European Legislation in a report on the proposed revision of the bathing water directive¹⁴:

"We also ask for the Government's views as to whether the protection afforded by the existing Directive should be applied to inland waters."

The Government's response to this was contained in its Second Supplementary Explanatory Memorandum on the EU proposal:

¹³ European Commission *Quality of Bathing Water 1994 1995*

¹⁴ House of Commons Select Committee on European Legislation *Twenty-fourth Report* HC 48-xxiv 1993/94 pp x-xiii

"...Inland waters which conform to the definition of a bathing water in Article 2 fall within the scope of the existing Directive. Early attempts to develop an interpretation of what is meant by the phrase 'a large number of bathers' contained in the definition of a bathing water in the Directive were not successful and it has subsequently become apparent that there are considerable practical difficulties in making reliable assessments of bather numbers. Following the advice from the Commission given in answer to the question in the European Parliament from Mr Prag MEP, the Government takes into consideration the existence of facilities which provide evidence that the waters are well used by bathers. In the Government's view this is the most practical way of distinguishing between heavily used bathing waters which are clearly within the Directive's scope and lightly used waters which are not.

"In general the most popular bathing waters have been identified. However, the process of identification continues and a small number of applications for identification are received each year. Each case is considered on its merits and no distinction is drawn between coastal or inland waters. A number of inland waters are used for water recreation but, so far, none has been found to fulfil the criteria for bathing waters under this Directive."

C. Sampling procedures

Details of the sampling procedures in England and Wales have been given in the NRA's latest report on bathing water quality in 1995¹⁵:

"The bathing season in England and Wales runs from 15 May to 30 September and sampling commences two weeks before the start of the season. NRA policy is that 20 samples are taken at regular intervals throughout the season at each site. All samples are taken at predetermined points off the beach of the identified bathing water where the daily average density of bathers is at its highest. Samples are normally taken 30 cm below the surface..."

"Twenty samples were taken for coliform analysis at each bathing water... and two samples were analysed for salmonellae. A minimum of two samples are analysed for enteroviruses at those bathing waters which failed the mandatory coliform standards during the 1994 season... Twenty samples from all identified bathing waters... were also analysed for faecal streptococci."

The procedure in Scotland is very much the same, although the bathing season is shorter¹⁶:

"A minimum of 20 samples are taken at each site during the bathing season, defined in Scotland as 1 June to mid-September, and the 2 weeks preceding the season. Compliance is achieved if no more than one sample in 20 fails to meet the mandatory standard for either total or faecal coliforms.

¹⁵ NRA *Bathing Water Quality in England and Wales - 1995* March 1996

¹⁶ Scottish Office Agriculture, Environment and Fisheries Department *Bathing Waters in Scotland: Monitoring in 1995 Summary of Results* February 1996

D. Results of monitoring and assessment of compliance

In Scotland 19 (83%) of the waters passed the standard required for total and faecal coliforms while 4 (17%) failed. The Scottish Office stated that "this was an increase of 3 passes from 1994 and was the highest number of waters to meet the standards since monitoring began" [ibid]. It also commented that:

"The exceptionally good weather during the summer is likely to have improved water quality because sunlight kills bacteria and low rainfall reduces the frequency of storm sewage discharges which may occur in the vicinity of bathing waters..."

In England and Wales there were 425 identified bathing waters in 1995. Of these, 379 (89%) met the mandatory standards for total and faecal coliforms, and 173 (41%) met the guideline standards for coliforms and faecal streptococci. Full details for the different NRA regions are shown in the table below.

1995 Monitoring results of identified EC bathing waters in England and Wales					
NRA region	Number of bathing waters	Compliance with mandatory coliform standards		Compliance with Blue Flag microbiological guideline standards	
		Number	%	Number	%
Northumbrian	34	33	97.1	16	47.1
Yorkshire	22	20	90.9	10	45.5
Anglian	34	30	88.2	9	26.5
Thames	3	3	100	1	33.3
Southern	67	62	92.5	28	41.8
Wessex	42	40	95.2	20	47.6
South West	134	127	94.8	66	49.3
North West	33	15	45.5	0	0.0
Welsh	56	49	87.5	21	37.5
Total	425	379	89.2	173	40.7

The NRA's 1995 bathing water report made the following comments about compliance with the directive:

The mandatory coliform standards given in the directive which are generally used to assess compliance require there to be no more than 10,000 total coliforms per 100 ml and no more than 2,000 faecal coliforms per 100 ml. In order for a bathing water to comply 95% of samples taken must meet these standards.

During the 1995, bathing season, 425 identified bathing waters were examined in England and Wales. The number of bathing waters complying with the Directive, as determined by the DoE on the basis of the coliform parameters, was 379; that is to say, 89.2%. This is an increase of 6.7% compared with the results of the 1994 survey.

The reference above to "bathing waters complying with the directive, as determined by the DOE on the basis of coliform parameters" would appear to be a reference to the fact that the results of sampling for enteroviruses and salmonella have not been taken into account in determining compliance. Including these results in determining compliance would significantly reduce the number of compliant bathing waters. For instance, there were 64 bathing waters which met the mandatory standards for total and faecal coliforms but failed the mandatory zero enteroviruses standard. On a strictly legal basis failures in the mandatory enteroviruses and salmonella standards result in non-compliance. For instance, the inclusion of the enteroviruses results would reduce compliance to 74%. In practice, however, results are only reported on the basis of total and faecal coliforms across the EU. The reason for this is that many EU countries do not monitor for enteroviruses as the directive states:

"Concentrations to be checked by the competent authorities when an inspection in the bathing area shows that the substance may be present or that the quality of the water has deteriorated."

In 1994, the last year for which Community-wide results are available, only three other countries made any monitoring of enteroviruses. The UK undertook the most sampling (191) followed by Spain (135), France (26) and Ireland (1). The UK reported 149 failures whilst no failures were found in the three other countries. The European Commission commented on this issue in its report on the *Quality of Bathing Water 1994*:

The situation has been improving over the last few years. The proportion of areas identified by the Member State complying with the standards has been rising steadily, and in 1994 reached 82%.

However, the position concerning enteroviruses has deteriorated compared to the 1993 bathing season. The Member State is requested to identify those factors related to the presence of enteroviruses and to take all appropriate measures in order to improve the situation. The United Kingdom is the only Member State operating an extensive and comprehensive enterovirus monitoring programme. Therefore there can be no comparability with data from other Member States.

The 1995 NRA report on bathing water quality also set out information on the variation in compliance of bathing waters from one year to next and the effect of last summer's good weather on the results:

"A significant number of bathing water show results for mandatory microbiological parameters that fall on the borderline between compliance and non-compliance. These bathing waters pass the Directive's standards one year and fail the next (or vice versa). This volatility is caused by a combination of the inherent variability of the data collected over the bathing season and the way in which compliance within the Directive is assessed on a "pass/fail" basis. Changes in compliance can therefore be caused simply for no other reason than the

laws of chance. Weather conditions can also play a part in the overall compliance level experienced during a bathing season. During the 1995 Bathing Season it is believed that the unusually dry and sunny weather conditions are likely to have contributed to the increase in compliance of bathing waters in England and Wales. The effects of these conditions are twofold; firstly increased and more intense sunlight causes bacteria in the water to die off more quickly therefore reducing bacterial counts in the bathing water, secondly the drier conditions result in less frequent operation of combined sewer overflows which tend to discharge via short outfalls close to the Bathing Waters. As a consequence there has been a reduction of untreated sewage material flowing into coastal waters.

"It is interesting therefore to examine the consistency of compliance by looking at the number of bathing waters that have failed the Directive in three, two, one or none of the previous three bathing seasons..."

Details of compliance rates over three year periods is shown in the table below:

Consistency of compliance in England & Wales over 3 year periods						
	1988-90	1989-91	1990-92	1991-93	1992-94	1993-95
No failures (%)	57	60	64	63	65	70
Failed 1 year (%)	18	22	16	17	17	16
Failed 2 years (%)	12	6	8	11	13	11
Failed 3 years (%)	13	13	12	9	5	3

Similar figures for Scotland are also shown in the Table below¹⁷:

Consistency of compliance in Scotland over 3 year periods						
	1988-90	1989-91	1990-92	1991-93	1992-94	1993-95
No failures (%)	35	43	43	57	61	70
Failed 1 year (%)	30	22	17	13	13	4
Failed 2 years (%)	9	13	17	13	4	13
Failed 3 years (%)	26	21	22	17	22	13

Full monitoring results for the last five years in the UK, giving details of compliance with the mandatory standards for total and faecal coliforms are shown in the table below.

¹⁷ Scottish Office Agriculture, Environment and Fisheries Department *Bathing Waters in Scotland: Monitoring in 1995 Summary of Results* February 1996

UK compliance with EC bathing water directive coliform standards 1991-95										
	Identified bathing waters					Numbers complying				
	1991	1992	1993	1994	1995	1991	1992	1993	1994	1995
Northumbrian ¹	33	34	34	34	34	21	20	25	29	33
Yorkshire ¹	22	22	22	22	22	19	20	21	20	20
Anglian	33	33	33	33	34	29	31	28	27	30
Thames	3	3	3	3	3	2	3	3	2	3
Southern	67	67	67	67	67	45	51	58	53	62
Wessex ¹	39	39	42	42	42	36	36	35	40	40
South West ¹	133	134	133	133	134	105	117	107	111	127
Welsh	51	51	51	51	56	45	39	42	39	49
North West	33	33	33	33	33	10	11	13	24	15
England and Wales	414	416	418	418	425	312	328	332	345	379
Scotland	23	23	23	23	23	15	15	18	16	19
Northern Ireland	16	16	16	16	16	16	15	15	15	15
United Kingdom	453	455	457	457	464	343	358	365	376	413

¹ Northumbrian and Yorkshire and Wessex and South West NRA regions amalgamated into 2 regions in 1993, separate res

Source: DOE Digest of
DOE News Rel

E. Non-compliance and ECJ ruling

The fact that a number of UK beaches fail to meet the mandatory standards in the directive has attracted much comment from environmental groups such as Friends of the Earth, the Marine Conservation Society and Surfers Against Sewage. As a result of these failures the UK was taken to the European Court following infraction proceedings initiated by the Commission in 1986.

The Court made its ruling in July 1993, finding the UK in breach of the directive in respect of bathing waters in Blackpool. The Government had argued that because the beaches in question had only been identified as bathing waters in 1985 the beaches did not need to comply with the directive until 1995. The directive required bathing waters to comply within 10 years following the notification of the directive, in other words by 31 December 1985.

The Commission drew the UK's attention to the situation concerning the bathing waters in Blackpool and adjacent Formby and Southport in letters of 3 April and 30 July 1986 respectively. Further to this, the Commission issued a reasoned opinion on 2 February 1988 arguing that the directive was still being infringed and gave the UK two months to adopt the measures necessary to ensure that the bathing waters at those beaches met the quality standards of the directive. In June 1988, the UK replied to the reasoned opinion, giving reasons why it thought the directive was not being breached. The Commission did not accept these arguments and in March 1990 the case was referred to the Court of Justice. The Court eventually produced a judgement on the case on 14 July 1993, when it ruled against the UK for the beaches at Blackpool and Southport, but in favour of the UK at Formby¹⁸.

The Government's defence to the case was that since the beaches were not included in the original 27 designated bathing waters, they did not need to meet the deadline for improvements of 31 December 1985 for designated waters (10 years after the directive came into force). The Government argued that since the Commission did not initially respond to the UK's letter of September 1980 defending its designations, it had believed that the Commission accepted its list of bathing waters. Two other defences were also introduced, namely that the definition of a bathing water was too imprecise to enable a Member State to identify waters falling within the scope of the directive and also that the directive only required States to take all practicable steps to comply with the directive rather than a requirement for the necessary water quality to be achieved. All these arguments were rejected by the Court [ibid]

¹⁸ Case C-56/90 *Judgment of the Court* 14 July 1993

F. Compliance of other EU countries

Details of compliance of all the EU countries with the bathing water directive are published in annual reports on bathing water quality by the European Commission. The results for 1994 for sea waters (as opposed to freshwaters) are shown in the table below¹⁹:

Compliance of EU countries with total and faecal coliform standards 1994				
Country	Identified waters	Mandatory standards (%)	Guideline standards (%)	Waters insufficiently sampled (%)
Belgium	39	92.3	30.8	0.0
Denmark ¹	1,190	95.1	84.3	0.1
Germany	444	80.2	59.0	5.0
Greece	1,282	94.9	91.0	1.8
Spain	1,490	96.1	83.4	0.7
France	1,870	90.3	69.4	0.9
Ireland	108	100.0	89.8	0.0
Italy	4,543	86.4	81.0	8.5
Netherlands ¹	52	63.5	46.2	36.5
Portugal	315	83.2	74.3	8.6
United Kingdom	457	82.3	33.7	0.0

¹ Member States for which only data on total coliforms are partly available, then only faecal coliforms are considered.

Source: European Commission's *Quality of Bathing Water 1994*

The UK is not the only member state to have had infraction proceedings taken against it by the Commission. Such actions can be taken for two reasons:

Directive "not properly implemented" - proceeding pursued on the ground that the Directive has not been properly incorporated into national law.
ie. the national law does not cover all the requirements of the directive.

Directive "not properly applied" - proceeding pursued on the ground that the Directive is not being applied properly.
ie. the law is comprehensive but is being broken in some way.

¹⁹ European Commission *Quality of Bathing Water 1994 1995*

Details of proceedings are published in the Commission's *Annual reports on monitoring the application of Community law*^{20,21} the most recent of which are shown in the table below:

Recent infraction proceedings against Member States			
Country	Case	Reason	Proceedings
Greece	87/0315	Not properly applied	Reasoned opinion in 1988 Terminated in 1993
Germany	89/0317	Not properly applied	Reasoned opinion in 1994
Spain	89/0418	Not properly applied	Reasoned opinion in 1990 Referral to be sent in 1994
France	87/0507	Not properly applied	Reasoned opinion in 1991 Terminated in 1993
Ireland	90/0152	Not properly implemented	Reasoned opinion in 1991 Terminated in 1992
Italy	87/0356	Not properly implemented	Reasoned opinion in 1988 Referral to be sent in 1995
Luxembourg	90/0289	Not properly applied	Reasoned opinion in 1991 Terminated in 1993
Netherlands	89/0651	Not properly applied	Reasoned opinion in 1992 Terminated in 1994
UK	86/0214	Not properly applied	Judgement in 1993 Case C-56/90

G. Improvement schemes

In November 1990, in announcing the monitoring results for the 1990 bathing season, the then Secretary of State for the Environment, Chris Patten, announced that the Government aimed "to complete the improvement programme for all bathing waters that presently fail to comply with EC standards by 1995"²²:

Provisional results for the survey carried out during the 1990 bathing season showed that 77 per cent. of the 446 identified bathing waters in the United Kingdom met the mandatory coliform bacteria standards of the EC bathing water directive. This compares with 76 per cent. of the 440 identified bathing waters in 1989.

²⁰ *Commission Twelfth Annual Report to the European Parliament on monitoring the application of Community law 1994* OJC 254 29 September 1995

²¹ *Commission Eleventh Annual Report to the European Parliament on monitoring the application of Community law 1993* OJC 154 6 June 1994

²² HC Deb 14 November 1990 cc 160-2W

Although this maintains the steady improvement of recent years, I believe that more urgent action is required to bring all our bathing waters up to the highest standards. Last March I announced that in future all substantial discharges of sewage to sea should be treated at a sewage treatment works. The estimated cost of this was £1.5 billion. I am now able to announce that following discussions with the water companies in England and Wales, they have agreed to provide additional treatment for around 40 improvement schemes at an estimated cost of about £600 million over the next five years. This is on top of the £1.4 billion bathing water compliance programme announced last year which the companies have also agreed to advance where possible.

This means that bathing waters will be improved sooner, and for many discharges the standard of treatment provided will be better than previously planned. Our aim is to complete the improvement programme for all bathing waters that presently fail to comply with EC standards by 1995, although present indications are that this may not be practicable for nine large schemes where there are major technical difficulties.

In fact it would appear that the improvement programme has fallen behind schedule with some schemes not being ready until the 1999 bathing season. The NRA's 1995 bathing water report commented:

"In general progress on the... remaining schemes in England and Wales is on schedule. Completion of some schemes has had to be re-phased because of objections, now largely resolved, to planning or discharge consents or the need to follow compulsory land purchase procedures."

Details of completion dates for the outstanding schemes are shown in the table below:

Bathing water schemes in progress after June 1995										
NRA Region	Completion by									
	April 1996		April 1997		April 1998		April 1999		Total	
	Schemes	(Waters)	Schemes	(Waters)	Schemes	(Waters)	Schemes	(Waters)	Schemes	(Waters)
Northumbrian	3	(8)							3	(8)
Anglian	1	(1)	1	(6)	1	(1)			3	(8)
Thames					1	(3)			1	(3)
Southern	6	(10)	1	(2)	1	(2)	3	(5)	11	(19)
South West	4	(7)	5	(9)	2	(9)	2	(5)	13	(30)
North West	8	(15)	1	(3)					9	(18)
Welsh	2	(3)			3	(10)	1	(1)	6	(14)
Total	24	(44)	8	(20)	8	(25)	6	(11)	46	(100)

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It should be noted that:

"...the dates shown as scheme completion dates are target dates for the commissioning of the last stage of the remedial works. Depending on the nature of the scheme, water quality improvement may be achieved before the completion of construction and commissioning"

There are no schemes in the old Yorkshire and Wessex regions due to be in progress after June 1995, and the above table excludes Porthallow bathing water in the South Western Region which has no completion date.

IV. Proposals for a revised directive

A. The Commission's proposals

At the European Council Summit in Edinburgh in December 1992 the EC Commission was given a mandate to review the existing water quality directives "in the light of scientific knowledge and technical progress". As part of this review, it published proposals for a new bathing water directive in April 1994²³. The proposal has been considered by the House of Commons Select Committee on European Legislation in three short reports^{24,25,26} and by the sub-committee C of the House of Lords Select Committee on the European Communities in two longer studies^{27,28}. The Lords' reports and the proposal were debated in May 1995²⁹.

In the Explanatory Memorandum (EM) to the proposal, the European Commission stated that its aims were to:

- maintain the protection of the environment and public health provided by Council Directive 76/160/EEC, to take advantage of technical progress and to focus on the most significant parameters;
- simplify the operation of the Directive by deleting redundant parameters and making certain definitions more explicit, thus reducing the financial burden on Member States without reducing the level of protection of public health and the environment; and
- ensure that Member States take action in cases of deteriorating water quality and make further provisions for the identification of new bathing waters, while allowing the necessary time in both instances for the waters in question to be brought up to the Directive's standards.

Commenting on the scientific basis for the proposal it stated:

Directive 76/160/EEC contains provisions based on microbiological and physico-chemical indicators.

However, since the adoption of Directive 76/160/EEC in 1976, there has been a considerable growth in scientific knowledge on microbiology and also an improvement in analytical techniques.

In particular, recent scientific findings in microbiological research enable the operation of Directive 76/160/EEC to be simplified by deleting redundant parameters and making certain

²³ EC draft 6177/94

²⁴ Select Committee on European Legislation *Twentieth Report* HC 48-xx 1993/94 pp xxiv-xxviii

²⁵ Select Committee on European Legislation *Twenty-fourth Report* HC 48-xxiv 1993/94 pp x-xiii

²⁶ Select Committee on European Legislation *Thirteenth Report* HC 70-xiii 1994/95 pp vii-ix

²⁷ House of Lords Select Committee on the European Communities *Bathing Water* HL 6-I 1994/95 6 December 1994

²⁸ House of Lords Select Committee on the European Communities *Bathing Water Revisited* HL 41 1994/95 21 March 1995

²⁹ HL Deb 18 May 1995 cc 684-708

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definitions and obligations more explicit.

Epidemiological studies carried out in several countries since 1976 have provided a great deal of information in relation to the use of pollution indicators relating to health protection.

Details of the changes proposed to the microbiological parameters are shown in the table below:

Comparison of microbiological parameters of existing and proposed directive			
Parameters	Existing directive		New proposed directive
	Mandatory "T" value	Guide "G" value	
Total coliforms	10,000/100ml	500	Parameter deleted
Faecal coliforms	2,000/100ml	100	Replaced by E.coli
Faecal streptococci	-	100	Mandatory value of 400/100ml
Salmonella	0/1 litre	-	Parameter deleted
Enteroviruses	0/10 litres	-	Mandatory monitoring obligation imposed

Reasons for these changes were also set out in Commission's Explanatory Memorandum. So far as total and faecal coliforms were concerned it stated:

The coliform parameters in Directive 76/160/EEC serve only as indicators of faecal pollution and of the possible presence of pathogens.

The results have no absolute significance. However, there is considerable overlap between the present two parameters: total coliforms and faecal coliforms.

The principal difference between them is that total coliforms are enumerated after incubation at 37°C while faecal coliforms are incubated at 44°C. Therefore, in the interest of simplicity it is proposed to retain only the faecal coliform parameter. In practice this is usually the stricter of the two conform standards.

The opportunity has been taken to rename the parameter *Escherichia coli*. This name is preferable because it reflects modern scientific usage and because *Escherichia coli* (*E. coli*) is the most readily and reliably measured form of coliforms. Their presence is characteristic of faecal pollution.

On the standard for faecal streptococci, the EM stated:

Faecal streptococci together with *E. coli* are probably the most significant single indicators of faecal pollution and so of the risk to the health of bathers from the presence of pathogenic microorganisms. There is therefore now a mandatory value for this parameter. The value chosen reflects scientific evidence...

On salmonella and enteroviruses, the EM commented that it had "been argued that the

standards in the 1975 Directive are, in some cases, impossible to respect because the parameters are ubiquitous" and that "no action a Member State might take could guarantee compliance". Consequently, as far as salmonella was concerned, the EM stated:

...the amended Article 6(3) contains an obligation for competent authorities to identify all discharges which might lead to salmonella reaching bathing areas, and to take appropriate action to avoid pollution from such sources.

Consequently, the parameter salmonella has been deleted from the Annex. As there must be a certain concentration of salmonella present in bathing water before a danger of infection arises, the general provision of Article 7(1) on prohibition where there is a threat to public health, seems appropriate for all cases in which the presence of salmonella gives rise to problems.

However, the Commission said that "with enteroviruses matters are different":

The term enteroviruses includes many individual kinds of virus, some of which are very infectious. There is therefore good reason to have a strict standard and the existing value is retained for the present.

The difficulty is that the isolation and enumeration of enteroviruses is time-consuming and expensive and requires well-equipped laboratories with highly skilled personnel. It is therefore proposed to replace this parameter in due course, and as soon as scientific evidence allows, by the parameter bacteriophages...

However, in some cases, it is possible to simplify the application of the present enterovirus parameter.

Where the guide value for faecal conforms and the mandatory value for faecal streptococci were complied with during the two preceding bathing seasons, it is expected that the bathing water will be of good quality. In such cases enteroviruses need only be measured twice in a bathing season. The exception does not apply to waters receiving discharges of chemically disinfected sewage. This is because disinfection could well reduce the bacteria counts substantially without producing a corresponding reduction in the numbers of viruses present.

In retaining the enterovirus mandatory standard the directive also tightens up the currently qualified requirement for monitoring which states:

"Concentrations to be checked by the competent authorities when an inspection in the bathing area shows that the substance may be present or that the quality of the water has deteriorated".

As stated above, virtually all Member States apart from the UK do not bother to monitor for enteroviruses and in practice it is ignored when assessing compliance with the directive. The new directive would require enteroviruses to be monitored at all bathing waters at least twice each season:

Footnote (2), on the opportunity of sampling has been deleted. This has removed an area of uncertainty. All parameters are important and should be measured regularly. It is only in this way that the results for different bathing waters can be compared on a correct basis.

The Commission suggested that the new proposal would have only "minor cost implications":

The assessment in financial terms of the improvement in the quality of the environment and public health is difficult to quantify. There is no reliable basis upon which an objective calculation to measure the value and security of a better environment can be made.

There is little doubt, however, that Directive 76/160/EEC has made a significant contribution towards improving the quality of life for the citizens of Europe in the 17 years since its adoption. Therefore, a revised directive which includes technical amendments will continue to provide such added value.

The new technical amendments aim at updating the scientific framework of the Directive and improving its practical implementation. The modifications proposed in this revised and consolidated text are considered to have minor cost implications. Firstly, Member States have long since implemented Directive 76/160/EEC. The continuing costs of monitoring and analysis are required to ensure a basic level of health protection. Therefore, these costs should not be attributed to revised Community legislation in this field.

The costs for remedying the problems related to bad quality bathing water resulting from untreated sewage should be attributed to that source of pollution. The measures required to address these problems are contained in Council Directive 91/271/EEC of 21 May 1991 concerning Urban Waste Water Treatment.

With regard to the financial benefits of a revised Bathing Water Directive, it is important to note that good quality bathing water at established holiday resorts helps to ensure that these remain popular with tourists and are not abandoned in favour of new locations. Thus the consequential loss of revenue from a reduced tourist trade as well as the unnecessary consumption of unspoilt coastal resources can be minimized.

B. Effects of proposed standards on compliance

The new directive if adopted as it currently stands would be likely to have a significant effect on the current rates of compliance in the UK. The NRA has attempted to estimate how many bathing waters would pass the proposed new standards. In 1993, 79% of bathing waters in England and Wales passed the mandatory standards for total and faecal coliforms. However, only 63% would have passed the proposed mandatory standard for faecal coliforms and faecal streptococci³⁰. Using the 1994 data, the number of compliant waters would drop from 83% to 67%. The above figures are based on the measured streptococci value but the new directive would allow abnormal peak values to be ignored if re-testing shows the value to be normal. The effect of this could significantly improve the chance of a bathing water complying with the mandatory standard, depending upon how "abnormal" was defined.

³⁰ This new directive proposes the use of E.coli instead of the faecal coliforms currently measured and so these figures may not be exactly equivalent.

The effect of requiring enteroviruses to be monitored at all bathing waters and including the results in assessing compliance would reduce the figures above still further. As noted above, last year the inclusion of the enterovirus results would have reduced compliance from 89% to 74% in England and Wales and enteroviruses were only actually monitored at 39% of bathing waters.

C. Scientific justification for the new standards

The House of Lords Select Committee on the European Communities made a number of comments about the appropriateness of new standards in light of the research conducted by the WRc in the Health Effects of Sea Bathing study as discussed in Section II above):

22. We think that the crucial issue arising from the WRc findings is whether gastro-intestinal symptoms constitute only "trivial" illness with which the directive should not be concerned and, if such illness is more than "trivial", whether the findings justify the setting of an *Imperative* [mandatory] level at about the 40/100ml level. The *Imperative* level proposed by the Commission is 400/100ml, an order of magnitude greater than 40/100ml...

24. The Committee sees the dispute over the level for this parameter as going to the heart of the public health issues raised by the bathing water directive. The key question, we think, is what level of protection from health risk should be provided. The Committee sees the setting of the *Imperative* value for this and other parameters as primarily a political issue to be decided by what is seen, after an educated public debate, as an acceptable level of risk. There is no firm evidence that the present directive, where its requirements are met, does not achieve a satisfactory level of protection from what our medical witnesses called "serious illness". However, neither the present requirements for compliance nor those proposed under the new directive provide or would provide protection from gastro-intestinal symptoms or from respiratory illnesses of the sort which are self-limiting. Such illnesses may well cause inconvenience and disruption to daily or holiday life and be regarded as serious by the individuals concerned; but the illnesses are unlikely to require more than self-administered treatment of a widely available kind. These illnesses are, therefore, unlikely to show up in any official statistics of serious or communicable diseases...

26. At present it is easy for the public to believe that, if a bathing water complies with the EC directive, ie meets the *Imperative* standards set by the directive, bathing will be risk free. This is, of course, an error. Completely risk free environments do not exist in water, in the air or on land. What needs to be understood is that there is a progressive relationship between sewage contamination and the health risks of bathing. More contamination means more risk, but not necessarily more risk of more serious illness. Less contamination means less risk of illness, but requires more expenditure on more, and more sophisticated, sewage disposal. Until both sides of the cost-benefit equation can be assessed and validated by research, decisions on *Imperative* levels to be imposed will be to some extent arbitrary. This arbitrariness is particularly disquieting where large sums of public money are at stake.

27. There are conflicting pressures on policy makers here, as with so many environmental issues. On the one hand, the general and admirable wish to improve human well-being leads to setting more stringent environmental standards, but on the other hand the costs of action to enforce stringent standards lead to acceptance of a situation falling short of the ideal.

28. On the evidence available to us, we are not convinced that there is justification for imposing on the public significantly higher costs, in water charges or taxes, in order to reduce somewhat the present level of risk of the self-limiting illnesses associated with bathing. For bathing waters meeting the current *Guideline* standards for faecal streptococci, (100/100ml), the present risks, we believe, are broadly in line with other virtually irreducible risks from normally acceptable eating and living habits in this country. The NRA told us that, in 1993, 41 per cent of the identified British bathing waters met this *Guideline* standard. We have to conclude that for most British bathing waters, including those said to comply with the directive-which only requires meeting *Imperative* standards-the risk of gastro-intestinal symptoms is higher than the risks the public meet in their normal daily life. We believe that the extent to which present risks should be reduced should be determined in the light of full and open discussion of the scientific data on health risk and the data on the associated costs. It appears that the scientific data used by the Commission were not widely discussed with the scientific community before the present proposal was formulated. Credible cost data, it appears, do not yet exist. We are, therefore, unable to recommend, as yet, any particular figure for the *Imperative* standard for faecal streptococci.

In their response to the report, the Government stated³¹:

In the cohort study, there was no significant difference between bathers and non-bathers with regard to the results of medical examination, the purchase of medicines, the seeking of medical advice or the loss of days of normal activity. This is to be expected given the minor and self-limiting nature of the illness associated with bathing.

...the robustness of the dose-response relationship for faecal streptococci is open to question. Where a robust threshold for a health effect can be established, the setting of a standard based on that effect requires consideration of a number of factors. These include the severity of the symptoms, the size of the increased risks and the public perception of them, and the way in which compliance with that standard is to be monitored and assessed. Any benefits also need to be set against the practical considerations and the likely costs.

The Government would welcome the Committee's assessment of these issues...

D. Costs of compliance

In July 1994 the DOE appointed consultants, Sir William Halcrow & Partners Ltd., to investigate the costs of implementing the proposed directive. Their report was published in February 1995 and it also considered the costs of implementing three further, less stringent water quality scenarios³². All were based on the assumption that any improvement schemes would be implemented after the existing investment programme for the Urban Waste Water Treatment Directive. Details of the different scenarios and the costs of implementation in the UK are set out in the table below:

³¹ Select Committee on the European Communities *Correspondence with Ministers* HL 83 1994/95
11 July 1995 pp. 31-38

³² Halcrow *Revision of the bathing water directive: study of the cost implications to the UK sewerage undertakers and regulators Final Report* February 1995

Halcrow report: Cost estimates of improvement works to met the proposed directive and other scenarios			
Scenario	Capital costs £m	Operating costs £m/year	Cost driver
A As proposed directive	1,640-4,240	70-150	Enterovirus
B Existing guideline standards without enterovirus requirement	1,140-2,640	50-100	F.Strep/E.coli
C Proposed direct without enterovirus requirement	440-1,100	20-40	F.Strep
D Existing mandatory standard plus F.Strep of 1000 per 100 ml	20-40	<1	F.Strep

These costs were based on the assumption that to meet the proposed directive, a minimum of secondary treatment followed by filtration and ultraviolet (UV) disinfection would be required. For scenarios B and C, filtration prior to UV disinfection could be omitted. In addition work would be necessary to reduce the frequency of storm sewer overflows to once every 5 years under the proposed directive, or once every year under scenarios B and C.

As can be seen from the table, the costs of implementing the proposed directive would be significant and the primary cost drive would be meeting a mandatory enterovirus standard.

The House of Lords Select Committee on the European Communities made the following comments about the costs of compliance in a follow-up report to their first report, *Bathing Water Revisited*³³:

14. On the evidence before us we believe that the enterovirus standard as formulated in the Commission's proposal could not be achieved unless all discharges of sewage were subjected to primary and secondary treatment followed by filtration and disinfection by chemical or ultraviolet radiation treatment. These levels of treatment are exceptional in the Member States and could not be introduced without major new engineering work. Non-sewage contaminants might still cause non-compliance.

16. The Commission's claim that the proposed new bathing water directive would be broadly cost neutral, or would even permit some cost savings without any reduction in the level of public health protection provided, does not survive scrutiny. In the United Kingdom the Commission's full proposal would entail significant capital expenditure-somewhere between £1.6 billion and £4.2 billion-additional to that required to comply in full with the existing bathing water directive and the Urban Waste Water Treatment Directive-around £9.5 billion over the next ten years. We regret that the Government was unable to answer our questions about the costs of compliance with these two existing directives in other Member States.

17. We believe that the Commission's claim to cost neutrality for their proposal is so ill-founded that we are dismayed that it could have been made. We have to conclude that in formulating the proposal there was, in DGXI, lack of adequate research or consultation with

³³ House of Lords Select Committee on the European Communities *Bathing Water Revisited* HL 41 1994/95 21 March 1995

Member States and a worrying lack of understanding of the microbiology and engineering involved in sewage treatment.

The Government agreed with the Committee in its response to the Lords' second report³⁴:

2. As the Committee has pointed out the Commission's claim of cost neutrality for the proposal does not stand scrutiny. The compliance cost assessment shows clearly that implementation of the present proposal would need substantial additional investment in sewerage infrastructure in addition to that required under the existing Bathing Water Directive and planned over the next decade under the Urban Waste Water Treatment Directive (UWWTD). The primary driver of the additional expenditure has been identified as the enterovirus standard. The cost assessment also shows that the proposed mandatory standard for faecal streptococci has significant investment implications.

3. Information has been sought from other Member States on the costs of compliance with the proposal. However, this information has proved difficult to obtain. With regard to the existing Bathing Water Directive, the costs will have been spread over the two decades since adoption and it is doubtful whether reliable conclusions could be drawn from such information given the large differences in the numbers of bathing waters in Member States and state of development of their sewerage infrastructures. For the UWWT Directive, Member States are in the process of submitting implementation reports to the European Commission which will include cost information. In due course the Commission should be able to provide a cost figure for the European Community.

E. Costs and benefits of the new proposals

The House of Lords Committee examined the costs and benefits of the new standards:

18. The costs entailed by the Commission's proposal might be justified if implementation would bring gains in public health greater than those achievable at similar cost from other actions. We believe that implementation would result in some reduction in the risk to bathers of self-limiting gastro-intestinal illnesses and other minor illnesses of the eyes, ears, nose and throat. There is no convincing evidence for or against claims that the incidence of serious or life-threatening illness would be affected...

19. We see no reason to change the opinion, expressed in our earlier report, that we were unconvinced that there was justification for imposing on the general public significantly higher costs in order to reduce somewhat the present risks of self-limiting illness associated with bathing. In our view the costs of the Commission's proposal remain unjustified on present evidence...

20. We think there is a need for a more serious attempt than appears to have been made hitherto to assess the economic benefits which might flow from a reduction in the minor illnesses associated with bathing if more stringent standards for bathing waters were achieved. In addition to possible environmental benefits there might be benefits for tourism and for the local economies of bathing resorts as well as from some reduction in the economic costs imposed by these minor illnesses. We were concerned that the Director General of OFWAT did not appear to take these wider issues as part of his remit.

³⁴ Select Committee on the European Communities *Correspondence with Ministers* HL 83 1994/95
11 July 1995 pp. 43-45

In its response the Government stated:

4. The Government agrees with the Committee's view "that we were unconvinced that there was justification for imposing on the general public significantly higher costs in order to reduce somewhat the present risks of self-limiting illness associated with bathing." The WRC research showed that symptoms affecting the eyes, ears, nose and throat appear to be related to the duration of contact with salt water irrespective of the microbiological quality of that water. At best, implementation of the Commission's proposal might result in a small reduction in the likelihood of gastrointestinal symptoms. Since there is no evidence that serious or life threatening illness is associated with bathing in waters that meet the standards of the current Bathing Water Directive, it follows that the revised standards would not be expected to have any measurable effect.

5. The Government accepts the importance of risk assessment in the setting of standards and the need for informed debate on the level of acceptable health risks. However, it endorses the conclusion of the study of the Health Effects of Sea-Bathing that "the imperative standards of the Directive for total coliform bacteria and enteroviruses, and by implication for faecal coliform bacteria, give adequate protection to health". It follows that the debate, as far as revised bathing water standards are concerned, would be about marginal reductions in the risk of mild and self-limiting symptoms.

6. The Committee suggests that a more serious attempt should be made to assess the economic benefits of more stringent water quality standards to the environment, to health and to tourism. The Government notes this with interest. It considers, however, that the Bathing Water Directive is primarily concerned with the protection of bathers' health as is reflected in the emphasis given to the key microbiological parameters. The proposal should therefore be judged on its ability to deliver additional health benefits in a cost effective manner. Current evidence suggests that any benefits to health will have little or no economic impact. As regards wider environmental benefits for bathing resorts, although implementation of the Bathing Water proposal may produce some gains, it is the implementation of the UWWTD which will result in the most significant improvements.

A number of bodies giving evidence to the Lords inquiry did call for tighter standards than provided for in the existing directive. Friends of the Earth stated that "the level of protection given to bathers and all other recreational water users should be maximised using the full range of technologies currently available and in operation at some sites in the United Kingdom"³⁵. In particular it thought that "this should include the use of ultra-violet disinfection of secondary effluent". Similarly, Surfers Against Sewage called for "end of pipe" standards with its General Secretary, Chris Hines, commenting "that it would be preferable to bathe in Jersey's outfall pipe [where UV disinfection has been used] than on a United Kingdom Government-passed beach"³⁶.

F. Revision of the proposals

In their report, the Lords Committee made the following recommendations for revising the proposal:

³⁵ *Memorandum by Friends of the Earth* HL 6-I 1994/95 pp 124-7

³⁶ *Memorandum by Surfers Against Sewage* HL 6-I 1994/95 pp 47-50

26. Drawing on the conclusions of our earlier report', to which we adhere, in our view a new bathing water directive should not require, for compliance, testing for enterovirus; an *E.coli* parameter should replace the total and faecal coliform parameters; the salmonella parameter should be dropped; and parameters not based on microbiological indications of public health risk should also be omitted. A new mandatory parameter for faecal streptococci should be introduced and the level set so as to deliver an acceptable level of protection from public health risk which we would expect to be no less than that provided by the present directive. This mandatory parameter level should be determined after openly conducted consultation between the Commission and scientific, including medical, experts in the Member States.

27. The United Kingdom's programmes for compliance with the existing bathing water directive and the Urban Waste Water Treatment Directive are, taken together, not scheduled for completion until the year 2005. We are concerned that the engineering and treatment programmes for compliance with these directives should be integrated with any additional work necessary for compliance with a new bathing water directive so that the water companies can operate from a stable base for planning and investment. If this is not done, there must be a risk of considerable wasted expenditure: for example, major engineering such as a long sea outfall required for the Urban Waste Water Treatment directive might not be essential if a new bathing water directive required secondary treatment, filtration and ultraviolet irradiation.

In response, the Government stated:

9. The Committee observes that the existing Directive needs updating and that the current proposal for revision is unsatisfactory. The Government supports this. It also shares the Committee's opinions concerning the enterovirus, *E. coli* and salmonella parameters and on the need for more wide ranging consultation and discussion on the proposed mandatory standard for faecal streptococci. In particular, decisions on the faecal streptococci standard need to be taken in the light of comparable information on health and cost implications from a representative number of Member States.

10. Further consultation is clearly necessary on the proposed revision and the Government understands that the Commission has taken steps to obtain views on some aspects of the current proposal from a small group of experts. It looks forward to the opportunity to consider these views and for wider debate of the issues, involving all Member States.

11. The Committee draws attention to the potential for wasted expenditure if the current investment programmes under the Bathing Water and UWWT Directives are taken forward without anticipating any revised bathing water quality standards. The bulk of the investment under the existing Bathing Water Directive is nearing completion but the Government agrees that the future heavy investment under the UWWTD throughout the European Community reinforces the need to ensure that a revised bathing water directive forms part of a coherent Community policy and that the implications for investment are properly understood.

The House of Commons Select Committee has not made detailed recommendations for revising the proposal, but in its most recent report it stated³⁷:

³⁷ Select Committee on European Legislation *Thirteenth Report* HC 70-xiii 1994/95 pp vii-ix

17. In response to our request, the Parliamentary Office of Science and Technology [POST] has commented on the Halcrow report:

"While the benefits of higher standards are largely hypothetical and therefore difficult to quantify in health terms, the costs of introducing additional safety margins are high. In that the Commission is proposing standards which are significantly tighter than those of other regulatory and advisory bodies, and whose scientific basis is questionable, it is unfortunate that the proposals do not make any attempt to assess the balance of costs and benefits other than in the most superficial of terms."

1.8 We maintain our opinion that this proposal raises questions of political importance, and confirm our recommendation that it should be considered further by the House, rather than European Standing Committee A, because of

- the potential costs involved;
- the doubted justification for these costs;
- the Commission's approach to subsidiarity' in the revision of existing Community legislation; and
- the issue of how these increased costs would be paid for in the United Kingdom.

G. Progress with the proposals

Since being published in the *Official Journal* in April 1994³⁸, the proposal has made little progress. It has been introduced under Article 130s(1) of the EC Treaty. It will therefore be dealt with under the cooperation procedure and so proposals must be submitted to the European Parliament for amendments. The European Parliament's Environment Committee started examination of the proposal in November 1994, but in December 1995 the Committee recommended that its deliberations should be held in abeyance until the Commission could come forward with better parameters, scientific justification and better testing methods³⁹. In Spring 1995, the Committee halted the scrutiny of all water legislation, calling on the Commission to conduct a strategic review of EC water policies.

To take the issue forward the Committee held a public hearing with the Commission on 20 June 1995. At the hearing the Environment Commissioner, Ritt Bjerregaard, aired her general concerns about the future of EC water policy rather than concentrating on specific proposals⁴⁰. She said that the Commission intended to produce a Communication "setting out a global water policy for the EU which would take on board the conclusions of the hearing. Ken Collins, the Committee's Chairman, said that there was a myriad of inconsistencies in current legislation and he called for a single framework directive to be drawn up to guide integration between water directives and between these and policies in other sectors.

³⁸ *OJC* 112 22 April 1994 p.3

³⁹ *NRA Bathing water quality in England and Wales - 1994* April 1995

⁴⁰ "Strategic rethink on water urged by MEPs" *ENDS Report* June 1995 pp 42-3

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The Council of Ministers also discussed water quality during the Environment Council of 22-23 June 1995 during which "a broad consensus emerged on the basic strategy of adopting a Framework Directive as the central pillar of the legislation, coupled with vertical, offshoot Directives addressing specific areas of the field"⁴¹.

The European Parliament's Environment Committee held further discussions with the Commission on 30-31 October 1995⁴². At the meeting Ken Collins announced that it would be wise for the Committee to suspend action on water policy pending the appearance of the Communication. Four proposals on water policy or related policy matters have recently reached the Parliament: the revisions to the bathing water directive; the IPPC directive; the revisions to the drinking water directive; and the ecological quality of surface waters directive.

At a meeting on 1 December 1995 national experts within the EU Council of Ministers informally exchanged views on future water policy⁴³. An article in the journal *Europe Environment* reported that the Commission's communication on EU water policy was likely to be presented in March 1996 and serve as the basis for a framework Directive which the Commission would present at the end of 1996 at the earliest.

The Commission published its communication on *European Community water policy* in February 1996⁴⁴. As expected, the communication proposed the introduction of a Water Resources Framework directive which would require integrated water management plans. The plans "would contain an assessment of the overall situation in the water body including its environmental quality, its resource potential and the environmental pressures impacting upon it". The Commission proposed that five directives should be repealed and replaced by the Framework directive, but the bathing water directive was not one of these. The Commission suggested that this directive "would remain largely unaffected by this proposal [the Framework Directive], although the Commission will consider the scope for transferring some of their definitions, monitoring requirements and other relevant elements into the Framework Directive". In a section of the Communication dealing with "Procedural Implications" the Commission stated that it believed the bathing water proposals (and another concerning drinking water) were "largely unaffected by the proposals in this Communication and... [the] Council and Parliament can continue their scrutiny of the texts".

In a specific section dealing with the bathing water directive the Commission reiterated that "the Directive together the amendments proposed in 1994, will remain a freestanding piece

⁴¹ "Convergence of opinion on EU-wide water strategy" *Europe Environment* 27 June 1995

⁴² "Water quality: Commission to clarify EU policy" *Europe Environment* 14 November 1995

⁴³ "European water policy still becalmed" *Europe Environment* 14 December 1995

⁴⁴ COM(96) 59

of legislation, but the actions taken by Member States to improve bathing waters will be coordinated with the integrated programme of measures under the Framework Directive".

It could be expected that the Council and Parliament will recommence examination of the bathing water proposal in due course, but they will presumably wish to study the Commission's Communication before doing so.