UKWIR NEWS

Issue 47, June 2008

SUSTAINABILITY

Leading the way on carbon accounting

"*The water industry's approach to carbon accounting is receiving recognition outside the industry and is gaining credibility in the way the industry is doing something about it*".

This was the positive message that United Utilities' Carbon Manager, **Chris Matthews**, gave to a UKWIR workshop that disseminated the findings of the second phase of a water industry carbon accounting project.

He added that the key element was when all UKWIR's members signed up to a consistent method of carbon accounting. This methodology has been designed to satisfy Defra reporting requirements and provide Ofwat with carbon emission data as part of the non-financial submissions for PR09.

Earlier this year UKWIR published the results of phase 1, *Carbon Accounting Methodology*, that dealt with operational carbon emissions (see page 4 for related project on how this is being applied to the WFD).

It was decided that data on '*embodied carbon*' was urgently required and a '*fast track*' project *Carbon Accounting in the UK Water Industry: Guidelines for Dealing with Embodied Carbon* was undertaken with support funding from the Carbon Trust and Water UK.

Embodied carbon emissions are those associated with building new assets including the emissions resulting from the extraction, transportation and processing of raw materials.

UKWIR project manager, **Gordon Wheale**, congratulated the contractor, MWH, for providing such a comprehensive and easy to assimilate report within three months.

MWH's **Charles Ainger** then emphasised that the guidelines were designed so as to help companies construct their own methodologies to suit local circumstances.

He illustrated how, as demonstrated in figure 1, reduced emissions in the long term can often require an increase in initial investment.

Whole life accounting

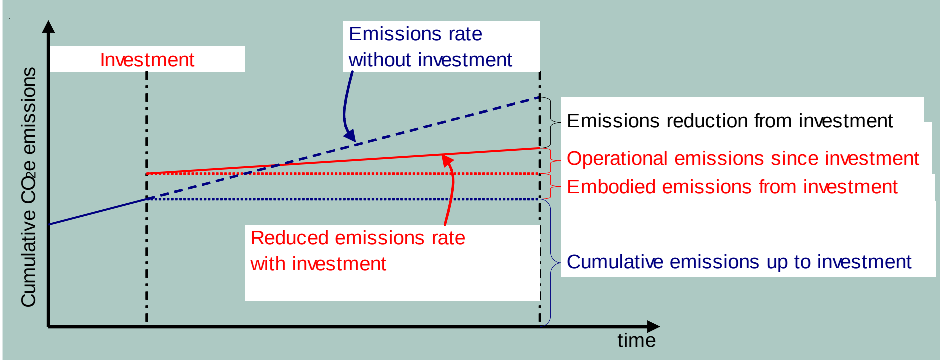
The guidelines also provide for combining embodied carbon emissions with operational emissions to provide '*whole life*' carbon accounting.

This includes additional information such as the shadow price of carbon, maintenance emissions, asset life information as well as economic factors such as the discount rate.

Charles' colleague, **Adrian Johnson**, described a case study, included in the guidelines, on constructing a pumping station and pipeline. This uses emissions values for common construction work items.

The project report is to be issued with an updated version of the first phase report and its carbon accounting tool, developed by WRc.

Figure 1 - Reducing carbon emissions from assets



Opportunities for Climate Change

This edition leads with UKWIR's work on carbon accounting, now about to move into its third phase by examining the impact of carbon in the supply chain.

These projects are part of UKWIR's programme of Climate Change research and from our work with GWRC (Global Water Research Coalition) members we know that other organisations are developing similar programmes of research.

AwwaRF, WERF (both of the USA) and UKWIR met in April to compare plans for Climate Change related research and to identify opportunities for shared funding of projects.

Twenty proposals have been selected ranging from '*impact on infrastructure*' to '*impact on ecosystems*' and '*impact on wastewater treatment*'.

Work will continue on developing this collaborative programme over the next few months and the UKWIR Board will consider funding options at their June meeting.

AwwaRF are promoting a bill through the US Congress which if successful will allocate $25M a year over the next ten years to climate change research in the water supply sector.

This is a significant investment in research and UKWIR continues to campaign in the UK for more research in PR09 and beyond to tackle these major challenges.

The Environment Agency's **Andy Howe** took the opportunity to give an update on the complementary project *Carbon Reduction and Energy Efficiency in the Water Industry*. This is in the process of:

- identifying issues and opportunities for carbon reduction
- identifying barriers and solutions for improved energy efficiency, especially any created by regulation
- ensuring that the Agency's approach to sustainable water management and climate change objectives are aligned.

Chris Matthews concluded proceedings by saying that the guidelines and the tool were "*right for our industry and fit for purpose*". He added that it is now up to UKWIR members to use the tool, in conjunction with stakeholders and regulators, and feed back their findings.

Microbial on track

UKWIR is contributing to a bacterial source tracking demonstration project being run by the Environment Agency with support from SEPA and the Scottish Government.

The project is helping to identify whether faecal pollution in bathing waters originates from animal or human sources. The value to the water industry is that spending can be more accurately targeted and potentially allocated to wastewater treatment only where the latter is the dominant source.

The Environment Agency's **Andrew Withers** explained at an UKWIR workshop, *Microbial Source Tracking* how the earlier well-funded EU ICREW project identified methods most suitable for further development.

The current demonstration project, managed for UKWIR by **Ted Thairs**, showed that one of these methods (bacterioides) proved unsuitable for all purposes and adopted instead mitochondrial DNA as a means of finding unique sequences within the DNA.

The Agency's **Jonathan Porter** described how its National Laboratory Service based at Starcross in Devon had delivered a limited routine service for the 2007 bathing water season, with samples from the North West and South West regions.

Of the first 260 routine samples, 157 suggested human or ruminant source only.

Figure 2 gives the proportion human and ruminant sources of faecal bacteria of the 157 samples where no other sources were suspected.

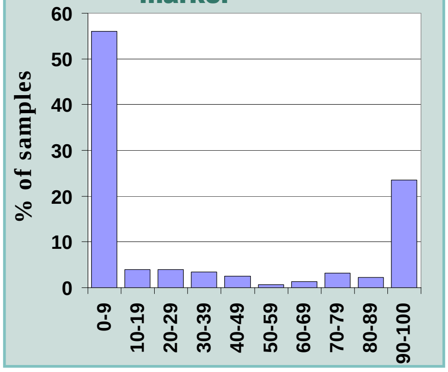
The three samples that failed mandatory or guideline bathing water standards were processed. The first showed the sources were 33% human, 67% ruminant, the second 0.8% human, 99.2% ruminant and the third 13% human, 87% ruminant. No other sources were identified in each case.

The MST methods are being extended to dogs and birds, seen as a particular problem in the UK. Because of diet there are complications that human and dog faeces may test positive for the presence of birds.

Dr David Kay described how a further collaborative study, managed by UKWIR and with a specific contribution from Yorkshire Water, is being undertaken in the Scarborough area by the Centre for Research into Environment and Health. This is calibrating the methods against field data.

The benefits from this MST research will come to fruition this summer when a routine service is to be offered to all Environment Agency Regions and possible commercial interests.

Figure 2. Human *Bacteroidetes* marker

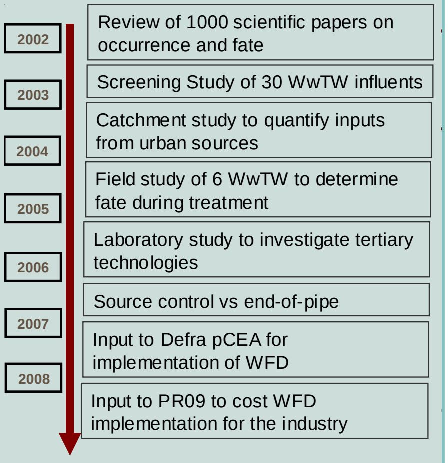


Dealing with priority substances

The *Dangerous Substances and Priority Hazardous Substances/Priority Substances* (WW17) series of UKWIR projects, managed by United Utilities' **Brian Ellor** with Yorkshire Water's **Tony Harrington** as Client Manager, has been evolving since 2002, as shown in fig 3.

At an UKWIR Technology Transfer workshop to disseminate the latest findings, Atkins's **Arthur Thornton** said the objective of the latest project *Priority Substances under the Water Framework Directive* was "*to develop the understanding of the risks and costs associated with the implementation of the Water Framework Directive to the water industry with respect to the priority substances and priority hazardous substances and extended to endocrine disrupting compounds and substances of potential future concern*".

Figure 3. WW17 programme



This involves meeting tighter environmental quality standards (EQS) without incurring disproportionate financial and environmental costs.

It is a collaborative programme of work between the water industry, the Environment Agency and Defra which means that there is transparency and an acceptance of the costs and the risks.

In 2004 the research estimated the cost of meeting tighter consents under the WFD in excess of £6 billion.

The latest research has updated these findings with improved data on removal rates, dilutions, potential consenting scenarios and unit cost estimates.

The project has identified significant risks with respect to the costs and the environmental impacts of end-of-pipe treatment.

Combined strategy

Avoiding such impacts requires a combined strategy. The most obvious element is to control pollution at source. The project has gathered a great deal of information on whether organic compounds such as TBT, NP/NPE, and PeBDE, and metals, primarily, mercury, cadmium, lead, copper and to a lesser extent zinc, come from domestic, industrial, light industrial, run-off or town centre sources.

The programme is providing a sound evidence base to the EU. This is in support of demonstrating where there are '*disproportionate costs*' as well as towards understanding the implications of the derivation EQS and the possible benefits.

In 2004, nickel was key in driving the costs with a proposed EQS of 1.3 µg/l, compared with a current standard of 50 µg/l in the UK. The research data was used in discussions at European level, and now the most recent proposed EQS is 20 µg/l. The great effect on potential costs is shown in figure 4.

Informed regulation

Informed regulation is important in ensuring there is appropriate implementation in the UK. The project has developed links between regulators and water companies. The methodology provided by the project has already informed the preliminary cost effectiveness analyses (pCEA) and regulatory impact assessments (RIA).

Setting risk reflective consents, 95 percentile v MAC consents and percentage of EQS allowed downstream of discharge are all critical issues in determining what standards and therefore what level of treatment and control is required.

In dealing with the EU it would be beneficial to establish the concept that the transitional areas of exceedence may, in many cases, reduce in size over time as controls are introduced and technology investment increases.

WRc's **Bob Crabtree** took the opportunity to present the findings of the related project *Methodologies for Catchment Based Consents* that looked at the sources of chemicals, catchment based risk assessment and compliance with the Water Framework Directive.

continued on page 3

DRINKING WATER QUALITY

Communicating safety plans

A step change is being made in the way drinking water is safely supplied in England & Wales. The application of Water Safety Plans (WSP) will be a more pro-active approach, adapted to each community situation, that balances all the risks from '*source to tap*'. There is a focus on meeting health requirements rather than just environment standards.

At an UKWIR workshop, **Professor Jeni Colbourne**, Chief Inspector of Drinking Water, reminded the audience that the World Health Organisation introduced the concept of Water Safety Plans back in 2004.

A WSP approach requires a system risk assessment, a validation of the control measures and, just as importantly, communication between all the stakeholders involved with an interest in drinking water quality.

It also requires verification and surveillance that is independent of the water supplier.

Jeni Colbourne added that the outputs from WSPs will inform the five-year investment programme from 2010.

WSPs will facilitate a strong basis for demonstrating due diligence defence as well as the sharing outputs with both openness and transparency.

The new Government water strategy, *Future Water*, confirms the WSP methodology as underpinning risk assessment by stating "*to facilitate this, the Government recently amended legislation to enable ongoing maintenance and investment to be based on individual risk based assessments from the water source to the tap*".

The UKWIR project, *Water Safety Plans Catchment to Consumer*, completed last year, has been instrumental in bringing the main stakeholders together to make the UK the first country in the world to introduce such plans.

One of the main objectives of the follow-on project *Drinking Water Safety Plans - Mitigation of the Identified Risks?* is to produce a consensus for a communication on WSPs between the industry, the regulators and customer support groups.

The workshop gave the opportunity for each of the stakeholders to present their approach to WSPs before '*break-out*' sessions examined the ways communications can further be improved.

One of the main players is the Health Protection Agency (HPA) and **Professor Nigel Lightfoot** explained how the organisation, since its establishment in 2003, is equipped to give a rapid response to new threats and emergencies.

The HPA is also geared to support the water industry with an immediate source of advice as well as with routine and enhanced surveillance. Its regional laboratories can carry out diagnostic microbiology, food and water microbiology as well as virology.

Sharing information

Much of the communication involves exchanging and sharing information. **Andrzej Nowosielski** from the Environment Agency described how they can produce key data on abstractions, source protection zones, discharges, flood zones, waste disposal and pollution incidents from which risks to water supply can be assessed.

The WSP approach requires water suppliers to think through the potential risks. **Catherine Jones** described how South East Water had considered such issues as:

- discharge from septic tanks & sheep dips
- illegal discharges from cess pools and fly tipping
- unmonitored discharges from old landfill sites
- chemical spills from motorways, garages
- pesticide and herbicide use from local farms, verges and parks.

Anglian Water has been concentrating on communication epitomised by their *Keeping Water Healthy* initiative that involves working with stakeholders to get the message out to customers. It includes the 'top ten tips' that can be found on the Anglian Water website.

Dr Robin Price explained how the company has completed a site-specific hazard and control template for every catchment, water treatment works, storage point, booster and public water supply zone. They are in the process of completing a series of validation workshops with local teams. These templates will form the basis of risk assessments due to be submitted to the Drinking Water Inspectorate by October 2008.

Even if water suppliers reduce the risks of contamination in the system, it can still occur in household and business premises. This is where communication with the public is vital in conveying understanding of risks from poor tap hygiene, poor plumbing and poorly protected header tanks. The company were monitoring the number of customer complaints to assess the success of the initiative.

Indeed, Southern Water's **Geoff Tute**, giving Water Regulations Advisory Scheme's perspective, graphically illustrated some of the bad practices people had devised, particularly related to potential backflow incidents.

UKWIR Client Manager, Bristol Water's **Arnold Bates** announced that the experiences exchanged at the workshop will be included in the full project report due out shortly.

WASTE WATER TREATMENT

Priority substances (continued)

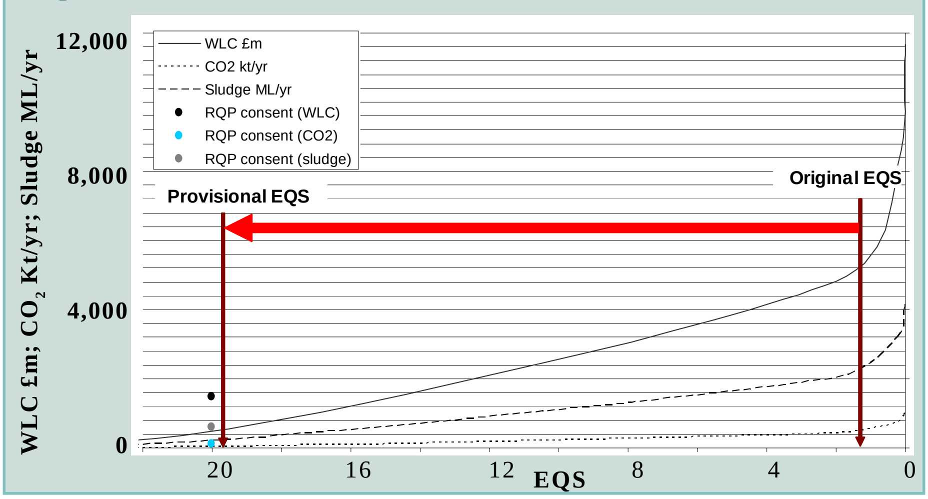
The object was to develop the scope of a future field trial that will test the approach, developed by the WW17 projects, for catchment based planning, management, monitoring and control.

The project found that phosphorus is a major potential problem and there are uncertainties over specific measures and costs to control diffuse pollution. It is uncertain how they will work and when the benefits will appear.

It also confirmed that catchment modelling based on the Environment Agency's SIMCAT model is the best current approach. It is then a case of arguing over how the results will be used and not how they were produced.

The issue of phosphorus is being addressed in the WW17 programme and WRc's **Sean Comber** updated delegates on the progress of the *Source Control of Phosphorus* project. It was Arthur Thornton who summed up the WW17 related work as "*placing the UK water industry at the forefront of knowledge and understanding of priority substances and regulatory impact*".

Figure 4. Cost curve SF-Nickel



Carbon accounting for the WFD

An UKWIR workshop was held in May to disseminate the findings of the project *WFD: Sustainable Treatment Solutions for Achieving Good Ecological Status.*

Project Manager, **Ted Thairs,** explained how the current work was a logical process of projects beginning with the *Environmental Performance Indicators* as long ago as 1998.

WRc has now developed a carbon accounting tool for UKWIR, on behalf of the water companies and in collaboration with Water UK and the Carbon Trust, that is being applied to assess sustainable wastewater treatment solutions.

WRc's **David Hunt** described how the carbon accounting tool uses parameters relating to processes in water, sewage and sludge treatment to estimate carbon emissions as well as setting out additional environmental criteria.

John Andrews and **John Hobson** demonstrated an additional tool for assessing sustainable wastewater solutions.

This uses Ofwat reporting criteria as well as data on consents, treatment processes, sustainability indicators, economic indicators, energy and vehicle movements.

The main output of this tool is in the form of an Excel spreadsheet and there is a linked Access database holding the mass of data.

Not only do these tools provide evidence on the costs and impacts of complying with the Water Framework Directive, they meet Ofwat's requirements in PR09 for cost benefit analysis and carbon emission information. They also meet Government reporting criteria.

What if?

Thames Water's **Jonathan Westlak**e confirmed how useful this tool is in examining '*what if*' situations.

For example, when considering a new build water treatment works supplying a population of a thousand to meet a set of environmental quality standards, there are several options ranging from a conventional works to building a reed bed.

The tool not only estimates the carbon emission figures (zero in the case of the reed bed) but also sets out land use and cost figures. All of this information helps the company come to the optimum decision.

Ted Thairs concluded the event by saying these are "*valuable tools for more sustainable solutions and more realistic standards.*"

RESEARCH REPORTS

This edition features UKWIR publications issued since the last newsletter.

CUSTOMERS

08/CU/02/4	Acceptability of Drinking Water - Willingness to Pay *(1 84057 486 0)*	£200

DRINKING WATER QUALITY & HEALTH

08/DW/04/10	Investigations into the Occurrence of Water Supply Zones that Demonstrate Resistance to Phosphate Dosing for the Control of Lead in Drinking Water *(1 84057 471 2)*	£150
08/DW/06/20	UV Inactivation of Cryptosporidium *(1 84057 474 7)*	£150
08/DW/11/2	WHO and EUREAU Support - Progress 2005-2007 *(1 84057 488 7)*	£150

ENVIRONMENTAL QUALITY

08/EQ/02/1	Health Impact Assessment of Water Management Options: Generic Guidance Note *(1 84057 475 5)*	£25

REGULATION

08/RG/05/22	Review of Water Mains Serviceability Indicators & Condition Grading: Volume II - Mains Condition Grading *(1 84057 480 1)*	£200
08/RG/04/3	Application of Time Series Analysis to Relative Efficiency Assessment *(1 84057 487 9)*	£500

SLUDGE

08/SL/01/6	Effects of Sewage Sludge Applications to Agricultural Soils on Soil Microbial Activity and the Implications for Agricultural Productivity and Long Term Soil Fertility: Phase III *(1 84057 473 9)*	£100

WATER MAINS & SEWERS

08/WM/07/8	Sewerage for the 21st Century: Executive Summary and Programme of Action *(1 84057 481 X)*	£50
08/WM/07/9	Sewerage for the 21st Century: Volume One - Data Collection & Management and Operation & Maintenance *(1 84057 482 8)*	£150
08/WM/07/10	Sewerage for the 21st Century: Volume Two - Active Operational Control of Sewerage Systems *(1 84057 483 6)*	£100
08/WM/07/11	Sewerage for the 21st Century: Volume Three - Lifestyle and Environmental Factors *(1 84057 484 4)*	£150
08/WM/07/12	Sewerage for the 21st Century: Volume Four - Statutes and Codes of Practice *(1 84057 485 2)*	£150
08/WM/08/37	Separation of Customers Night Use from Leakage in Night Flow Analysis *(1 84057 472 0)*	£200
08/WM/12/20	Minimising Street Works Disruption: Mapping Technologies for Buried Asset Location - Mapping the Underworld Seminar September 14th 2006 *(1 84057 478 X)*	£50
08/WM/12/22	Minimising Street Works Disruption: Data Integration and Display - Mapping the Underworld Seminar April 17th 2007 *(1 84057 476 3)*	£50

WASTEWATER TREATMENT & SEWERAGE

08/WW/21/10	Best Practice for Flow Data Flagging *(1 84057 479 8)*	£250

All UKWIR research reports are available for purchase via the internet on www.ukwir.org

UKWIR PEOPLE

Chris Matthews is leading the Carbon Accounting projects, featured page 1.

As United Utilities's Carbon Manager Chris's key responsibility is to drive the delivery of the company's carbon strategy and plan, the first to publicly declare a short term reduction in carbon emissions.

Chris, a graduate of history and politics, joined UU in 1994 and has held a variety of roles including Business Design Manager, responsible for designing and planning for a major business change programme. In his last role, he programme managed the preparations of the wastewater business for the forthcoming price review.

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