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IES INFORMATION

Incineration:

the main atmospheric pollutants and their formation

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As incineration is a viable method for the treatment of various types of waste, such as municipal solid waste (MSW), hazardous liquid waste or hospital waste, it is worth considering the atmospheric pollutants formed from this treatment method.

In very simple terms, incineration involves four stages; in stage one drying occurs where heat is used to raise the temperature of the moisture in the refuse or waste and evaporate it. Devolatilisation follows, where the combustible volatiles in the waste are released at 350°C and 980°C. The third stage involves ignition, where in the presence of oxygen, the combustion begins as the volatile material in the waste reaches ignition temperature. Finally, after the complete combustion of the volatile matter, the fixed carbon content is oxidised to carbon dioxide.

A large number of air pollutants can be formed from the incineration of waste; the variety and concentration of these contaminants depends on factors such as the incinerator combustor design, operating conditions, amount of non-combustible material in the waste and precursor elements and compounds present in the waste.

Thus atmospheric pollutants can include particulate matter, sulphur dioxide, nitrogen oxides, carbon monoxide, hydrogen chloride, hydrogen fluoride, metals and chlorinated organics.

A number of mechanisms can lead to the formation of particulate matter in the combustion process. Turbulent conditions in the combustor chamber can lead to the trapping of the lighter fractions of the non-combustible material in the exhaust flow. Inorganic materials, which are volatile at combustion temperatures, can lead to the formation of particles as they

condense downstream of the combustion zone. Oxidation of inorganic matter downstream can also lead to particulate matter formation. Organic material, emitted through pyrolytic reactions near the fuel bed, can also condense downstream if they are not fully combusted in the incinerator.

Sulphur dioxide is formed by the oxidation of sulphur compounds found in refuse items such as paper, rubber, plastics and waste oils. The sulphur content of waste can range between 0.1-0.35%, with the amount of sulphur conversion ranging from 10-90%. Operating conditions influence contaminant formation; for example, using an incinerator with spread stokers, where more of the refuse is exposed to high temperatures and oxidation conditions, can lead to higher rates of conversion of sul-

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phur to sulphur dioxide than other firing methods. Waste composition is also an important factor as, for example, the presence of metallic oxides may reduce sulphur conversion.

If we consider nitrogen oxides, the main polluting species are nitrogen dioxide and nitric oxide – the latter being the dominant species produced in the combustion process. Their formation occurs due to the conversion of nitrogen compounds in fuel and conversion of nitrogen in the combustion air, as a result of reacting with oxygen at high temperatures. The former source is more significant, as the nitrogen content of refuse can range between 0.34% and 0.83%, with wastes such as textile contributing largely. The conversion of nitrogen in the combustion air can be further influenced by the residence time at peak temperatures and by oxygen availability. For example, conversion rates for fuel nitrogen in coal range from 50% for well-mixed conditions to 55% for oxygen-starved, staged combustion.

Carbon monoxide is formed as a result of incomplete conversion of organic materials, which can occur for several reasons including insufficient combustion air, low combustion temperatures or inadequate residence time. The above conditions can be due to excessive feed rates, firing of wet refuse, high overfire air rates, poor mixing and inadequate supply of combustion air.

The formation of hydrogen chloride and fluoride can be due to the reactions of chlorine and fluorine in the waste with hydrogen ions from the combustion of hydrocarbons. Plastics are the largest contributor of chlorine in refuse, where it can range between 0.3-0.7%; fluorine content can be between 0.5-2%.

Metals are present in both combustible and non-combustible fractions. During combustion, some of the incombustible fraction can become entrained in the combustion air and carried out of the incinerator. These are in the size range of 1-20µm and contain iron, aluminium, copper, zinc, calcium and silica.

Metals in the high temperature combustion zone may vaporise directly or form oxides and chlorides which also vaporise. These may then condense homogeneously as a fine metallic fume or heterogeneously on the surface of entrained particles. Due to their high surface area to mass ratio, heteroge-

neous condensation favours small particles, which means the metal content of the difficult particle size/fraction to collect is enriched.

Finally, chlorinated organics/organic micropollutants are also air pollutants that can be formed due to the incineration of waste. There are three groups of concern, namely polycyclic aromatic compounds (PAHs), dioxins/polychlorinated dibenzo-p-dioxins (PCDDs) and furans/polychlorinated dibenzofurans (PCDF).

PAHs are formed during waste combustion or volatilisation of chlorinated organics or more specifically during incomplete combustion, as a result of improper operation of the incinerator (e.g. at low temperatures <800°C, at startup, or during overloading of the plant).

The second and third groups of organic compounds, mentioned above, are formed by the same mechanisms mentioned for PAHs above. They can also survive the combustion process, particularly at lower combustion temperatures that prevail in certain zones of some incinerators, due to their thermal stabilities. Chlorobenzenes and chlorophenols can act as precursors for their in-situ formation. Lastly, elementary reactions of hydrogen, carbon, oxygen and chlorine can also lead to the de novo synthesis of PCDDs and PCDFs.

Thus, it can be seen that the primary pollutants from the incineration of waste are atmospheric pollutants. Secondary pollution problems, relative to the above air emissions, are posed by categories such as contaminated waste water and contaminated ash residue. However, the environmental risks from the latter categories can usually be minimised by the proper functioning and running of an incinerator. Environmental and human health risks from the atmospheric pollutants, however, require the use of modern and integrated pollution control systems which are capable of keeping the atmospheric pollutants well below the regulatory and recommended emission limits.

References

- 1) *Handbook of Pollution Control Processes* (1991).
- 2) MSc Lecture Handouts from Dr P.T. Williams.
- 3) *NCSA Pollution Handbook* (1995).
- 4) DoE (Consultation Paper) *Air Pollution Control in Great Britain* (1988).

RECENT PUBLICATIONS

Risk Assessment

Title: *Risk Assessment for Contaminated Sites in Europe*
Volume 1: Scientific Basis

Edited by: Ferguson C., Darmendrail D., Freier K., Jensen B. K., Jensen J., Kasamas H., Urzelai A. and Vegter J.

Publisher: Land Quality Press

Price: £25 (by post from Land Quality Management Ltd, PO Box 5095, Nottingham, NG2 6FB)

ISBN: 0 9533090 0 2

British Library

Title: *How to Find Information: Environment*

Author: Paula S. Owen

Publisher: The British Library

Price: £8.00 (individual copies)
£5.00 (orders of 10 or more) (overseas postage extra)
36 pp, paperback

Available: from Turpin Distribution Services Ltd, Blackhorse Rd, Letchworth, Herts SG6 1HN

This short guide on how to find environmental information is designed to introduce the environmental enquirer into the complex and interdisciplinary world of environmental literature.

It is ideal for students undertaking environmental science/studies degrees and also for the environmental professional who has to conduct searches into the literature.

It is packed full of practical examples and lists the advantages/disadvantages of the various sources of information media available.

It also includes a section on Internet sources and lists, with a short description, some of the more important UK government, academic and commercial sites that hold useful environmental information.

The Hon. Secretary's news desk...

BUPA membership discounts

In the March/April edition of the Journal we published details of a discount offer available from BUPA for Institution members. We have been advised by BUPA that this can only be effected *after* the Institution has been officially registered on their records. Application has been made for registration and we are currently awaiting confirmation of a registration number.

Anyone who is interested in applying for a discounted service should first contact the Institution for the relevant details.

Responses

Two further responses have been made to consultation papers recently. They are as follows:

- *Modernising Planning: Delivery of Plans*, to the DETR.
- *Foresight Programme: the next stage*, to the Office of Science and Technology.

Industry guide

Businesses & Assets Ltd have recently published the 1998 Spencer's Guide to the UK Environmental Industry. This contains a number of articles on topical environmental subjects and profiles on a wide range of industrial environmental companies.

The Guide retails at £39.95 but the publishers are kindly offering a one third discount to members of the Institution.

Any members interested should contact:

BM Publishing,
East Common,
Gerrards Cross,
Buckinghamshire SL9 7AG

and quote their Institution membership and number.

EMF '98

Information for Industry are launching a major event for environmental managers this October entitled Environmental Management Forum '98. Environmental Software Demonstrations '98 will take place within the forum and more than 100 companies will be exhibiting.

There will be opportunities for managers to network, attend briefings and meet with regulators as well as seeing the many exhibitors. The event is being run in association with the Engineering Employers Federation and the Confederation of British Industry, who will both be running seminars, and the Institute of Environmental Management who will be holding their annual general meeting.

The event takes place at Olympia 2, London on 27 October 1998, entrance free. Further information can be obtained from Tom McCave on 0181 944 2930.

Short courses

A number of three-day short courses are being provided at the University of Surrey this autumn which would all count for CPD purposes. They are as follows:

2-4 September 1998

Environmental Law

Judicial and court-room procedures in the context of environmental claims. Rules of evidence, preparing and presenting evidence as expert witness. Mock enquiry, court-room scenario of dispute resolution, other methods. Overview of UK and EC substantive environmental law. The style of the course is participative and includes group work.

12-14 October 1998

Design for Environment (DfE)

(developed jointly with DfE Group, Manchester Metropolitan). The Business Case (eco-efficiency, product differentiation), DfE principles based on Life Cycle thinking and methods, designing for durability, service, disassembly, reuse. Practical exercises and industrial case studies, including hands-on exercise disassembling and redesigning telephones.

23-26 November 1998

Values, Ethics and the Environment

Theory and practice of putting values on the environment. Economic values and the Environment, Environmental Ethics. Normative principles for environmental policy. Case studies, and role plays will be used to explore and debate different approaches.

For further details of these courses contact Mrs P.A. Savill, Centre for Environmental Strategy, University of Surrey, Guildford, Surrey GU2 5XH. Tel: 01483 259047, Fax 01483 259394, e-mail P.savill@surrey.ac.uk.

RAF

Occasional papers available now

Waste management

- From waste to woods – planting trees on landfill
- From waste to woods: trees on landfill and their place in landscape
- Enhanced landfill strategy
- Waste minimisation: the long term benefits
- European study on EISs of installations for the treatment and disposal of toxic and dangerous waste

- Mercury fall-out from crematoria

Education and training

- Environmental courses undergo a quality assessment
- Student environmental declaration
- On-line information systems in environmental sciences courses
- Global environmental charter and network for students

Business and industry

- The tourism challenge

- The tourism debate and environmental scientists
- Enjoying environmental science as a career
- The Brent Spar and the best practical environmental option

National and local government

- Transport policy, environmental pressures and the new UK government
- Local Agenda 21 – making it work

New members

The IES is pleased to welcome the following to membership of the Institution:

APEM Ltd	Associates	Mr C. G. Gray	Environmental Scientist
Miss N. P. Archer	Student Lancaster University	Mr O. J. Grievson	Wardell Armstrong Water Quality Analyst Central Scientific Laboratories
Dr I. A. Arnott	Student Napier University	Mr J. W. F. Harrison	Research Assistant (Env. Ecotoxicology) Napier Environmental Technologies
Mr D. A. Atkinson	Recent graduate Staffordshire University	Mr L. Kuhre	Asst. Professor & Director of Env. & Safety Distance Learning University of San Francisco
Mr K. Bennett	Environmental Engineer Richards, Moorehead & Laing Ltd	Mr P. J. Mallard	Recent graduate University of East Anglia
Mr J. C. S. Binns	Student Lancaster University	Mr G. McMeekan	Environment Advisor, A.W.E. Plc
Mr R. Bodenham	Environmental Technician Stadco Tipton	Mr D. S. Patterson	Senior Environmental Consultant WSP Environmental
Mr J. D. G. Carlyle	Technical Sales Engineer Casella Ltd	Miss J. Silverwood	Recent Graduate University of Glamorgan
Mr C. R. Davies	Postgraduate student Cardiff University	Prof D. A. Spencer	Professor in Geology University of Maine, USA
Mr R. J. C. Dew	Technical Administrator Unicorn Consultancy	Miss D. J. Tagg	Environmental Scientist White Young Green Environmental
Mr D. M. Evans	Environmental Scientist Richards, Moorehead & Laing Ltd	Mr J. R. Vincent	Dept. Head, Environmental Auditing, ENSR International Ltd
Miss K. E. Ewens	Environmental Business Advisor Business Eco Network	Mr W. A. Wadsworth	Ecologist, Environmental Management Consultants
Mrs C. E. Fowell	Environmental Scientist Parkman Environment		

News of IES members

A Member of our Institution, Mick Evans, a Fellow of the Royal Institution of Chartered Surveyors, has been elected by the Minerals and Environmental Management Division of the RICS to serve as the Divisional President for the 1998-99 session.

Mick, who started his career with the National Coal Board in 1969, qualified as a Statutory Mine Surveyor in 1973 and spent the next ten years working at collieries in the North Staffordshire Coalfield.

During this time he studied at the local polytechnic, passing the RICS Final Examinations (Minerals) in 1977.

In 1983 became Assistant Area Surveyor and Minerals Manager at the Stoke-on-Trent based Western Area HQ of the NCB where he was responsible for Minerals Estates Management matters.

On re-organisation of British Coal in 1989 he became Deputy Surveyor and Minerals Manager for the North West Group, and he became heavily involved in implementing corporate policy relating to environmental management. Consequently, from 1990 to 1993 he was a key member of the Environmental Audit Team for the North West and sub-

sequently the Midlands & Wales Group. Since 1989 he has served on the RICS Minerals Divisional Council and was Chairman of the North Staffordshire Branch in 1993-94.

In 1993 he moved to pastures new to fill the position of Environmental Protection Officer at Stoke-on-Trent City Council. His knowledge of environmental law and new found skills in environmental management and audit have been put to use in a regulatory role relating to industrial pollution under the provisions of Part 1 of the Environmental Protection Act.

His past experience in dealing with historical mining legacies, gas and water emissions, waste disposal and geology are now to be put to use in an extended capacity relating to the identification and remediation of contaminated land in the City, under the new provisions of S.57 of the Environment Act, 1995.

Mick's main objectives for the year are improving communications with members, progressing a new APC in Environmental Management, developing links in Europe and the badging of suitable postgraduate diplomas in areas of environmental management.

Dumping at sea to be banned

In July 1998 agreement was reached at the first Ministerial meeting of the Oslo and Paris (OSPAR) Commission in Sintra, Portugal, to ban sea dumping of large off-shore steel installations and to reduce radio active emissions from Sellafield to 'near zero'

The UK and France have agreed to withdraw their opt-out from a ban on dumping nuclear waste at sea, ending a 15 year campaign

The agreement relates to 34 large steel UK installations which weigh in excess of 10,000 tonnes in air excluding topsides.

British Nuclear Fuels (BNF) have been asked to conduct a feasibility study into how to achieve the objective over the next 20 years.

RD

Forthcoming events and conferences

2 September: Packaging Waste Regulations – It's a wrap?

London Chamber of Commerce & Industry. £100-180

Morning seminar covering the packaging regulations.

Details:

Larissa Barrett,
The Environment Council,
212 High Holborn,
London, WC1V 7VW.
0171 632 0113

16-17 September: Joint annual conference of the IEA/EARA

The Swallow Hotel, Sheffield.
£280 members £320 non-members
Achieving Improved Environmental Performance

Details: Alison Hirst,

IEA,
Welton House,
Limekiln Way,
Lincoln LN2 4US.
01522 540 069

30 September - 2 October: Working with your Stakeholders.

Resolving Conflict and Building Consensus on Environmental Issues,
Wast Hills House, Birmingham.
£375-750

Three-day management development course in process design and facilitation skills.

Details:

Freya Levy,
The Environment Council,
212 High Holborn,
London WC1V 7VW
0171 632 0113

8-9 October: The UK and European Legislation on Air Quality.

The Berners Hotel, London
£299-699

Two-day conference that examines the implications of the UK NAQS and the Framework Directive on Air Quality on industry and the regulators.

Details:

Christiana Sztadhaus,
IBC UK Conferences Ltd,
Gilmooa House,
57-61 Mortimer Street,
London W1N 8JX
0171 453 5491

13-15 October: Risk Assessment for Waste Management.

Loughborough University.
£497.38

Details:

Rachael Lindley,
Centre for Hazard & Risk Management,
Loughborough University,
Loughborough,
Leics LE11 3TU
01509 222 161

29-30 October: Environmental and Safety Management in 1999 and Beyond.

London.

Details:

Andrew Allan,
EIS International,
1731 Eastbrook Court,
Santa Cruz, CA9 5062, USA.
Tel: 408 479 8632.
Fax: 408 440 0712.

5-6 November: Expanding Hong Kong – a dredging record.

One Great George Street Conference Centre, London.

Dredging works in Hong Kong have included some of the most complex, demanding urban reclamations ever undertaken, including Hong Kong airport. The conference includes papers describing how these projects were successfully completed, including environmental assessments and monitoring of the projects.

Details:

Carol Chin,
Thomas Telford Conferences,
Institution of Civil Engineers,
One Great George Street,
London SW1P 3AA.
0171 665 2316

12-14 November: Coastal & Ocean Modelling.

International conference,
Valletta, Malta.

Covers current research, advances in modelling techniques with particular reference to Princeton Ocean Model (POM).

Details:

The Secretary,
International Conference:
Coastal & Ocean Modelling,

Foundation for International Studies,
University Building, St Paul Street,
Valletta, Malta.
(356) 248 218, 234 121/2

17-18 September: Marine Biodiversity – contemporary issues.

Natural History and Linnean Society in association with University of Southampton and Plymouth Marine Laboratories.

Details: Tel: 0171 938 8731.

Fax: 0171 938 9158

The Environment Council

We have a really packed programme of seminars and events over the next few months and we are exclusively offering our Environment Councillors the opportunity to sign up to any two or more of the following events and get a further 10% discount on Environment Councillor event rate.

9 September: Introducing Stakeholder Dialogue.

Half day briefing, 2pm - 5.30pm,
London.

23 September: Local Agenda 21: Business Benefit of Bewilderment?

Morning seminar, 9am - 2pm, London.

30 September - 2 October: Working With Your Stakeholders.

Resolving Conflict and Building Consensus on Environmental Issues.
Three-day management development course in Process Design and Facilitation Skills.
Birmingham.

Part 1: 25-27 November 1998

Part 2: 3-5 February 1999 Initiating and Sustaining Stakeholder Dialogue.

A foundation course in Facilitation for the Environment.

Intensive six-day sandwich training course.

Details:

Environment Council,
212 High Holborn,
London WC1V 7VW.
Tel: 0171 836 2626.
Fax: 0171 242 1180.

This section of the Journal is in response to the growth of news, information and activities which underpin the Education Committee of the IES.

Special prominence will be given to student activities and projects, national and international initiatives, campus developments and research in order to capture the diversity, wealth and vitality of

modern environmental education.

Readers are invited to send articles and letters to:

■ **Derek Blair, School of the Environment, University of Sunderland. Benedict Building, Sunderland SR2 7BW.**

■ **Tel: 0191 515 2737.**

■ **Fax: 0191 515 2741.**

■ **E-mail: derek.blair@sunderland.ac.uk**

Standards and quality in environmental studies/science

Background

As a professional and academic body, the IES has a deep interest in the current debate on Standards and Quality in the HE sector. In May it convened a special workshop on Quality and Standards for Environmental Studies/Science in response to the Quality Assurance Agency's (QAA) consultative paper *An Agenda for Quality* which emanated from the Dearing Report.

This long and in parts controversial paper has been digested on campuses around the country and produced significant responses, some positive, some negative which the QAA has now considered. They are submitting their final report on 28 August and if it is acceptable to all partners will be approved at the full board of HEFC on September 14. The IES's interest focused on only one of the QAA's proposed subject areas but it was couched within the wider context of generic changes within modern learning and teaching. In particular, the IES, founded as it was over a quarter of a century ago on a platform of interdisciplinarity, was concerned about how the QAA's disciplinary priorities related to alternative curriculum models.

The QAA consultative paper

The QAA had invited comments on a framework for qualifications and awards at all levels of HE, threshold standards relative to that framework across subject areas, and codes of practice to improve the quality of student experiences. Quality was to be assured by reviews of institutional systems, programmes in 41

subject areas and by a system of registered external examiners. The Dearing Report for England and Wales and the Garrick Report for Scotland were to be used as models for improvement and refinement. There was to be a stronger specification on what was expected of institutions, a stronger focus on outcomes rather than teaching and learning processes and greater cognisance of the needs of different external agencies.

Academic standards would be made more explicit through, for example, a qualifications framework which will have generic qualifications, definitions and defined level descriptors linked to awards and credits. The qualifications framework will be linked to subject benchmark information so that what a student is expected to attain at each threshold level within an academic area can be recorded.

Employers would be able to match specific and generic outcomes of a particular programme to the needs of the workplace. Verification of academic and professional attainment would be ascertained by codes of practice applied by institutions, agencies, professional bodies and registered external examiners (REEs). Trials were being conducted on three pilot subject areas, law, chemistry and history, to explore these ideas.

IES special workshop

The IES special workshop on 6 May, therefore, sought to examine the relevance of the QAA thinking of the interdisciplinary area of Environmental Studies. The group was helped by a lead paper and oral contribution by Dr Peter Milton, Director of Programme Review in the QAA. Fortunately, Dr Milton had

academic experience of environmental studies/science and also of the founding of the IES in the early seventies. In addition to its interest in the nature of standards and quality relating to environmental education, IES wanted to embrace in its deliberations the hoary old chestnut of the 'common curriculum' of environmental studies/science in view of the continued proliferation of 'environmental' courses and its expanding work on accreditation.

The IES offered its comments on the original paper to the QAA in time for the tight deadline of 22 May. Generally it adopted a positive and proactive stance to the paper and the issues it raised with reservations in a few but important areas, including the REE system and the danger of confusion of academic and professional roles. Also, in view of its accreditation activities and wider interdisciplinary framework, the IES offered different and valuable perspectives on benchmarking and standards to the QAA. The IES was not confident if such terms as 'standards', 'quality' and 'threshold' were fully used or perceived in the same way; nor if they were as distinguishable and as measurable as the QAA implied. The IES's experience of the academic and professional environmental field over the last 25 years suggested that there would be difficulties in defining generic skills for specific fields, even though it agreed on the need to continue to define benchmarks for environmental studies/science. Despite the well known proliferation (and confusion) of environmental courses documented for 1988-1992 in the Toyne Report and experienced subsequently, the IES supported the QAA in

the encouragement of diversity and creativity in the design and delivery of courses. Significantly, the IES is refining its own accreditation currently to make explicit the criteria it anticipates from graduates in Environmental Sciences and what they should know and be able to do. The IES has invited feedback from its members on these questions using the template designed by the QAA.

National feedback

Meanwhile the QAA has co-ordinated the national feedback to its paper. HE institutions generally are concerned that a 'national curriculum' culture with standardisation and regulatory straitjacketing will emerge. Some perceive the proposals as threats to their autonomy, academic freedom, heterogeneity of provision and diversity of mission. As expressed by the IES, HE institutions believe that the single subject model is too narrow and fails to take modular, unitised and interdisciplinary alternatives and lifelong learning into account. Most institutions acknowledge the need to be accountable and to be able to produce clear, robust, accessible and explicit information. As the IES knows from its professional work, employers require comparative information on similar courses in the same subjects at different institutions so that fair and rational decisions can be applied individually and collectively. Questions on employers' perceptions of graduates from different academic backgrounds have reappeared this summer (July) in another report

from the Association of Graduate Recruiters which claims in a survey that graduates are not offering what employers want. They identify a growing gap, over the past five years, especially in numeracy, oral communication, business awareness and initiative.

Interpersonal skills and team working followed by motivation and enthusiasm were the most valued graduate skills. Clearly these are not specific to only Environmental Studies/Science but are generic in varying capacities in all degree courses.

Employers and, interestingly, student bodies have concurred with the IES's support of benchmarking and programme specifications even though generally a mixed response from institutions and funding councils has been received. Funding councils stress their statutory responsibility to secure the assessment of quality, which they can use in funding decisions. Many respondents expressed major concerns about links between funding and quality (as expressed by HEFCE). There seems to be strong support for a bidding process which would support quality enhancement, which apparently remains insufficiently weighted.

There is broad support for strengthening the external examiner system with externals having a more explicit framework and a code of practice with guidance on good practice preferred to formal training and registration. There was a strong antipathy to REEs reporting on both quality and standards with concerns about losing the benefits of the

current system, about conflicts of interest, about workload, about confusion of reporting relationships and about recruitment and retention. It seems certain that the original proposals for REEs will be jettisoned as will be the standard five year institutional visits.

Summary

The timetable for the consideration, consultation and debate of all the Quality and Standards issues raised by the QAA in March has been very tight. Proposed implementation is ambitious given the differences between English, Welsh and Scottish Funding Councils.

The original 20 page QAA paper has been significantly modified in the consultation process over the summer. The QAA presents its final report on 26 August and if accepted to the full board of HEFC on 14 September.

The IES has made its views known to the QAA and these seem to be compatible with expressed national and institutional concerns. As a professional body which has consistently promoted the interests of interdisciplinarity and which is currently very active in course accreditation, the IES welcomes the move towards better comparative information within a culture of improved curriculum and professional development. The IES is well placed to be pro-active in the national search for improved quality and standards. Any member with a particular interest and/or view on this big issue is invited to communicate them to the IES Education Committee.

Derek Blair

ENVIRONMENTAL NEWS

A new deal for transport – better for everyone

On 20 July 1998 the Government unveiled *The New Deal For Transport* heralding a new era for the travelling public which will make transport better for everyone. The integrated transport White Paper sets out a far-reaching plan of action which includes:

■ **Local Transport Plans**, which will require local authorities to consult with local people, businesses and transport operators to deliver five-year strategies to meet local needs. These will cover all forms of trans-

port and road traffic reduction;

- **Greater investment in bus services**, through up-graded quality partnerships between local authorities and operators, delivering faster, more reliable services with modern, comfortable, vehicles;
- **National minimum concessionary bus fares** for pensioners, which will mean at least half-price tickets for those who qualify;
- **A Strategic Rail Authority**, which will take on the task of managing

passenger railway franchising, driving up service quality and with the power to ensure that operators honour their commitments on investment and modernisation. The SRA will also have a remit to deliver a rail freight renaissance;

- **A rail infrastructure investment fund** and a **rail passenger partnership scheme**;
- **A national public transport information system** by the year 2000, which will use new technology to

improve reliability of services and provide integrated timetable information, making it easier to plan and make public transport journeys;

- **Reform of the Highways Agency** to give it a key role in managing the trunk road network, possibly with new income streams from tolling;
- **New income streams for local authorities** to tackle pollution and congestion by levying charges for driving into town centres and for workplace parking. This will raise money for local authorities, creating a dedicated income stream which will be used to boost public transport;
- **A new deal for the motorist**, which will mean better maintained roads, better traffic information and management, and a clamp-down on cowboy clammers and unscrupulous second-hand car salesmen;
- **A new Commission for Integrated Transport** to provide impartial advice to Government and monitor progress on policy implementation;
- **Integrating transport with land use planning** to plan out car dependency and plan in environmentally-sustainable alternatives;
- **Driving up safety** by setting tough new targets and reviewing safety across all transport modes;

■ **Developing regional ports and airports** so that they play their full part in meeting local demand and as drivers of local economies and growth.

When launching the White Paper John Prescott said: 'Mondeo man can breathe a sigh of relief and breathe a little easier because this will give him cleaner air, less congestion and better transport choice.'

'The car will remain an important symbol of a prosperous, inclusive, mobile society. It is an essential tool for some people's work. It can also be part of a seamless journey with an integrated public transport system. But there needs to be a better balance so that people are encouraged to use the car less and public transport more.'

'The policy is also about providing people with real choices about how they travel – for work or for leisure – by setting out exciting new ways of funding safe, reliable, clean, comfortable public transport. And let's not deceive ourselves. We need to make those choices for we cannot go on as we are.'

'No-one really believes that we can allow traffic growth to go unchecked when projections show that the growth of the motor vehicle is going to be about 30 per cent in 20 years. That means to meet that demand I'd have to build a

motorway equivalent from London to Leeds with 150 lanes on it. That is bad for our economy; bad for our health; and disastrous for our environment and that's why I believe people are ready to accept our radical approach.'

'There is a clear mood for change and I am in a mood to deliver it. But the way ahead is a shared responsibility and we all have a part to play in achieving our goal. That's why we want to create new partnerships at all levels, helping local government, business and local communities to come together to deliver a truly integrated transport system which meets the challenge of the 21st century and an environment we can be proud to hand on to future generations.'

'The New Deal for Transport means integration within and between different types of transport to make connections work; between transport and environment policy for a better environment; with land use planning to reduce the need to travel; and between transport and our policies on education, health and wealth creation so that transport helps make a fairer, more inclusive society.'

■ *A New Deal for Transport – Better for Everyone*: the government's White Paper on integrated transport is available from the Stationery Office, price £16.50. ISBN 0101395027.

The comprehensive spending review and the environment

A summary of the Government's plans for the DETR

Following the outcome of the government's year-long Comprehensive Spending Review, which was announced just a few days before the publication of the transport White Papers in July, it was claimed that £6 billion would be made available to the DETR over the next three years to assist in:

- establishing 150 local integrated transport strategies to reduce congestion, improve safety and the environment and to increase accessibility to transport in all parts of the country. There is to be £1.1 billion more for local transport, public transport and integrated transport initiatives. This involves increasing the level of private sector investment, through, for example, the new public-private partnership for the London Underground. Resources are to be increased to

allow local authorities to oversee integrated transport strategies aimed at reducing dependence on the car;

- ending the decline in the condition of motorways and trunk roads, and beginning to restore previous cuts in the maintenance and strengthening of local authority principal roads and bridges. £700 million is earmarked for 'well targeted' maintenance;
- tackling the problems of areas of multiple deprivation, including former coalfield areas. This is to be made up of two elements:
 - A 'New Deal for Communities' programme will help improve the most deprived neighbourhoods (£800 million over next three years), focusing on enhancing economic and employment opportunities, improving the quality of life and offering better

neighbourhood management; and

- a re-shaped Single Regeneration Budget will be targeted on the most deprived urban and rural local authority areas and more than 50 new schemes in those areas will be established (£2.3 billion over three years);
- local authorities being able to reduce the backlog of repairs to council houses by at least 250,000 dwellings. This will be assisted by an additional £3.6 billion. A Housing Inspectorate with power to tackle poor management will be established under the Audit Commission. Reforms will be introduced requiring councils to plan their maintenance better and hold them accountable for investment decisions. Local authority rents will increase by 1 per cent in real terms next year and by 2 per cent in each of the following

two years. Part of this increase will be available for revenue expenditure on maintaining the stock. Tenants are to be given more say in how their homes are managed and maintained;

- environmental improvements: an extra £174 million is to be provided for those on low incomes to improve the energy efficiency of their homes

and to help meet the UK's commitments on climate change;

- enhancing rural communities and the countryside: a new strategic approach underpinned by improved coordination and financial planning of DETR and MAFF programmes is aimed to 'enhance opportunity' in rural areas, improve access to and enjoyment of

the countryside and assist the management of rural landscape and wildlife resources;

- improving the Planning Inspectorate's response time on appeals, to take forward the new regional planning arrangements, and to develop the National Land Use Database.

DH

The Government's Spending Plans	£ millions			
	1998-99 (budget)	1999-2000 (plans)	2000-01 (plans)	2001-02 (plans)
Housing	2299	2438	3127	3661
Regeneration (including New Deal for communities)	1220	1352	1533	1765
Transport	2685	2880	3231	3673
CTRL, London Transport* and rail franchise payments	1994	1670	1238	1367
Other **	1657	1835	1704	1785
Total DETR Main Programmes	9855	10175	10833	12251

Notes on table

* Includes no provision for London underground as from 2000-01, from when a public-private partnership is planned to be in place. Investment in the Underground is set to increase with private sector investment of around £7 billion over 15 years.

** Includes some provision for DETR spending in support of local government administration and for planning research.

New deal for the railways

In July the Government announced comprehensive plans for a new deal for the railways including a new Strategic Rail Authority, two new investment funds and stiffer regulations. They want to make sure that Britain's railways play their full part in an integrated transport system. The Government will introduce the following:

■ **A Strategic Rail Authority (SRA)** – which will take a look at what needs to be done to develop the network; make sure the railway is properly integrated with other forms of transport, and run as a single network and not a collection of different businesses. The Strategic Rail Authority, including a chairman and a board, will take over the powers of the Franchising Director, responsibility for freight grants, and have the main responsibility for consumer protection.

■ **New role for Rail Regulator** – The Rail Regulator's role will be redefined. Consumer protection will switch to the SRA. The Rail Regulator will have a new duty to take account of the Government's broad policy for the passenger and freight railway, and new duties relating to integrated transport and sustainable developments.

■ **Two new investment funds for the railway** – Controlled by the Strategic Rail Authority, the new Infrastructure

Fund will support strategic investment projects to help tackle capacity 'pinch points' in the current rail network in addition to the commercial infrastructure investment undertaken by Railtrack. The Rail Passenger Partnership will encourage and support new and inventive ideas to get more people onto trains at regional and local level with priority going to proposals which will improve rail's appeal to existing passengers, disabled people and new users.

■ **Tougher controls over train leasing companies** – A new agreement between the Rail Regulator and the Rolling Stock Leasing Companies (ROSCOs), backing up the Competition Bill, to protect the public interest and prevent the companies abusing their monopoly positions.

■ **More power for passengers** – To make sure that passenger groups provide the most effective and independent voice for rail users, sponsorship for the existing Central Rail Users Consultative Committee and Rail Users Consultative Committees passenger groups will transfer to the SRA and membership of the groups will include a wider cross-section of passengers. The strengthened groups will co-ordinate with bus user representative groups, contribute jointly to regional transport

strategies and get specific new powers to report breaches of rail franchise agreements to the SRA.

■ **A halt to the sale of British Railways Board land** – To remove the risk of any existing railway land which might be of potential value to the passenger or freight railway slipping through the net, the British Railways Board will suspend land sales immediately until it has conducted an audit of the remaining sites.

■ **Better performance from train operators** – The existing performance of passenger train companies needs to improve. To do that train operators will be judged on their current performance before any new contracts are agreed. In all new contracts we expect to see much better performance requirements and arrangements to enable passengers to hold operators to account for the services they run. In addition we will amend the Railways Act so that financial penalties for poor performance can be imposed much faster, and past infringements penalised. In future, train passengers will be asked how their service is performing every six months, with the results published, and train operators will be required to take action to fix problems.

RD

Ecological impacts of pollutants: the case of nitrates and amphibians

Dr Nick Barnes, MEnvSc

Introduction

Widespread and intensive application of nitrogen-based fertiliser continues to be a feature of agricultural practice in lowland Britain with potential consequences for aquatic ecosystems and the wildlife they support. The eutrophication of standing waters across intensively farmed landscapes has caused major environmental problems which have been widely studied, although little is still known about the long term impact of nitrates on some of our more familiar wildlife, including amphibians. Furthermore, despite the potential importance of toads, frogs and newts in freshwater ecosystems, their susceptibility to chemical hazards is still largely undetermined.

What has been recognised for a number of years, and continues to be widely reported, is the phenomenon of widespread declines in amphibian populations in many countries including the UK (Halliday and Heyer 1997), although the causative factors behind these declines are still poorly understood. Amphibians are known to be vulnerable to changes in quality and this may be an important contributory factor. For example, initial research undertaken at the Open University suggests that anurans (frogs and toads) are adversely affected by exposure to raised nitrate concentrations (Baker and Waights 1993). More recent research also shows that anurans can be adversely affected by nitrates which are applied to their terrestrial habitats at concentrations similar to those used by farmers (Oldham *et al* 1997).

Increasing concern

Increasingly, there is concern about the long term effects of sub-lethal concentrations of pollutants and the impacts they can have at ecological levels. Although such 'chronic pollution' may not cause direct fatalities its influence can be profound on wildlife populations and communities; for example, a reduction in reproductive activity or success can result in a smaller population size over a period of generations. Many properties of populations may be used to gauge the environmental impact of pollutants. For example, changes in population abundance, or the rates at which individual animals grow or develop may reflect changes in water quality, whilst assessments of reproductive activity and inter-population variations in the size of individuals may also reveal differential responses to pollutants. Potentially profound changes in the population ecology of amphibians and other aquatic organisms may therefore occur as a result of long-term exposure to sub-lethal concentrations of chemical compounds such as nitrates (Barnes 1998). Chronic exposure to toxic compounds

in freshwaters may thus allow individual animals to survive but, owing to impaired growth, altered reproductive potential or behaviour modification, the population structure and dynamics may show severe symptoms of exposure.

Environmental conditions which impair population performance measurements may therefore become evident when populations are examined and this kind of information has considerable potential as a 'big-indicator' of pollution impacts.

Research issues

The research undertaken at the Open University suggests that exposure to increased concentrations of nitrate ions can reduce larval growth and size at transformation in laboratory-reared toad tadpoles. Poor growth during this larval stage can result in reduced body size at maturity, a factor associated with low reproductive potential in amphibians with long term implications for the population as a whole (Halliday and Verrell 1986).

A further study of the effects of nitrate ions on tadpoles of the Tree Frog *Litoria caerulea* (Baker and Waights 1994) also showed reduced growth, and increased mortality among larvae exposed to raised nitrate concentrations. Alteration of amphibian population characteristics as a consequence of exposure to nitrates at breeding sites may therefore provide a possible explanation for the declines in amphibian populations which are causing so much concern in the UK and many other countries. Since it is ecologically relevant to consider the adverse effects of compounds in mixtures and under conditions of low, sub-lethal concentration, it is this 'ecotoxicological' approach which is critical to an adequate understanding of the environmental impacts of nitrates and other chemical compounds on aquatic wildlife.

The central problem, however, of interpreting population information from field-derived observations lies in deciding the degree to which observed changes in, or differences between populations represent deviations caused by chemical compounds of interest, or whether such changes are part of natural fluctuations inherent within the system, or by the species concerned. Amphibians for example, often exhibit wide fluctuations in population size from one year to the next as a consequence of differing weather conditions and other factors. This problem can be addressed to some extent, however, by the parallel use of experimental work to allow controlled maintenance of (for example) nutrient concentrations combined with a reduction of environmental variability present in field situations. In this respect, controlled semi-natural 'mesocosms' can be


employed to try and 'tease-out' the effects of pollution from naturally occurring factors.

With these considerations in mind preliminary research by the author is now also under way at the OU which aims to try and establish the extent to which raised nitrate levels might explain declines in toad populations in lowland Britain. Initial work is being funded by a 'seed grant' from the Declining Amphibian Populations Task Force (DAPTF), a global initiative which has its UK base at the OU. The DAPTF is a collaborative effort supported by the IUCN and endeavours to support a variety of projects which are investigating possible causes of amphibian declines across the world. The ultimate aim is identify the causal factors behind amphibian declines and to initiate conservation measures which can halt and reverse them.

One of the aims of the research project will be to collect a variety of information from toad populations at sites exhibiting a range of nitrate levels. Populations exposed to raised nitrate concentrations may thus be compared to 'control' populations in order to gauge the extent to which variation in abundance, growth or other characteristics may be due to chronic exposure to nitrates. The hope is that the study will help identify the extent to which exposure to sub-lethal concentrations of nitrate is having adverse effects on amphibian populations. By raising awareness of these 'hidden' ecological impacts and gaining a better understanding of the possible long term effects of these agrochemicals, it is hoped that the policies concerning the use of nitrates and other compounds can be more fully informed.

Conclusion

Environmental managers require information which will allow predictions to be made about the long-term

impact of nitrates and other chemical compounds at ecological levels. The evaluation of amphibian population responses resulting from long term exposure to chronic nitrate levels may provide a basis for predictions concerning their ecological impacts with consequent implications for effective conservation management of amphibians and other aquatic wildlife. 

■ *Dr Nick Barnes is a Research Fellow at the Open University and NORSKI Visiting Researcher at Nene University College, Northampton.*

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Genetically modified foods

■ Benefits and risks

■ Regulation and public acceptance

Genetically Modified (GM) Foods have been in UK shops for some time. They have been clearly labelled as such, and commercially successful. Recently, however, changes in US agriculture mean that many of our processed foods already (or soon will) contain GM ingredients. This is causing problems for UK and EU regulators in deciding how such foods should be labelled, and may also contribute to trans-Atlantic tensions in agricultural trade.

POST has analysed recent developments in GM foods. This note summarises the report and the issues of interest to parliamentarians.

Why genetically modify foods?

Virtually all plants used in agriculture are genetically modified in the sense that they are the products of

selective breeding programmes, and present-day crops are genetically far removed from their wild predecessors. Traditional breeding programmes are however somewhat 'hit and miss' and when the more precise techniques of genetic manipulation made it possible to introduce specific genes into plants, researchers turned their attention to how crops and foods might be improved by the new technology – e.g. by inserting genes to improve flavour or nutrition, increase yields, impart resistance to pests and diseases, or extend the conditions under which crops are grown.

The full report describes the techniques involved, and how GM plants and foods have made their way from research in the laboratory, through development, field trials and the various regulatory systems, to reach the consumer's plate. The UK has many strong centres of research industry (e.g. Zeneca Plant Science), in research institutes (e.g. John Innes Centre), and universities where the support of both the BBSRC and MAFF is important. Many research ideas are now

moving out of the laboratory into field trials (e.g. potatoes with increased starch content), but the use of GM foods has been quite limited in the UK until recently – vegetarian cheese uses an enzyme produced by a GM bacterium rather than from extracts of animal; and a paste from GM tomatoes is selling well.

But such products are only the beginning and, as outlined in the full report, GM plants and foods are set to make a major takeover of our diets and agriculture.

The main GM plants on or nearing the market offer:

- **Herbicide tolerance.** Crops such as soya beans, maize, oilseed rape and cotton are made resistant to a company's broad-spectrum herbicide (e.g. Monsanto's glyphosate, AgrEvo's glufosinate ammonium or Rhone-Poulenc's bromoxynil).
- **Insect resistance.** Crops are given genes of bacterial origin which produce proteins toxic to insects but harmless to plants and humans.
- **Altered ripening.** Fruit (e.g. tomatoes) can be modified to allow it to ripen without softening.
- **Altered fertility** – to produce hybrid seed by conventional breeding or to cause the crop to die before it can pollinate.

Now that earlier technical problems faced by scientist in modifying some crops are being overcome, the range of GM plants worldwide will soon extend to include many more commercially significant plants – for example, trials of plants such as aubergine, barley, broccoli, carrot, chicory, cranberry, grape, pea, pepper, raspberry, strawberry, sugarcane, sweetgum, sweet potato, watermelon and wheat have all occurred in the last two years.

As the range of plants being modified has expanded, so too has the spectrum of modifications, and some of the main targets currently being developed include:

- resistance to bacteria, viruses or fungi;
- improving product quality (e.g. changing oil profiles, amino acid composition, carbohydrate metabolism, carotenoid content);
- changing the agronomic properties of plants (e.g. improving growth rates, tolerance to cold, drought, stress, changing nitrogen metabolism, maturation rates, yield, etc);

Although many of these targets involve clear advantages to the consumer (e.g. improved taste or nutrition), the 'big business' is currently in GM crops such as maize, soya bean and oilseed rape, which have been modified to tolerate proprietary herbicides or resist insects. For instance, GM soya beans tolerant to glyphosate currently account for some 30% of the soya sown in the USA this year, and over 6 million acres of insect-resistant (Bt) maize were grown in 1997. Since Europe relies on US imports of these foods, this means that in practice, foods containing GM soya ingredients have been sold from 1997.

The regulatory system

The full report explains how the regulatory system has evolved and how responsibility shifts from one body to another as a GM plant moves from the research stage,

through development and field trials, to marketing approvals for food use or use as seed. From the very beginning, both national and EU regulatory responsibilities have had to be resolved, and the resulting system is much more complex than its US equivalent. Combined with apparently greater public sensitivity to the issue of genetic modification in the EU as a whole, regulatory approvals in the EU can be protracted, and thus deployment of GM plants in agriculture is well behind that of the USA. Some of the EU initiatives (particularly that on labelling) have found it difficult to keep up with technology and events.

The means by which the EC resolves differences between Member States (MS) is also complex. Thus when a company applies for EU-wide marketing approval for a GM food, it need only apply to one MS. If approved, the details are circulated to the other MS which have 60 days to object. Objections are then considered by the Commission, which may seek advice from its own scientific committees. Many of the applications have triggered objections (including some from the UK) and are described in the full report.

The regulatory system applies controls towards three primary ends – protection of the health of the consumer eating GM foods; protection of the environment from any effects of growing the food; and the provision of information to the consumer via labelling. The more important aspects of each of these areas (see full report for details) are summarised below.

Protecting the health of the consumer

The primary responsibility for ensuring the safety of GM foods is with MAFF, advised by the Advisory Committee on Novel Foods and Processes (ACNFP). The two main considerations are the potential toxicity/allergenicity of the novel gene projects, and the possible impact of the antibiotic resistance genes, still widely used as 'markers' at the research phase. Some of the questions which ACNFP has had to address include:

- Do residues of B toxin (to kill insects) in a GM maize pose any health risk?
- Could any of the modifications cause allergic reactions in some people?
- Could antibiotic resistance genes transfer from the plant into bacteria in the human or animal gut?

As explained in the full report, ACNFP assesses risks on a case-by-case basis. Overall, the risks have generally been estimated to be extremely small, but some evidence is inevitably circumstantial, leaving scope for uncertainty. Public faith in the regulatory process can thus be critical to public acceptance of the new product. The full report describes measures taken recently to improve openness and transparency and to ensure a wider representation of interested groups on ACNFP.

ACNFP's main reservations are over the antibiotic resistance genes which are often inserted as part of the

early research and screening phases for GM plants. These genes persist into the plant and, in some cases, are even active so that the plant itself contains enzymes capable of inactivating specific antibodies for antibiotics. ACNFP has pointed to the general undesirability of creating new opportunities for antibiotics resistance to spread – even if the probability of it doing so from plants is very low – and has urged the industry to develop alternatives. Some companies have responded, but progress is likely to be slow. One option would be for the regulatory authorities to identify the least safe practices and to discuss phase-out strategies with the industry. For instance, some genes (e.g. for ampicillin resistance) were considered particularly undesirable by ACNFP, and were allowed by the EC only after the UK objected.

Environmental and ecological impacts

The lead department here is DETR advised by the Advisory Committee on Releases to the Environment (ACRE). The full report points to some potential environmental consequences of widespread use of the GM plants – particularly ‘selection’ pressures which could encourage insects to develop resistance to Bt toxins, and possible spread of herbicide tolerance to close wild relatives of the crop involved. Regulators and industry point out that selection pressures are also present with non-GM plant agriculture, and argue that the risk of gene transfer is relatively small and controllable. Recent research, however, suggests that emergence of resistance insects and plants may be more likely than thought hitherto. Strategies to contain this do exist (e.g. refuges for non-resistant insects, and rotation of herbicide-tolerant and conventional crops), but concerns over GM crops’ long-term effects remain. Evidence that companies are not always adhering to consent conditions designed to restrict spread of the modifying genes in field trials, also increases the perception that undesirable gene transfer may well occur. As the range of GM crops expands, there are also concerns that other crops of their close relatives could develop multiple herbicide tolerance.

Most recently, the emphasis of some companies on herbicide-tolerance has interacted with the wider debate over the role of pesticides in agriculture. Instead of seeking to reduce dependence on pesticides along with principles of sustainable agriculture, some conservation groups see herbicide-tolerant and insect resistant crops as providing a further intensification of agriculture, which is already under scrutiny for its adverse effects on natural biodiversity.

Conservation groups are particularly concerned that the use of GM crops could remove what little food remains in modern arable fields for birds and wildlife, and have called for a moratorium on allowing GM crops to be grown commercially, during which period the effects of such crops on the environment and biodiversity should be fully tested. Such concerns have not affected the rapid increase in the use of GM crops in the USA.

Public attitudes and labelling

Attitudes towards GM foods vary considerably – at one end of the spectrum are those who see this as the technology to feed the world, and at the other end are groups who are opposed to such techniques in principle. Surveys (see full report) suggest that many European consumers do not reject GM foods out of hand – rather, they weigh the perceived benefits to themselves (e.g. is the product cheaper, tastier, healthier?) against the potential risks (e.g. could it harm the environment, human health or animal welfare?). In practice, this means that GM products where the perceived benefits accrue to the producer rather than the consumer are among the least readily accepted. Many consumers appear to view GM products derived from herbicide and insect-resistant crops in this category.

The issue of labelling to inform consumer choice has been central to much of the public debate over GM foods. Here the lead is with the EU, and progress has been very slow. The Novel Food Regulation took some eight years to develop and was finally introduced in May 1997. This put in place an EU-wide pre-market approval and labelling system.

Because of these delays, the regulation had already been overtaken by events in that GM soya and maize had already received marketing consents and were in use without labelling. A second regulation was thus needed in September 1997 to address this. Still being discussed, however, are key details including what should be labelled and what the label should say. The Commission is currently considering these issues, and produced a proposal for a further regulation in February 1998, which will be discussed in May.

The key questions here are why is the label there and what is it meant to convey? In practice, the only real difference in a GM food is that it has novel DNA (the inserted genes and related sequences) and the material produced by these genes (proteins). The Commission thus proposes that labelling will depend on whether or not novel DNA or novel protein can be detected in the product, leaving for future resolution exactly what detection methods are used and what levels would trigger a requirement to label.

Until the technical details are resolved, many inconsistencies will remain. For instance, some label only those foods which contain the GM protein (not the DNA) which means that products containing oil or sugars/starches from GM maize (e.g. soft drinks) and soya (e.g. margarines) do not need to be labelled, while those containing proteins (e.g. semolina, tofu, soya milk) do. On the other hand, if low levels of GM DNA were the yardstick, more such products might need labelling (e.g. DNA is found in food starches, but not in oil). Because GM soya and maize are not segregated at source in the USA, most major UK retailers will label products containing soya protein as ‘containing genetically-modified soya’, irrespective of whether this is actually the case. However, at least one supermarket chain (Iceland) has announced that it has secured a full traceable non-GM source of soya, and



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Environmental Incident Management

The Institution of Fire Engineers in association with the Essex County Fire and Rescue Service and SmithKline Beecham present an Environmental Incident Management Seminar.

The seminar will take place on Thursday 17 September 1998 at the Swallow hotel, Waltham Abbey, Essex and will include formal presentations and workshops relating to:

- Pre-Incident Planning
- Incident Control
- Media Management
- Post-Incident Considerations

The cost of the seminar is £200.00 and will include lunch, coffee and free admission to a trade exhibition.

For Details contact:
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will not be using GM derivatives in its own brand products, and others (Sainsbury and Tesco) have managed to eliminate GM soya from most of their own brand products.

This situation appears unsatisfactory in several respects. Food retailers are applying labels which cannot be used to find out whether the product contains GM soya and how much. Some products from the same GM raw material are labelled, others not. And by labelling everything which may contain some soya or maize (some 60% of processed food contains soya), the consumer has no choice to exercise (except in so far as some retailers guarantee a GM-free source of soya or maize).

The whole issue could benefit from the regulatory activities of the EU being more in step, so that the details on labelling requirements could be known before another part of the Commission issued marketing consents to use the GM product in food. As to the future, one option would be to continue with the current (science-based) approach, and to clarify what methods should be used to detect and define GM foods, and to develop more specific labelling. Another is based on the argument that consumers should have a right to choose between GM and non-GM versions of a product which would involve the introduction of traceability and segregation of ingredients throughout the whole food chain. Whether or not this is a realistic prospect (e.g. given GATT rules enforced by the World Trade Organisation and sensitivities over EU-US agricultural trade) remains to be seen.

Issues overview

Biotechnology is widely seen as a major source of economic benefit for countries with a strong science base, and GM foods and plants are a primary research target. The success of industry depends on a favourable regulatory and consumer environment, and over-regulation in this area within the EU could lead to further dominance by US companies, and EU companies relocating to more favourable regulatory environments outside the EU. National and EU regulatory policies have thus sought to ensure adequate protection for the consumer and the environment without placing such a burden on industry that innovation in Europe is stifled. At the same time however, too light a regulatory touch could fuel some of the public's concerns over the potential risks associated with new plants and foods. Here the key principles of labelling and choice have an important role to play in achieving the right balance.


The overall regulatory regime had, until last year, led to the first GM foods being successful in the UK and non-controversial – consumers had a choice and could see benefits. The rapid growth in GM herbicide-tolerant and insect-resistant soya and maize crops in agriculture in the USA has however driven a coach and horses through the steady approach previously seen in the UK. There are two issues here – the first is that US authorities have effectively deregulated GM soya and maize, so there is no segregation at source and European food manufacturers thus receive mixed

product. But second is that it is easy to portray the modifications involved as benefiting only the companies which successfully tie the GM crop to a specific herbicide, with no advantage to the consumer in nutritional quality, taste or price. While scientific assessment judges any additional risks to human health to be very small, uncertainties remain. Research on risk perception suggests that such situations (where there are no perceived benefits to balance even minute levels of perceived risk) often lead to consumer resistance, particularly when denied a choice between GM and non-GM products.

Some companies' concentration on herbicide-tolerant crops has also acted as a 'lightning rod' for more generalised concerns over the role of intensive agriculture within the rural environment. This has led to concerns that there might be a 'backlash' against GM products in general to the particular disadvantage of European companies who would face extra difficulties in their own home market in getting new products established.

GM applications in food and agriculture thus raise a number of questions of relevance to parliamentarians.

- Firstly, there is the reaction of UK consumers to developments and how to improve public representation within the regulatory framework.
- Secondly, the negative reaction to the current focus on herbicide tolerance and insect resistance is spilling over into hostility to the technique itself, threatening UK investment in this area, and the creation of wealth from previous investments in R&D.

- Thirdly, the UK's own position is heavily constrained in this area – not only is this an area of EU competence, from the point of view of both food safety and environmental impact, but any action taken across borders impacts substantially on the global agreements on trade.
- Current practice in the EU is leading to inconsistencies between the different functions, typified by the granting of marketing consents before labelling policy is resolved. The means of resolving disagreements between MS has also proved to be somewhat cumbersome.
- Finally, even within the UK, the specific terms of reference allocated to the various agencies involved mean that some of the more general issues such as the role of GM crops in agriculture and the effects on the rural environment, and of general consumer anxiety over the principle of clear and meaningful labelling, have no obvious forum for resolution. 

- ¹ The full report, *Genetically Modified Foods – Benefits and Risks, Regulation and Public Acceptance*, is available from POST, House of Commons, 7 Millbank, London SW1P 3JA, price £12. Contact Parliamentary Bookshop on 0171 219 3890.
- ² Bt toxin is a natural insect toxin found in the soil bacteria *Bacillus thuringiensis*.

*Post Report Summary 115, May 1998.
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Countryside ponds review

Lowland ponds – the home of the Great-crested Newt, Medicinal Leech and Frogbit – are threatened by intensive land management, according to Environment Minister Angela Eagle.

Agricultural activity, urban development and road construction are the key factors influencing pond loss and damage in the countryside, according to research carried out for the DETR by Pond Action and the Institute of Terrestrial Ecology.¹ Detailed surveys of 150 one kilometre squares were carried out in Britain in 1996, following up surveys of the same areas undertaken in 1990.

But the report also highlights that new ponds are being created at almost the same rate as they are being lost or damaged. The research suggests that farmers in lowland areas are creating ponds for their amenity value, and for storing water.

Ponds were defined in the survey as natural and man-made small waterbodies between 25 square metres and two

hectares, which hold water for four months of the year or more (i.e. they may be dry in the summer). Between 1990 and 1996 it is estimated that the total number of ponds declined by less than one per cent. In practice, allowing for the range of uncertainty associated with the sampling, it is not certain whether a small net loss or gain actually occurred over the country as a whole. Of more consequence is the large turn-over of ponds found in the survey. As the survey was of lowland areas only, it is perhaps not surprising that most ponds (89%) are in England. About half of those recorded were on farmland, with twice as many in grassland as in arable land. Some 20% were in woodlands. Urban areas were not covered in this survey.

Key findings from the report include:

- there were an estimated 229,000 ponds in lowland Britain in 1996;
- between 1990 and 1996 there was a high turnover of ponds, with the number of ponds lost (17,000) almost

equalled by the number of new ponds;

- the main causes of loss are filling in and drainage through agricultural activity. Further ponds are lost through urban development or road construction;
- new ponds are often rich in wetland plants, including uncommon species such as Fox Sedge and Frogbit; and
- ponds are an important biodiversity source but many are degraded by nutrients from surrounding farmland.

The Minister considered that the survey had established a national baseline for monitoring future changes in both the number and condition of lowland ponds.

DH

¹ *Lowland Pond Survey 1996* is available from the Rural Development Division, Department of Environment, Transport and the Regions, 3/A6, Eland House, Bressenden Place, London SW1E 5UD.

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Diary dates 1998

7 September	GP Committee	13.00
7 October	Education Committee	10.30
7 October	Council	13.30
12 November	Burntwood Lecture preceded by GP Committee	19.00 13.00
3 March 1999	AGM followed by Council	13.00

Contributors

The *Environmental Scientist* aims to provide a forum for members' contributions reflecting their interests, activities and news, as well as topical feature articles. Feature articles should be no longer than 5000 words and other shorter contributions may be up to 1000 words. All submitted material should be received by the Editor (three weeks prior to publication in the last week of January, March, May, July, September and November) at 25 Kennedy Avenue, Huddersfield, West Yorkshire, HD2 2HH; telephone 01484-426796, fax 01484-546640. Views expressed in this journal are those of the authors and do not necessarily reflect IES views or policy.

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Environmental Recruitment

Project Manager (Industry)

to £35K

You will have experience in environmental impact assessment within the power or water industries. Role will involve travelling abroad.

Ref: MN3600

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£ Neg

We have a number of clients seeking staff with expertise in air quality, ranging from dispersion modelling to stack emissions monitoring. Senior and Junior positions available.

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Reputable consultancy seeks a dedicated professional with expertise in auditing, EMS (ISO14001), phase 1 reviews, business development and team management.

Ref: MN3601

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Ref: MN3605

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to £23K

Qualified in Chemical or Mechanical Engineering, expertise required in the design and construction of remedial schemes. Skills to include bioremediation, aeration, soil extraction.

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£Neg

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We have a number of vacancies not advertised. Check our Website! Alternatively, for an informal and confidential discussion please call **Melanie Nunn** quoting reference numbers at:



Environmental

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