Water Framework Directive pCEA

Ofwat & Water Industry commentary on the Defra/Environment Agency draft pCEA synthesis report

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Disclaimer

To aid audit and understanding, this document contains values that have not been rounded. However, water companies have indicated in their confidence grades that there is still a great deal of uncertainty around many of the estimates and therefore all values in this document should be treated with caution.

Contents of draft pCEA synthesis report

Note: The draft report chapters in black text are available from the CMS website: http://www.coastms.co.uk/cgi-bin/ftpex/FTPex_conferences.cgi?browse&Outputs%20and%20Reports/A%20%20%20%20pCEA%20Report%20Chapters).

Alternatively, go to www.coastms.co.uk and click on 'Conferences' at the top of the home page, select 'Outputs and Reports' and then the top folder 'A pCEA Report Chapters'.

As of 15 August 2007, the chapters highlighted in red italics are not available on this website.

Acronyms and abbreviations

AMP	Asset Management Plan. This is a water company's detailed description of its investment plans for its assets. AMP1 covered plans for assets taken into account at privatisation in 1989 from 1990-95. The subsequent planning periods are AMP2 for 1995-2000, AMP3 for 2000-05 and AMP4 for 2005-10. AMP is often used as a shorthand name for the companies' business plans.
BOD	Biochemical oxygen demand. A measure of the amount of biodegradable organic substances in water.
Capex	Capital expenditure – appointed water companies' spending on new capital assets (construction, purchase of machinery etc.)
CEA	Cost effectiveness analysis
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EU	European Union
GEP	Good Ecological Potential
GES	Good Ecological Status
GW	Groundwater
mg/l	Milligrams per litre
Ml, Ml/d, Ml/day	Ml = megalitre = 1,000,000 litres = 1,000 cubic metres = 1,000 m^3 = 220,000 gallons Ml/d = Ml/day = Ml per day = thousand cubic metres per day (tcmd)
N	Nitrogen
NH_3	Ammonia
Ofwat	The Water Services Regulation Authority (England and Wales), formerly the Office of Water Services
Opex	Operating expenditure - appointed water companies' day-to-day spending on running the services (staff costs, power, etc.)
P	Phosphorus
pCEA	Preliminary cost-effectiveness analysis for the Water Framework Directive
pe	Population equivalent. The capacity of a sewage treatment works is measured in terms of the amount of organic material that can be treated. It is assumed that one person is equivalent to a load of 60g of biochemical oxygen demand. Effluent may also include industrial wastewater treated at works. Hence, the population equivalent served by a works can greatly exceed the population served in the catchment, especially if a large volume of industrial effluent is also treated.

RBD	River Basin District
RBMP	River Basin Management Plan
STW	Sewage treatment works
SUDs	Sustainable Urban Drainage systems
SWMI	Significant Water Management Issues
UKTAG	United Kingdom Technical Advisory Group - consists of experts from the UK conservation and environment agencies and the Department of Environment and Local Government for the Republic of Ireland
WaSC	Water and sewerage company
WFD	Water Framework Directive (2000/60/EC)
WIN	Water Industry sub-group (for the WFD pCEA programme)
WoC	Water only company (provides water but not sewerage services)
WTW	Water treatment works
WwTW	Wastewater treatment works (another name for sewage treatment works)

Introduction

1. We lead the water industry (WIN) sector group which evaluated the possible implications of the EU water framework directive (WFD) for the water industry to inform Defra's preliminary cost effectiveness analysis (pCEA).

2. We recognise that the pCEA is a valuable exercise in achieving WFD objectives by identifying a fair balance of investment and obligations across sectors in accordance with the polluter pays principle.

3. We believe investment must be on a no-regrets basis by ensuring that any potential obligation is supported by robust environmental evidence. Where this is not yet available, investigations and pilots should be completed in advance of the then confirmed investment in subsequent river basin management plans (RBMP).

4. This includes the assessment of risk versus certainty of delivery. Measures to meet the WFD objectives should incorporate a reasonable approach to risk rather than being unduly risk averse to deliver the maximum environmental benefits for what must inevitable be a finite cost envelope.

5. There is a general observation that for the substantive issues so far addressed (water resources, priority substances, nutrients and sanitary determinands), the water industry seems to bear the brunt of the expected measures and at very high cost, but without consideration of disproportionate cost and affordability. In terms of process it is strange that pCEA rejects other measures (eg in Hydromorphology, addressing flood defence structures) as disproportionately costly but without any clear justification. This may well be correct, but at this stage, shouldn't the documents tackle only the cost-effectiveness rather than prejudge implementation? (There is a similar point in the 'Alien species' chapter where elimination of signal crayfish is obviously 'too difficult' and therefore not costed).

6. Another general issue is the comparability of the costs – as raised at the WFD pCEA findings conference (12 July 2007) – since some are expressed as whole life costs whilst others are annualised. This makes comparison unnecessarily difficult. The expected costs are a reflection of the 'gap' between existing and desired quality, but this exercise has highlighted again the uncertainties of actual targets (such as eutrophication/phosphorus and water resources) needed to support good ecological status. Even where there are quoted target concentrations, as for priority substances, the link between environmental concentrations and good status remains unproven. This may be straying from cost-effectiveness to cost-benefit, but we should not lose sight of this.

7. We have concerns that only some of the costs have been considered. Social and environmental costs appear to have had little consideration, nor does the carbon cost feature strongly. Full consideration of these might well affect the reported rankings. We therefore strongly urge that the environmental and social costs of large investment programmes are a key consideration in the decision process for new obligations.

8. All the costs per kg removed or Ml relocated/saved calculated for the water sector group were based on the costs that would fall to the water customers in delivering the output. The annual financial costs to the water industry of delivering the improvements were calculated from the costs of financing capital investment, maintaining the assets and operating the assets. These were calculated on an annual basis, using the cost of capital for the industry, and the average reasonable asset life for appropriate assets. This was therefore the costs to this sector, and not the cost to society. When assessing the cost-effective measures for delivering the WFD environmental objectives, we believe that the correct comparator is the financial cost to the sector. Using the 3.5% social discount rate would give a very misleading view of the eventual costs to the sector (in our case water bills), and lead to decisions in which the burden of delivering WFD objectives will not be seen to fall in a fair and proportionate manner.

9. In this commentary, we detail below our main issues on each of the chapters of Defra's WFD pCEA synthesis report relevant to the water industry sector, received so far.

Chapter 4.1 Chemicals

10. We agree that more knowledge is needed before committing to end-of-pipe treatment. This recognises the large uncertainty around the compliance gap, the uncertainty about the efficiency of existing source control measures and the lack of conclusive evidence about how cost-effective source controls are compared to end-of-pipe treatment.

11. We are concerned that the chapter focuses predominantly on end-of-pipe treatment for industry (direct industrial discharges) and the water industry (at STWs) to achieve good chemical status.

12. This over-reliance on end-of-pipe treatment has not considered that this technology will not necessarily remove all of the priority substances of concern or indeed reduce them to the required levels to achieve good chemical status.

13. Whilst it is reassuring to note that application of 'clean water' treatment technology to sewage works is recognised as unrealistic on a large scale (as a generic option) it remains of concern that it is being considered as the primary measure, given the uncertainties of the gap analysis, the effectiveness of source control and, not least, the actual effectiveness of this as regards ecological improvements. This is such an expensive approach, in terms of carbon footprint as much as finance, that a thorough analysis of costs and benefits is essential. We support the view that much more work is needed in this topic area, including a review of the effectiveness of source control, before expensive commitments are made.

14. We are concerned that environmental and social costs of end-of-pipe treatment have not been fully considered. End-of-pipe treatment requires increased energy use and hence increased emissions of greenhouse gases. The chemicals chapter does not consider the carbon cost to be importance because it is a small percentage of the total cost. However, the carbon cost should be based on the percentage of the industry emissions. According to the Atkins (2007) report[1], the carbon cost could be quite significant (end-of-pipe treatment at over 50% of STWs would produce a 24% increase in greenhouse gas emissions).

15. Extra wastewater treatment will also produce additional waste and potentially hazardous sludge and again the environmental cost to deal with this has not been considered.

16. We believe the total cost estimates in the chemicals chapter may be an underestimation for the water industry. This is because the costs used are from the Atkins (2007) report[1] which only costed applying sand filtration at STWs. If water companies were required to install granular activated

[1] Atkins (2007) Partial cost effectiveness analyses for the water industry, industry and non-agricultural diffuse pollution.

charcoal or UV treatment, the costs both financial and social (in terms of increased energy use) would be substantially higher.

17. We would support an approach that has pilot studies of the technologies during the first RBMP with associated monitoring of the STW performance and of the river chemistry and ecology. Particularly for the ecology, the appropriate level for the environmental quality standards (EQS) must be addressed. Some of the EQS are based on little evidence, and hence a large safety factor has been incorporated under the precautionary principle. If evidence of the impact of the chemical on the ecology of the water body is gathered from pilot studies, this can help inform the fine-tuning of the EQS. Further improvements can then be based on firmer environmental evidence and will then deliver ecological benefits. Any decisions on the balance between source control and end-of-pipe measures must take account of environmental and social costs.

Chapter 4.2 Water resources

18. We strongly support an approach that requires site specific investigations to evaluate the ecological benefits of modifying or reducing abstraction licences. This recognises the current scientific uncertainty over conditional flow standards and how these relate to good ecological status.

19. We agree that once the need to reduce abstraction has been clearly identified, the water companies' water resources plans are the appropriate mechanism to determine the best combination of measures to achieve this. Since water companies are currently preparing their water resources plans for consultation next year it is unlikely they will be able to factor in abstraction reductions for the first RBMP (2009-15).

20. We have concerns over the calculated cost to reduce the impact of abstraction licences. The cost of this measure is based on a unit cost range (£2-5m/ Ml/d) from the Environment Agency's (2001) report[2] and is not based on the costs provided by the water industry in June this year.

21. The water industry provided costs with associated volume savings for its measures in the WIN pCEA supporting document. These clearly showed the cost-effectiveness of the proposed measures with development of new sources being the most cost-effective measure, followed by further leakage reduction and then demand management. This differs from the order based solely on the Environment Agency's unit cost ranges.

22. We are also concerned that the cost to reduce abstraction is calculated from an average unit cost of several measures. Firstly, using this approach the average unit cost of all the water industry measures (£6.7m/ Ml/d) is higher than the Environment Agency's range (£2-5m/ Ml/d). Secondly, this does not show the difference in average unit cost of each type of measure.

Measure	Cost £m/year	Volume saved Ml/d	Cost £m over 18 years per Ml/d	Annual cost per Ml (£m)	Daily cost per Ml
Demand	71	85	15	0.83	£2,283
Leakage	123	157	14	0.77	£2,131
New sources	345	1198	5.2	0.28	£791
Total	**539**	**1439**	**6.7**	**0.37**	**£1,020**

From the WIN pCEA supporting document, the average unit cost of new sources over 18 years is £5.2m/ Ml/d, further leakage reduction is £14m/ Ml/d and demand management is £15m/ Ml/d. Finally, this does not show the regional range in the unit costs for each type of measure across the river basin districts as shown in the table below. We are concerned that none of this has been factored into the pCEA scenario costs.

[2] Environment Agency (2001) Water resources for the future: a strategy for England and Wales

	Lowest			Highest		
Measure	**Cost £m/year**	**Volume saved Ml/day**	**Daily cost per Ml**	**Cost £m/year**	**Volume saved Ml/day**	**Daily cost per Ml**
Demand	0.3	1	£822	35	20	£4,794
Leakage	0.9	6	£411	72	24	£8,219
New sources	0.4	2	£548	90	244	£1,010

23. There is no apportionment of costs between sectors because the measures to achieve abstraction reductions have not been identified in the water resources chapter. However, the text indicates that the bulk of the costs will fall to the water industry because its abstractions are the ones most contributing to potential flow deficits (90% England, 95% Wales).

    We disagree with this apportionment. Water abstraction for public supply is only 45% of the total daily abstraction[3]. Of the approximately 16 billion litres of water abstracted daily, over 10 billion litres of treated wastewater are returned to the watercourse. The chapter appears to acknowledge a returning benefit for the power industry's wastewater (around 80% of what it abstracts)[3] but not for the water industry (who return 90% of its wastewater)[3]. The water resources chapter also doesn't appear to recognise the positive contribution water companies make to river flows through compensating releases from reservoirs.

24. A measure to reduce water demand through metering in water stressed areas is proposed. We expect the text to reflect that this measure will depend on the outcome of Defra's consultation into 'water metering in areas of serious water stress' and the EA's consultation into 'the identification of areas of water stress'. Even if some water companies are required to consider compulsory metering as part of their water resources plan, whether compulsory metering is undertaken will depend on its cost-effectiveness. We note that no volume of water saved was provided for this measure and therefore its cost-effectiveness could not be assessed.

25. We believe any measures proposed should be phased to allow time for the associated benefits to be assessed. The approach adopted will need to realise that savings from demand measures are less certain to be achieved and that the scope for savings from demand measures are limited. The potential abstraction reductions required will need a mix of all types of measures including new sources.

[3] Environment Agency (2006) Strategic Assessment

Chapter 4.3 Nutrients

26. We welcome the use of WIN sector group data in the nutrients chapter.

Phosphorus (P)

27. We are pleased that the chapter recognises the proposed costs are national averages and that for the water industry the costs could be much higher at a local level.

28. The potential bill increases for water customers (£3 to £52 per year) will depend on what technology is implemented and where. It should be recognised that these bill increases may not be affordable for all individual water customers. It is therefore extremely important that any investment is on a no-regrets basis with a robust environmental need.

29. We have concerns over the order of cost-effectiveness of measures given in table 20. In this analysis, the cost per kg does not include carbon costs. As a result, the water industry measures (chemical and biological treatment) look more cost-effective than they actually are. The WIN supporting document indicated that chemical treatment to reduce P would increase the industry's annual greenhouse gas emissions by a very significant 0.36 million tonnes (roughly a 10% increase in total emissions). Even this figure is an underestimation because it is based on 8 out of 10 companies' data and has not been scaled up to an industry total. The carbon cost would be higher still if biological treatment was used instead of chemical treatment to reduce P.

    The ranking in table 20 has solely considered the implementation (financial) costs per kilogram of removing phosphorus and has not accounted for the social or environmental costs, which must be considered if the true cost-effectiveness is to be understood.

30. A further concern regarding table 20 is that it does not include an indication of the scope of each option (eg as a percentage of total P load that could be addressed through each measure). This could lead to false assumptions that some of the cheaper solutions could achieve the desired load reduction for least cost. Without consideration of the load reduction each measure will achieve there cannot be a proper assessment of the cost-effectiveness of each measure and therefore what combination of measures will meet WFD objectives.

31. Under the polluter pays principle we would expect the proposed scenarios to fairly apportion measures to each sector. Yet four out of the six scenarios are for individual sector measures only. We are sceptical that measures by only one sector would meet the proposed P standard.

    As there remains uncertainty over P apportionment and how this varies regionally, it is unlikely to be possible to propose a national scenario of measures to meet the proposed P standard.

32. We do not support a blanket approach which proposes chemical treatment at all STWs (scenario 5) or at all STWs of a particular size (scenario 2). We believe site-specific water quality modelling is required to demonstrate the need and benefit of chemical treatment. We are not convinced there is sufficient evidence to justify treatment at all STWs of size band C (10,000-99,999 population equivalent).

33. It is important to consider that there may be little benefit to river quality where STWs discharge lower down in the catchment. The location of STWs depends on the company and river basin district. This further emphasizes the need for site-specific water quality modelling before deciding on the need for treatment.

34. Although there is low uncertainty associated with the water industry and industry measures, we believe this fails to acknowledge the remaining uncertainty that the in-river standards can be achieved given the limitations of STWs' performance. Water companies have successfully delivered improvement programmes over the last 18 years. We are concerned with the paradox that a sector having become more efficient and delivered is likely to have to take more action than inefficient sectors with a low certainty of delivery – this is not in line with fair and proportionate.

35. There is no recognition of the environmental trade-off of using chemical treatment as a measure to reduce P. Increased chemical treatment uses more ferric salts and increases the amount of sludge requiring disposal. The works may also need a consent to discharge iron (Fe), which could require additional tertiary treatment to meet. The options to reduce P may be limited further if a UKTAG standard is derived for Fe.

36. We strongly disagree that there is no distributional trade-off for water customers. Water customers are not the same as the general public and the costs water customers may have to pay should not be aligned with benefits to the general public.

37. We also do not believe there is an issue over how property rights are assigned for agriculture. Under the polluter pays principle, the farmer must pay for the measures to mitigate agricultural diffuse pollution. If farmers have a 'right to pollute' so do other property owners and perhaps even individuals.

38. Phosphate dosing of drinking water supplies is identified as an additional pressure from the water industry. We would not support any attempt to cease phosphate dosing which the industry undertakes to meet the Water Supply (Water Quality) Regulations 2000 lead standard. This must be continued at the optimised level to protect public health.

39. Similarly, we would not support the proposed non-agriculture diffuse measure to transfer power for misconnections from local authorities to

water companies. It is not appropriate for private companies to have powers over members of the general public. This approach would also require the water companies to employ hard engineering solutions which would be at odds with the current trend towards sustainable development.

40. We would like some clarity on the effectiveness of SUDS at delivering reductions in pollutants. Generally SUDS are not suitable for retrofitting and therefore the scope for them to be used is limited. SUDS will also not reduce the number of discharges/spills from existing combined sewer overflows unless they have been retrofitted. As many of the SUDS use soakage as the form of attenuation the impact on the watercourse in terms of P input concentration may not be significant if P is attenuated within the aquifer. There may also be problems if other compounds are present in the surface run-off which may also enter the aquifer. If the SUDS are on impermeable soil, such as clay, then seepage and soakaway may not be feasible. In this case SUDS will be designed to act as attenuation and retention only - either temporary retention basins, or purification ponds. If excess nutrients are present, it will have to be accepted that the artificial water bodies comprising the SUDS are indeed eutrophic, and indeed this is a purification process, before the water enters the natural water bodies downstream. If SUDS is to be used as a pollution control mechanism, there may also be issues over their maintenance as the deposited sediment, with its ration of heavy metals or organic compounds, may be considered a controlled waste and subject to the Waste Management Licensing Regime.

41. We support measure to ban phosphate in detergents. We believe this will benefit the water industry by reducing the load requiring treatment. We have asked the water companies for their savings in ferric salts use as a result of treating influent with 15% less phosphate and will shortly be providing you with these operating cost savings.

Nitrogen (N)

42. We look forward to responding to the government's consultations on revised nitrate vulnerable zones (NVZ) and changes to NVZ action programmes which we expect will be based on a robust environmental need.

Chapter 4.4 Fisheries & Alien Species

43. Greater consideration of fisheries pressures on Habitats sites is required, e.g. should fishing be allowed at all when a feature is in unfavourable condition?

44. We recognise that there is a significant knowledge gap concerning the pressures that some alien species create and support the proposal to undertake research and development work to close this gap. Having said that, it would appear that the threshold for determining what would be too disproportionately costly to consider costing is significantly different from that the Water Industry used. This can be determined by the measures that are being proposed are many orders of magnitude lower than that of the measures put forward for water resources, nutrients and chemicals. This does not seem to be an equitable way of undertaking a pCEA exercise.

45. It is also unclear as to how the expected use of derogations in the case of the signal crayfish will be applied. Presumably a case will have to be made on disproportionate costs that are so large that even phasing them across the three RBMPs they cannot be justified. This will then require a reduced target to be met. Will the measures put forward in the paper be sufficient to meet this reduced objective? One impact of the signal crayfish that does not appear to have been considered is that of bank destabilisation following burrowing by the species, especially when in greater numbers. This can lead to increased sedimentation in the river.

46. Another concern is that of the costs for the 'early warning system' as £50k per year seems too low. To ensure early detection, surveillance and monitoring is undertaken on all water bodies would appear to require significant human resource to ensure site surveys are undertaken regularly on all water bodies.

Chapter 4.5 Morphology & Biodiversity Benefits

47. For good ecological status (GES), a surface water body's hydromorphological conditions are stated as 'must be consistent with the achievement of the relevant biological quality elements'. This statement seems to drive a circular argument in as much that heavily-modified water bodies have only to achieve good ecological potential, suggesting that it is at best meaningless and at worst misleading.

48. It is also of concern to note that major river engineering costs (eg restoration of engineered or reinforced channels) have not been estimated on the basis that they are disproportionately costly. This would seem to be overstepping the remit of the pCEA and influencing subsequent implementation.

49. In terms of the scenarios, the cost-effective measures proposed are all small scale and unlikely to resolve the majority of the water bodies 'at risk' of not meeting the WFDs objectives.

Chapter 4.6 Sanitary Determinands

General comments

50. Companies have commented that this is a disappointing chapter on a number of levels. It starts promisingly by noting that the information currently available is incomplete, and continues with the inference (paragraph 1.2) that further work is needed to develop cost effective and practical measures. Unfortunately, the conclusions do not reflect this but state that: 'the majority of ammonia … can be attributed to sewage discharges … and problems with the sewerage infrastructure'. It is hard to see what support there is for the comment regarding infrastructure.

51. Whilst it must be acknowledged that the Water Industry is one of the largest contributors of continuous inputs of ammonia and BOD, the chapter fails to differentiate between continuous and intermittent inputs. It is not clear to what extent intermittent discharges threaten the proposed UKTAG standards which are set as 90%iles – so it is not obvious how the GES 'gap' has been apportioned.

52. If there is a 'gap' caused by intermittent Water Industry discharges then the cost-effectiveness of tackling this must be understood. At present it does not feature at all and it could be inferred that this is a low-cost solution. It is not.

53. It is worth noting, if it is proposed to tackle Water Industry infrastructure, that (according to EA information) the farming sector causes broadly the same number of serious pollution incidents as the Water Industry. Hence it is particularly disappointing that other sectors contributing BOD and ammonia to the water environment have undertaken little or no costing work for the pCEA. As the report correctly notes, the absence of information from these sectors cannot be taken to mean they do not contribute to the GES gap. Nonetheless the report has prejudged the outcome of the analysis, with the Water Industry bearing the weight of any measures to be considered.

54. There appears to be limited information from sectors other than the Water Industry contributing to the pCEA; therefore it cannot be assumed that other sectors do not have a contribution to make. It is essential that further work in terms of modelling and monitoring is undertaken to review apportionment and cost effectiveness. This approach will require site-specific water quality modelling and biological monitoring in order to demonstrate environmental need, prior to what can be very significant investment. It will also prevent abortive or over conservative investment.

55. Due to limited information provided for the pCEA, the scenarios focus on the water industry only which we do not consider to be a successful approach nor reflective of polluter pays or perhaps cost effectiveness (as other sectors' cost effectiveness has not been attempted). An integrated

approach will be required in order to meet the needs of the WFD, and therefore we suggest that the final report recommend further and more localised monitoring and modelling to enable a true cost effectiveness analysis to be undertaken.

56. Unlike work undertaken for the nutrients chapter, there is no information available on the cost effectiveness of reducing agricultural run off into surface waters. As it is known that agriculture is a significant contributor to nitrogen in surface waters, it cannot be assumed that they do not contribute also to ammonia in surface waters.

57. It is important to recognise that the spatial arrangement of catchments is taken into account, for example there is little benefit in improving a STW if those close down stream are not improved, and/or focussing improvement on those at the very bottom of the basin or where pressures from other sectors are also present. It is for this reason that a local assessment of need and benefit should be undertaken across all sectors.

58. Overall, this report does not appear to give a fair assessment of the cost-effectiveness of all potential measures that may be required to achieve GES and it may prove beneficial to re-evaluate the potential measures to ensure the most cost-effective Programme of Measures can be achieved.

Specific paragraphs

59. Paragraph 2.4 - UKTAG are proposing to use Dissolved Oxygen (DO) for compliance instead of BOD. UKTAG standards alone should not drive the improvements as they do not consider that a slightly less onerous STW consent standard could have a much reduced power, chemicals and carbon impact on the whole environment (as is recognised in paragraphs 5.4 and 7.2 of the synthesis report).

60. Paragraph 2.9 - a move towards the more stringent UKTAG standards for protected areas.

61. Paragraph 4.5 - it is not appropriate to base the apportionment on the Ribble pilot study (this indicated that 95% of ammonia comes from Water Industry discharges and 5% from urban run-off).

62. Paragraph 5.5 suggests that misconnections (of domestic sewage to surface drainage) are a significant issue and there is an expectation that SUDs will deliver reductions in polluting load. This latter point is consistently overplayed, but that said, (and if the intention is to tackle intermittent discharges) highway drainage is recognised as being highly polluting - but there is no cost or effectiveness noted to address this.

63. Paragraph 6.9/Table 6.1 includes costs for England only (ie excludes the costs for Wales). The load reductions also need to be checked when considering the England only data. The chapter does not include the

Water Industry cost per kg reduction figures that clearly show how disproportionately expensive it is to get to 1mg/l.

64. There are some issues regarding pollution abatement which are disturbing; for instance, paragraph 6.13 states that improved treatment for ammonia/BOD would assist with p-reduction; whilst paragraph 6.14 implies some unspecified process to make ammonia disappear. We would like to understand the origin of these comments.

Scenarios

65. It is apparent that only one scenario even considers measures outside the Water Industry and this is only to undertake further research. Considering the lack of data provided by other sectors it would seem prudent that further research should be included in all scenarios. It would also seem reasonable that measures noted in paragraphs 6.1 through to 6.8 should be included to varying degrees in the scenarios.

66. Scenario 1 – hard enforcement to meet new UKTAG standard via STW improvements. We recommend that this be revised to clarify that this is where detailed water quality modelling has demonstrated with certainty that it is due to the STW alone and could not be achieved by contributing improvements by other sectors. Also where there are no STW improvements in AMP4 which may, following monitoring and sufficient time for the local ecology to improve (approximately three years), which may negate a conservative approach of initiating yet further investment without monitoring the effectiveness of recent improvements.

67. A monitoring programme in RBMP1 (chemicals and ecology) following major AMP4 STW improvements, such as for the Freshwater Fish Directive should be undertaken prior to significant repeat investment at the same site to prevent an over conservative approach and unnecessary investment. This would also enable a review of the conservative nature (or not) of the UKTAG standards and/or consent regulation mechanisms which could reduce investment requirements in future RBMPs.

68. Scenario 2 - STW consent change in a phased manner, in conjunction with other major investment - we agree that this should bring about a more cost effective approach and would enable time for demonstrating the environmental need in a more robust manner. It must be noted that following the pCEA for nutrients, the most likely STW improvements for nutrient removal would be chemical dosing to reduce phosphorous and as such would have less of an impact upon ammonia performance than a biological treatment approach.

69. Scenarios 3 and 4 should be part of, not separate to, the other scenarios, as they can contribute to the overall improvements and hence should be run in parallel. Pilot studies could be undertaken in the first RBMP to reduce uncertainty and inform the use of these approaches in subsequent RBMPs.