

The Hazards Forum Newsletter

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Edited by Dr John Bond

Views expressed are those of the authors, not necessarily of the Hazards Forum

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HAZARDS FORUM AGM 2008

The Annual General Meeting this year was held on Tuesday 11th March at One Great George, London, the home of the Secretariat of the

Hazards Forum and also of the Institution of Civil Engineers, commencing at 17.00 hrs.

The meeting was chaired by the Hazards Forum chairman, Sir David Davies, who welcomed the members attending. He also welcomed the new independent annual reviewer (or examiner) for the accounts, Alexander Bierrum FCA.

The Annual Report of the Trustees for the Forum for 2007 was available. Sir David gave a brief summary of some of the highlights from the year, including mention of the evening events and giving an outline account of the Forum's finances for the year. He stated that details were, of course, in the report. Alexander Bierrum stated that, from his review of the accounts, he was content with them and complimented those involved with the professional presentation. The meeting signified it's satisfaction with the accounts. The Chair added that the signed report would be sent to the Charity Commissioners with the annual return for 2007.

He concluded his report with staff changes when he thanked, in their absence, both Simon Whalley, who had left the Secretariat and Lucy Roberts who had left the accounts section. In their place he welcomed Alison Brown into the Secretariat and Jason Simpson into accounts.

This year, two trustees had completed a three year term and had stood for re-election for a second three year term. As no other candidates had been nominated there was no election and thus Professor Dick Taylor and Dr Michael Considine were welcomed back to the Executive Committee for a second three year term by Sir David. Retiring Executive Committee co-opted members Sally Brierley and Dr Dougal Goodman were thanked for their involvement and the Chair stated that appropriate people would be identified and invited to join in their place.

Before a brief discussion, Sir David thanked the remaining members of the Executive Committee for their work during the year and also Brian Neale for his work during his first year as Secretary of the Forum.

The meeting closed at 17.30 and was followed by refreshments which were in turn followed by the evening event on *Risk in the leisure industry*.

Brian Neale – Secretary, Hazards Forum

NEW MEMBERS OF THE EXECUTIVE COMMITTEE

The Executive Committee is pleased to announce two new members of the Committee. They are Dr Scott Steedman, FREng and Mr Richard Jones who have both agreed to join as co-opted members and are welcomed.

As a brief introduction to each:

Scott Steedman has been Director of Group Strategy for international capital project consultants HPR (High-Point Rendel) since November 2006. Formerly a Fellow and Lecturer in Engineering at Cambridge University, Scott joined Sir Alexander Gibb & Partners Ltd (later LAWGIBB, now Jacobs) in 1993, becoming Director of Engineering in 1995. He was Director of Civil Engineering at Whitbybird from 2000-2003. He has specialised in risk and disasters, urban engineering and innovation strategy. Scott has extensive television and radio experience including presenting a 13 part series for Discovery called, 'How did they build that?'

Richard Jones is Policy and Technical Director of the Institution of Occupational Safety and Health (IOSH). He has been a member of IOSH since 1989 and worked for the Institution since 2000. He has 33 years engineering experience, with 11 years in marine engineering with the Royal Navy and 22 years in aerospace engineering with Rolls-Royce plc. He has a masters in Risk Management and Safety Technology; the NEBOSH Diploma in OSH; is a Chartered Safety and Health Practitioner and a Fellow of the IOSH.

RISK IN THE LEISURE INDUSTRY

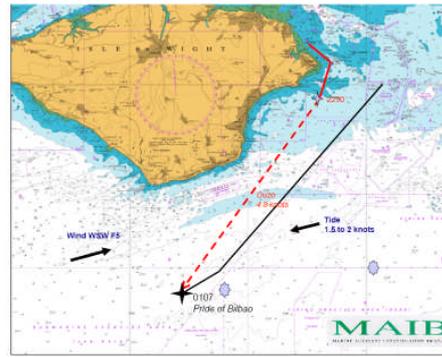
Lessons learned from the loss of the yacht Ouzo

The Hazards Forum held an evening meeting at the Institution of Civil Engineers on the 11th March 2008 to discuss the lessons learned from the loss of the yacht Ouzo. There were three speakers who were Mr. Steve Clinch, Deputy Chief Inspector of the Marine Accident Investigation Branch, Department of Transport; Mr. Karl Lumbers of the UK P&I Club and Mr. James Stevens of the Royal Yachting Association. The event was chaired by Dr. Dougal Goodman. The Hazards Forum is grateful to the following for sponsoring the event: Lloyd's Register, Catlin and the Department for Transport.

Mr. Steve Clinch, Deputy Chief Inspector of the Marine Accident Investigation Branch, Department of Transport started with a talk "Lessons Learned from the loss of the yacht Ouzo". The Marine Accident Investigation Branch was setup following the Herald of Free Enterprise disaster and is separate from the regulatory side. The MAIB does not prosecute or establish blame or liability and is responsible to the Secretary of State for Transport. The MAIB has a similar position to the Air Accident Investigation Branch and the Rail Accident Investigation Branch. The MAIB has to establish - What happened? - How did it happen? - Why did it happen? and What can be done to stop it happening again? The MAIB investigated the loss of the yacht Ouzo with the three members of the crew off the Isle of White on the 20/21 August 2006.

The report is published on the MAIB website. The MAIB had no involvement in the subsequent trial involving the yacht Ouzo and the P&O ferry The Pride of Bilbao.

The yacht Ouzo was built in 1980 with a length of 25 ft and a beam of 9 ft and had a diesel engine. The equipment included a VHF radio, a Ground Position System, radar reflector (hoisted at night), flares etc. The three RYA qualified yachtsmen were all well experienced men with appropriate clothing.



The estimated course of the yacht south of the Isle of Wight indicated that it might have collided with the ferry boat The Pride of Bilbao. The question has to be asked why did the bridge team on the ferry not detect the presence of the yacht? Possible reasons were the lenses of navigation lights on the yacht prone to crazing, damaged filament, wrong rating of bulb (easily done!), heel of boat reduces effective range of light but no wreck of the yacht was found. Trials with radar detection showed that the ferry was unlikely to be able to separate Ouzo from the sea clutter and unlikely that a radar reflector would have made much difference. Other questions to be asked were why did the crew of the yacht not effectively warn the ferry of its presence, why did the crew of the Ouzo not raise the alarm after the incident and why did the crew not survive longer in the sea with their lifejackets?

The MAIB issued flyers to merchant and leisure industries containing key safety lessons which are contained in the report. The Department for Transport's Medical Advisor has considered relevance on use of photochromic lenses to other modes of transport. P&O Ferries issued a number of fleet circulars to address key findings. Recommendations were made to the British Standards Institute to consider making crotch straps mandatory part of standard for lifejackets and to the International Chamber of Shipping that in the next revision of Bridge Procedures Guide to include clear guidance on night vision adaptation, clear guidance on good blackout procedures and advice on the effect on night vision of "white light". The investigation report and research reports are available on www.maib.gov.uk.

The second talk was given by **Mr. Karl Lumbers** of the UK P&I Club titled "The Ouzo incident - a commercial insurance perspective". He first of all outlined the interests of the P&I Club as provision of Third Party Insurance, being non-profiting making, having common interest of assured ship owners and covering the main risks of collision, pollution, cargo, damage,

damage to fixed and floating objects and personal injury. The P&I Club covered 4,000 ocean going ships of many companies covering quality and inspection. There was a view that shipping as an industry was now over inspected. With respect to the leisure industry, the P&I Club are concerned with collision, pollution, wash damage, floating containers, the risk to shipping interests, embarrassment of incidents, groundings and criminal proceedings. As risk managers they have to consider the frequency and consequences of any incident. The risks are low but there are many standards for commercial shipping including International Mandatory Standards, Company Standards, Personal Standards and the possibility of Criminalisation. The leisure industry has few International Mandatory Standards and Personal Standards and is seldom subject to Criminalisation.

The Shipping Industry is subject to economies of scale, as demanded by consumers, hence smaller general cargo ships are being replaced with much larger container ships.



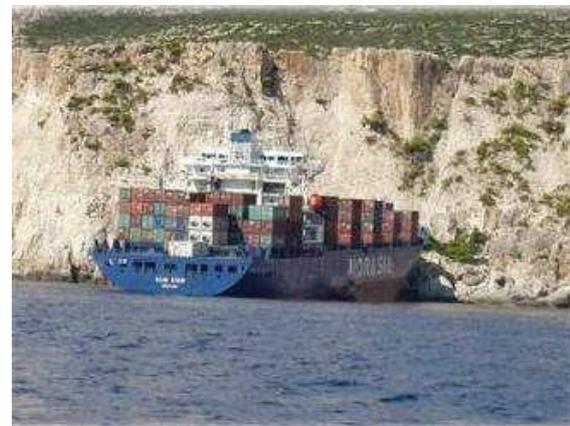
restricted visibility and greater distances with bridge wings to control units. The leisure industry has to make itself more aware of these conditions.

With the boom in the shipping industry there is evidence of a shortage of experienced people and a pressure to promote them, but certification is one thing with ability to do the job is another. Recruitment is difficult with youngsters not wanting to go to sea to see the world as they did in the past. The leisure industry seems to be expanding with more yachts and other sea craft. The manning issue for commercial shipping is becoming a greater issue. There is a trend to lower crew numbers, for example the Emma Maersk carrying 158,000 tons of cargo has only 13 crewmen. Safe manning levels are important but some companies ignore the rules. The leisure yachting industry must be aware of these changes and take appropriate actions and learn from such incidents as the Ouzo.

Containers are a problem and sometimes fall off ships due to shippers overloading containers, weather anomalies and more cargo now being carried on deck 7 to 8 high. Due to safety concerns in the USA, stevedores are not allowed on containers to put locking devices in, so now new designs of locks have to be introduced. Commercial pressures are very demanding and wanting everything today and cheap. Just in time deliveries to save warehousing causes many problems.

In conclusion we must have responsibility, accountability and a review of technology.

Be a Little Careful with the Blame Culture



Passenger ships are now taking 5000 passengers. As a result of these demands the ships are less manoeuvrable, are subject to windage, draft clearance can be as low 1 foot,

are 1.5 and very much lower than many comparable countries.

Yacht design has improved, although there are still issues with keel structure. Crews are better prepared and have a better understanding of the hazards. The loss of the yacht Ouzo, although a rare type of accident, has highlighted the difficulties for ships in detecting yachts on radar. Even in poor visibility yacht/ship collisions are rare, yachts are more likely to collide with each other resulting in structural damage but rarely injury.

GPS (Global Position System) has ensured that yachts rarely founder through uncertainty of position, although training in navigation is still essential.

Recreational boating is largely unregulated in the UK although breathalyser laws are being introduced. It is difficult to produce definitive statistics but there is evidence that boating in Britain is no more dangerous than in other countries where compulsory licensing and other laws have been introduced. Commercial yachting and sea schools in the UK are subject to a raft of legislation, some of which could be unnecessary.

It is essential for the health of the nation to encourage sport. With this comes risk, but this is considerably less than the dangers of unfitnes and obesity.

The RYA's training programmes are recognised as a world leader and have an impact not only on safety but also provide a foundation for competitive success.

An **active discussion** session followed the presentations.

Issues discussed and commented upon included: radar reflectors, their orientation when suspended, types, height, legal position and their real effectiveness; the rate of alteration of course and easily this would or could be noticed; use of lamps on sails not very effective at a mile away, particularly as for a 25 knot ship a mile is not that far; use of binoculars can help detection with poor lights, but may not be as helpful as desired; there may be a case for changing regulations; are manning level adequate, especially when looking out for other vessels; human factors implications; more use of technology such night vision devices.



None of us is perfect

The third talk was given by **Mr. James Stevens** of the Royal Yachting Association on "Sailing a Risk Activity"



In the UK, there is no requirement for the skippers of recreational craft less than 24m in length to be qualified or register their boats. Sailing involves risk which for many participants is an attraction. The sport has developed and become safer in many ways since 1979, when a severe storm resulted in 15 people losing their lives in the Fastnet yacht race. Fatalities per 100,000 vessels in the UK

Others included: the need for look outs at all times (audible and visual) and difficulties for single handed sailing; Yachtsmen think radar will pick them up (with reflectors), but may not; Ocean racing sailors reduce speed in fog - why not commercial vessels; the importance of effective lighting and awareness of limitations; life jackets with more marking and better crotch straps on suggested; there were very few accidents involving yachting and large ships and a suggestion for better dialogue between the commercial side and the yachting side.

The Chair **concluded the discussion** by thanking the speakers and the sponsors. He then invited those attending to continue the discussions during the reception which was to follow and to take the opportunity to network.

THE STORAGE AND DISPOSAL OF NUCLEAR WASTE

A joint Hazard Forum and Engineering Group of the Geological Society conference was held at the Geological Society on 21 May 2008. The meeting was organised by the Geological Society, sponsored by NUVAIR and chaired by Adrian Collins of the Engineering Group.

The keynote talk was given by Phil Davies Head, Waste and Nuclear Materials at NDA. on "The Storage and Disposal of Radioactive Waste - overview of current UK waste issues"

The Nuclear Decommissioning Authority (NDA) was established in April 2005 as a non-departmental public body with a remit to clean up the civil public sector nuclear legacy built from 1940's onwards with an annual funding of £2.8Bn. The NDA is based in West Cumbria and was responsible for 20 former UKAEA and BNFL sites and for integrating waste strategy. The waste consisted of Low Level Waste, long lived Intermediate Level Waste and vitrified High Level Waste. A draft table of waste was given with a total of 477,860 m³ based on a 2004 inventory. An integrated waste strategy to minimise, reuse, recycle, recover energy and then dispose was given. A discussion of the legacy of waste issues was beyond the scope of the presentation but such cleanup was very important to NDA.

There were five issues to discuss;

1. Low Level Waste developments
2. Opportunities for innovation
3. Managing Radioactive Waste Safely
4. Geological disposal project
5. Where next?

Firstly the Government's policy statement in 2007 concerned diversified disposal solutions (risk based) approach, placed the national responsibilities with NDA, outlined international waste transfer rules and postponed as unjustifiable final disposal to future generations.

The new Government LLW Policy required the NDA to develop a national strategy for the nuclear-industry LLW in conjunction with the non-nuclear industry and to ensure the two strategies are suitably integrated and managed.

The NDA completed the new LLW contract and appointed the UKNWM in April 2008. Element 2 of the new contract equates to NDA's strategic partner for LLW to develop the national LLW management plan. The NDA's national LLW strategy group was launched in April 2008.

Secondly opportunities for innovation existed for 'economies of scale', improved LLW characterisation and segregation, new disposal solutions, national solution for treatment of 'wet' ILW and open market initiatives.

The Memorandum of Understanding on waste management, December 2007, included opportunities waste solutions and sharing knowledge, opportunity for closer with NDA's geological repository project and major civil nuclear cleanup mission.

Thirdly Managing Radioactive Waste safely covered the Government's MRWS programme and the role of NDA. There was broad support for the responses published Jan. 2008 but the Government MRWS White Paper will be published in June 2008. It is expected that local authorities will be invited to express interest in being a volunteer host community. Information packs will be made available and proposals for siting process to be consulted upon.

The NDA role will be to support MRWS generally, support community engagement and site selection, interact with Committee on Radioactive Waste Management (CoRWM), implement the geological disposal project, track skills and supply chain issues, engage with Regulators and make organisational changes.

Fourthly the geological disposal project will cover the approach to be adopted and the multi-

barrier approach for higher-activity wastes. The disposal project will be based on partnership with host community, implementation by NDA, strong independent regulation and independent scrutiny by CoRWM.. The disposal project and the multi-barrier concept were described in more detail.

The NDA's Radioactive Waste Management Directorate was described with a Technical Department (Engineering, Research and Assessments), Communications, Regulatory interface, Stakeholder Engagement, Inventory, Business Services and Repository Project Department.

The second presentation was given by Paul Robinson of NUVIA titled "The Implications on the new LLW national policy on the disposal of VLLW". and covered

- The disposal and management of LLW, in particular the lower contamination level
- The new LLW policy
- The impact on the LLWR near Drigg
- Look at some of the potential alternatives to LLWR near Drigg

The LLW wastes were generated from decommissioning and new build, operational waste streams and non nuclear waste producers. A significant proportion of LLW was only slightly contaminated and did not need to be disposed of to LLWR near Drigg. Operational wastes could be moved to bulky decommissioning wastes in which case the nature of the waste will change. The majority of contaminated demolition material will be in the VLLW category and contaminated soils will quickly fill up LLWR near Drigg if alternative waste disposal routes were not found. The quantities of waste to the year 2030 was given and included asbestos, ferrous metals, combustible materials, lead, oils and high volume material such as concrete and soil.

The current challenges were the majority of UK LLW sent to LLWR near Drigg and the uncertainty over the long term capacity of the LLWR at Drigg. The future capacity of 750,000m³ subject to authorisations was insufficient to meet national requirements with Sellafield alone producing over 1million m³ of LLW. There was urgent need for alternative LLW management solutions for decommissioning nuclear facilities and strategic issues for other industry sectors, e.g. NORM, defence, hospitals & universities. The uncertainty over the future permitting of the LLWR facility for storage or disposal involved waste which had low radiological hazards and

being sent to LLWR near Drigg was unnecessary. Radiological loading restricted the disposal of certain radio nuclides.

The new LLW policy review was published in March 2007 and defined two categories of lower activity LLW. It used a risk informed approach with the introduction of LLW waste management plans and a hierarchy principle. The plans accepted a proximity principle to the decision making, the utilisation of BPEO for LLW waste management decisions, export of LLW and accepted decay storage,

Low Volume VLLW is defined as radioactive waste which can be safely disposed of to an *unspecified* destination with municipal, commercial or industrial waste ("dustbin" disposal) and bulk VLLW. The principal difference between the two definitions is the need for controls on the total volumes of the bulk VLLW category being deposited at any one particular landfill site.

The LLW Repository Ltd. took over the management and operation LLWR near Drigg in April 2008. The contract is for the operation of the facility and the delivery of the national LLW strategy involves diverting waste from LLWR near Drigg to alternative disposal facilities. The NDA will deliver a plan for the optimum use of the LLWR near Drigg by diversion of LLW away from Drigg. Changes may not need a new LLWR if sufficient waste is diverted and minimised, more cost effective disposal options are taken, a move away from one solution that fits all approaches and delivery of a true Integrated Waste Strategy for the UK. Waste may be exported from LLWR Drigg after sorting if no viable facility is or will be available

The national LLW disposal policy is due in 2009. It is being produced by LLWR Repository Ltd for the NDA, allowing a close linkage between the LLWR near Drigg and the LLW strategy group providing oversight to the LLW strategy. Waste minimisation would be achieved by a number of actions with a presumption that waste minimisation will be applied to all waste streams.

Alternative VLLW disposal routes include dedicated Bulk VLLW landfills, smelting, other technologies and recycling and re use of materials. In order for this to work to be done there will be a need to apply the waste hierarchy principles, maintain close linkage with LLWR near Drigg for secondary and unsuitable wastes and for material specific routes to be used where possible

LLWR Repository Ltd is required to divert waste from LLWR near Drigg and therefore is focusing on developing alternatives to LLWR near Drigg and means of minimising wastes. This may involve incorporating a number of disposal options and routes, putting invitation to tenders to provide alternative disposal routes and the potential to export waste. Public perception and opposition will significantly influence the availability of all alternative disposal options.

Existing landfills would be suitable for lightly contaminated PPE, some operational wastes, asbestos and demolition wastes. Procedures will be required to dispose of the VLLW in a controlled manner, for example burial below non radioactive wastes. New dedicated Bulk VLLW landfills will be required like that planned at Hinkley Point and near to Sellafield

Smelting would be suitable for wastes including ferrous and non ferrous metals as well as lead. It has already been tried in Sweden and the US with the processed metals sold for re use. Incineration was suitable for some wastes including oils and solvents and offered excellent volume reduction. Other disposal routes include treatment and down categorisation

Paul Robinson concluded his presentation with the view that there were clear opportunities to develop and utilize alternative disposal options to LLWR near Drigg and that alternative solutions had to be found. The LLW policy provided an effective policy tool to change the way LLW is managed but incineration and smelting capacity in order was required to reduce the volume of waste. Was the public ready for the new approach to the management of VLLW?

The third presentation was given by Mike Board, Senior Consultant Nuclear Technologies plc' and titled "Radioactive waste packaging and disposal - An overview of ILW packaging: cementation baseline technology and waste package performance requirements".

A variety of solid and liquid Intermediate Level Wastes (ILWs) including fuel element debris, corrosion sludges from fuel storage ponds and ion exchange materials have been produced by the UK nuclear power stations, the Sellafield site and a number of other waste producers. The UK policy for the disposal of ILW consists of three stages, namely: passivation of ILW in the form of waste packages; interim storage of waste packages, typically on the site of ILW origin and final disposal of waste packages in a geological repository.

An ILW package consists of two components: the wasteform (the waste in the physical and chemical form in which it will be disposed) and the waste container. The baseline technology for the passivation of the majority of ILWs is encapsulation using a cementitious matrix, either by the grouting of solid wastes or the mixing of liquid waste with cement powders. The ILW waste packaging process using cement encapsulation is a proven technology that has been developed and applied over the last 25 years by nuclear waste producers.

Waste packages are designed and produced to meet the stringent performance requirements specified in the Generic Waste Packaging Specifications (GWPS) set by the Nuclear Decommissioning Authority Radioactive Waste Management Directorate (NDA RWMD). The compliance of a waste package with the GWPS facilitates the safe and efficient packaging, transport and disposal of radioactive waste, based on the requirements of the future geological repository.

This presentation described the:

- encapsulation process for selected IILWs
- range of waste package types produced
- key performance requirements of a waste package as specified by the GWPS
- process for evaluating waste package compliance with the GWPS
- packaging progress to date and future work

The fourth presentation by John Heathcote of UKAEA & Russell Walker, Quintessa Ltd was on "Safe management of residual radioactive ground contamination at Dounreay". He outlined where we are, where we want to go and how much remediation is necessary. A case had to be made by safety assessment taking into account regulatory implications. The basic requirement was flexibility to re-use parts of the site after 2025.

The cleaner areas of the site had to be de-licensed by 2025. This required the most radioactively contaminated areas to be excavated. Residual radioactive contamination will be managed *in situ* and the site substantially de-licensed by 2300

The work that has to be done involves an estimated 13,000 m³ contaminated land to be excavated. Some 40,000 m³ of contaminated land and chemically contaminated land will require some remediation as necessary. The de-licensing criterion was 'no danger from ionising radiations'. The risk had to be As Low As Reasonably Practical and a risk of a fatality

of 1 in a million per year is considered low enough with 10^{-6} being approximately equivalent to 0.017 mSv/yr

The Safety Case for contaminated land was based on the safety assessment approach covering Context, Conceptual model, Calculations and Consideration of results including uncertainty. It included guidance on clean-up levels, current use as a nuclear-licensed site but future use at some time will be, either industrial or agricultural. The assessment period is 300 years but with some sea-level rise and coastal erosion will occur in this time. Detailed results were given over the time periods involved.

The summary of assessment results

- Median inventory results in “intolerable risk” for some activities, without some remediation
- The highest risks are to a farmer (crops), or office worker located on highly contaminated land
- General use may not result in “intolerable risk”, in current condition prior to remediation

Consideration of the results indicated the reduction of inventory was necessary with the removal of most contaminated and mobile material but further work necessary to prove concept. The regulatory implications indicated that a two-pronged approach could meet the HSE “no danger” target which would leave artificial radioactivity in the ground

The fifth presentation was given by John Roberts of the University of Sheffield on “Skills and Resources for the Future.”

In 2006 the government appointed CoRWM recommended that “There should be a commitment to an intensified programme of research and development into the long-term safety of geological disposal aimed at reducing uncertainties at generic and site-specific levels, as well as into improved means for storing wastes in the longer term”. It also recognized that there is a need for further research into the characteristics of geological disposal in the UK.

Within the present state of knowledge, CoRWM considers geological disposal to be the best available approach for the long-term management of all the material categorised as waste in the CoRWM inventory when compared with the risks associated with other methods of management. The aim should be to progress to disposal as soon as practicable, consistent with developing and maintaining public and stakeholder confidence

Currently undergraduate nuclear degree courses are held at Lancaster University and Imperial College London and Master degree course at University of Sheffield and Lancaster University. Eleven Universities and Research Institutes have nuclear education courses covering:

- Decommissioning Core Modules
- Decommissioning/Waste/Environmental Management
- Processing, Storage and Disposal of Nuclear Wastes
- Decommissioning Technology and Robotics
- Management of the Decommissioning Process
- Geotechnical Aspects of Radioactive Waste Disposal
- Site Investigation & Contaminated Land Assessment
- Methods and Techniques for Targeted Geotechnical Studies
- Principles and Applications of “Safeguards”
- Groundwater Investigation and Assessment
- Radioactive Waste Disposal
- URL, repository design, retrievability, backfill, etc

Post graduate research is carried out at

- Immobilisation Science Laboratory, University of Sheffield
- Geotechnical Research Centre, University of Cardiff
- Keeping the Nuclear Option Open - KNOO
- DIAMOND Consortium, Decommissioning, Immobilisation And Management of Nuclear wastes for Disposal

The presentation gave an overview of the current status of research and training in the UK and discussed some of the new initiatives being put forward by Universities to maintain and increase the skills and resources for the future.

The final presentation was given by John Harrison of Imperial College London on “Deep Geological Disposal of Radioactive Waste - rock mechanical challenges.”

Producing a repository in a perfect rock mass, Continuously Homogeneous Isotropic Linearly Elastic (CHILE), would be relatively straightforward as the material properties could be fully understood. However Discontinuous Inhomogeneous Anisotropic Not Elastic (DIANE) rock formation poses immense challenges. Understanding and quantifying the effects is the key. Discontinuities fractures perturb the local

stress state but how this effects large scale stress is unknown. At the small scale heterogeneity can strongly influence fluid flow. but poorly developed. Managing the hazard requires understanding of the DIANE problem but substantial and sustained research effort worldwide and with underground facilities are required. In the UK, DIANE was the problem and each target geological regime required research. Was site selection dependent on geology, was the rock engineering dependent on research and was the rock engineering special. The problems to be solved were generic and site specific but does the UK have the expertise required at university teaching, research and the engineering companies? The presenter had his doubts.

NATURAL DISASTER UPDATES

Based on the NASA's Earth Observatory.

STORMS

DUST STORM OFF WEST AFRICA

On June 21, 2008, plumes of Saharan dust blew off the west coast of Africa, forming a large arc south and west of Cape Verde.

DUST PLUMES OFF SOUTH AUSTRALIA

Dust plumes blew off the coast of South Australia in mid-June 2008

DUST STORM OVER THE MIDDLE EAST

A massive dust cloud hovered over the Middle East in mid-June 2008, stretching from Iraq to India, and spreading south past the Arabian Peninsula.

DUST STORM IN NORTHEASTERN AFGHANISTAN

A two-pronged plume of dust hovered over north eastern Afghanistan and neighbouring countries in mid-June 2008.

DUST STORM OFF WEST AFRICA

Dust plumes from the Sahara blew off the west coast of Africa and over the Atlantic Ocean in mid-June 2008.

FIRES

FIRES IN SOUTHEASTERN RUSSIA

Over 15,000 hectares of forest were on fire in eastern Russia in mid-June 2008. This image shows fires in the Amur and Khabarovsk Provinces on June 23.

FIRES IN CALIFORNIA

"Dry" thunderstorms triggered hundreds of fires in California on the first day of summer 2008. This image from June 23 shows dozens of active fires burning in the state.

FIRES IN CENTRAL AFRICA

Annual agricultural burning in the western countries of central Africa was widespread in mid-June 2008.

FIRES IN NORTH CAROLINA AND VIRGINIA

A lightning-triggered fire in a North Carolina wildlife refuge and a human-caused fire in the Virginia portion of the Great Dismal Swamp spread smoke over a wide area in mid-June 2008.

FLOODS

FLOODS IN THE U.S. MIDWEST

Heavy rains flooded several rivers in the U.S. Midwest in early June 2008.

HEAT WAVES

HEATWAVE IN NORTHERN EUROPE

On the calendar, Scandinavian summer starts on June 21 in 2008, but summer temperatures had already settled over much of northern Europe by early June.

VOLCANO

CHAITEN VOLCANO ERUPTS

Dormant for more than 9,000 years, the Chaiten Volcano in southern Chile began to erupt on May 2, 2008, forcing thousands of residents from their homes. The volcano remained active in the weeks that followed.

NOTES BY THE EDITOR

Lifetime Achievement Award for leading Queen's engineer

One of Northern Ireland's leading engineers, Queen's Professor Emeritus Sir Bernard Crossland, has been awarded a Lifetime Achievement Award from Engineers Ireland. The award was made at a ceremony at Stormont Castle this morning.

The Lifetime Achievement award is presented periodically to an engineer who has made an exceptional contribution to Irish engineering through practice or education. For the duration of his career Sir Bernard Crossland has been, and continues to be, an engineering educator who is an enthusiastic advocate of strong links and integration between industry and education. On hand to honour his contribution was Bruce Robinson, Permanent Secretary at the Department of Finance and Personnel in the Northern Ireland Executive.

Sir Bernard called on Northern Ireland's engineers to learn from their colleagues' experience in the Republic to assist with rejuvenating the North's manufacturing base. He said: "In the 1960s there were the first

stirrings of the Celtic Tiger with extensive discussions on technical education in the Republic in which I was involved. Out of these discussions came the Regional Technical Colleges, which have been the lifeblood of the Celtic Tiger. In the intervening years, I have observed the growth of the manufacturing base in the Republic whilst in the North our manufacturing base has been in great decline.”

He continued: “We have much to learn and perhaps now that our politicians have agreed to a power sharing Assembly, we can begin to learn and implement the lessons provided by the Republic’s experience. Engineers Ireland could have an important role to play in such a development.”

Sir Bernard is currently Emeritus Professor of Mechanical Engineering at Queen’s University Belfast. A former Pro-Vice-Chancellor of the University, he was Professor of Mechanical Engineering at Queen’s from 1959 to 1982 when he was appointed to a special Research Chair. He retired in 1984 and was awarded a knighthood in 1990. He began his engineering career in 1940 as a trade-apprentice and then was promoted to an engineering apprenticeship in Rolls Royce, gaining his education through part-time study culminating in the award of a PhD from the University of Bristol in 1953.

Sir Bernard has played a leading role in the technical investigation of some major disasters such as the King’s Cross Underground fire in 1987, the Bilsthorpe Colliery roof fall in 1993, the Ramsgate walkway collapse, the Southall high speed train crash and the Ladbroke Grove rail crash. He has lectured and written extensively throughout his career and recently published his memoirs, “The Anatomy of an Engineer”.

He has been awarded ten honorary degrees and won numerous prizes and medals including the James Watt International Medal of the IMechE for which he was nominated by Engineers Ireland.

Engineers Ireland is the largest professional body in Ireland with over 22,000 members. Members come from all engineering disciplines across industry, public service, semi-state bodies and academic institutions.

CORPORATE MANSLAUGHTER ACT

This Act came into force on April 6. Sue Pesch of the Institute of Advanced Motorists has pointed out that “No company that either employees professional drivers or expects its employees to drive in connection with its business can afford to be ignorant of this new law. In the event of a work-related road accident resulting in one or more fatalities, the police will investigate how the company involved managed its road safety. For example:

- Was the vehicle roadworthy?
- Was the driver fit and/or competent to drive?
- Was the journey safely manageable in the time available?

Under the new legislation, if such management failures are found to have been a factor in the accident, then the company concerned could be charged with Corporate Manslaughter, as well as breaching the Health and Safety at Work Act of 1974”

Corporate Social Responsibility has a section on Health and Safety with three bullet points.

- Encouraging organisations to consider health and safety at board level.
- Encouraging organisations to report publicly on a range of health and safety issues.
- Producing and promoting a health and safety index for insurance companies, investors and others to gauge the performance of the company

This can be found on www.csr.gov.uk

I do hope that the second bullet point will be to encourage the sharing of lessons learnt from accidents in a database and the index will include whether or not companies are sharing lessons learnt.

Some new developments have been noted on the HSE Web Site.

A European Campaign on Risk Assessment 2008-2009. The UK’s campaign was launched on the 24 June when full activities were announced

**JUDITH HACKITT, CHAIR OF THE HSE,
ADDRESSED THE CEO OF MAJOR
ORGANISATIONS ON THE 29 APRIL.**

<http://www.hse.gov.uk/aboutus/speeches/transcripts/hackitt290408cl.htm>

Here are a few of the key messages I've heard which must resonate with safety people:

1. Process Safety cannot be managed or led from the comfort of the Boardroom. Real leaders have to demonstrate their commitment by walking the talk – which means going out and seeing for themselves. All too often senior managers and directors are far too detached from the reality of what is actually taking place on the ground.

2. If the people on your Board don't know about/understand process safety, then they must learn. We cannot assume that Board members understand the concept. This is not something which can be delegated. You are responsible and you must lead, and to lead you must understand.

3. This is not about glossy volumes of procedures and management systems - it's about listening to the people at the coalface who really know what's going on. Procedures which look wonderful but are not being followed in practice are no use. Whatever system is in place has to be geared to ensuring safe operation – not to creating good impressions – whether that be for the senior management of the organisation or indeed your regulators.

4. We have heard also that every Board needs to consider what the real vulnerabilities are and address them – and they also need to know that it is OK to seek help and advice from others – that's also part of real, honest leadership.

We've heard about the importance of consistency – leadership credibility takes a long time to build but an instant to lose with one inconsistent decision – “production comes before safety, just this once” simply will not do – the whole culture will be destroyed.

MOVEMENT TO BOOTLE

The Health and Safety Commission (HSC) and the Health and Safety Executive (HSE) are the two Department for Work and Pensions (DWP) agencies responsible for health and safety in Great Britain. They are to be merged and moved to a single headquarters in Bootle, Merseyside. The Committee is satisfied that the merger is a sensible proposal but is concerned that the move to Bootle could lead to a huge loss of experienced HSE staff, who are unwilling to relocate.

We have found that the original legislative framework governing workplace health and safety is proportionate but that partly due to some lack of legal clarity, employers can be over-cautious in their interpretation of its provisions, increasing the compliance burden on themselves. Over-zealous health and safety “consultants” contribute to this problem and we call for a system of accreditation of consultants and advisers. We hope that HSE's Risk and Regulation Advisory Council will be tasked with addressing this.

Many who submitted evidence to our inquiry believed that HSE does not have sufficient resources to fulfil its remit. HSE aims to meet a 60:40 ratio of proactive and reactive work, however we heard that not only are businesses likely to have an HSE inspection just once every 14.5 years but that also accident investigations are being scaled back. Academic research has highlighted the influence of the number of inspections on levels of compliance with health and safety obligations. We believe that an under resourced health and safety inspectorate has an impact upon employer compliance and accident rates. In view of the total lack of clarity in financial information supplied, it is not clear to us whether additional inspections can be financed from within the Comprehensive Spending Review 2007 settlement or whether further resources will be required.

In addition to the lack of inspections, we conclude that current levels of fines for health and safety offences are too low and do not provide a sufficient deterrent to ensure duty holders comply with their obligations. We would also like to see more innovative penalties to encourage compliance among employers.

The Health and Safety at Work Act 1974 is clear that as well as duty holders, employees must take responsibility for health and safety in the workplace. We examined the role of safety representatives and measures to increase employees' involvement in non-unionised workforces. We believe that the HSE should do

more to promote worker involvement in health and safety.

The increase in the number of fatalities in the construction industry; the offshore oil industry's failure to meet its major hazard sub targets, and health and safety risks to migrant workers are key areas of concern for HSE. We commend the work that HSE has done on the Construction Forum, its review of North Sea assets and its planned research on migrant workers but we question whether these actions are enough to rectify the problems.

We are concerned that HSE is struggling to cope with its occupational health remit. It admits to basing its occupational health policy on an incomplete data source and is failing to meet its occupational ill health targets.

During this inquiry Dame Carol Black published a review of the health of Britain's working age population. Her report stressed the need for a fully developed occupational health service which we endorse but we do not believe that this provision should be within HSE. We also believe that there may be a need for financial incentives for employers to engage in rehabilitation programmes for injured or sick employees.

HSE needs to concentrate on its core remit and measures to extend its responsibilities into other areas places an excessive strain on its resources and risks diverting its focus.

The Economics of Land Use Planning

Discussion Paper Series No. 001

**David Kemball, Tara McNally and Chris Milne
June 2008**

Abstract

This paper explores the economic theory behind alternative approaches to the current Land Use Planning (LUP) system around major hazard sites. Analysis in this paper is set out on an individual risk basis, however the concept of societal risk considered briefly as a separate topic. This paper attempts to summarise the LUP system and examines the economic rationale for government intervention in LUP. We also consider the recent changes in policy following the Buncefield explosion and provide a survey of approaches to Land Use Planning adopted in other countries.

This paper aims to encourage discussion of the use of market based instruments (an alternative or complementary approach to the current system) in the context of LUP around major

hazard sites, which could lead to a greater understanding of these potential policy options for the future.

Market based mechanisms are used in an attempt to internalise the costs of increased risk. Three options are considered; the introduction of a safety levy on new developments based on the increased exposure to risk that a new development brings. Secondly, mandatory purchase of insurance by developers against any damage arising from an accident. Thirdly, through introducing a 'Cap and Trade' system affecting most developers and major hazard sites.

NUCLEAR PROGRAMME STRATEGY AND OPERATING PLAN 2008

**De-commissioning and radio-active waste management
1 April 2008**

Background

It has been the practice of the Nuclear Directorate (ND) for some time to place its annual Operating Plan and its separate Strategic Plan on the ND website. In 2007 a new approach was adopted, leading to the development of a single joint document that sets out both medium term and longer term Directorate Objectives in a format that is intended to provide much greater clarity of intent. This may be downloaded in portable document format (PDF) using the link below:

It was always the intention to place this document into the public domain after a period of internal use. This was with a view to encouraging suggestions for the development of ND's future strategies as part of the normal planning process, but it also reflects ND's policy of greater and more effective stakeholder engagement. This is a significant change from previous practice that it is hoped will lead to a better common understanding of ND's regulatory interests and priorities. The document has been in use internally since 1st April and is now published following the incorporation of a number of minor revisions to the original Version 1.0.

The intention is to maintain this document as a live plan, modified as required throughout the year by successive minor internal changes, with more significant changes being incorporated into major re-issues at key points in the planning cycle. These are likely to be in October and April, and these revised versions will in future be placed on the web-site as a matter of course.

To date, since the new approach had to dovetail into the existing planning cycle, most attention has been on medium term objectives. It is therefore intended to re-examine long term objectives in some detail in the months ahead.

Intentions

It is intended to publish Version 2 of the plan in October 2008, following a three month communications exercise and parallel internal work to refine Directorate Objectives, in particular long term objectives.

This version will form the basis of ND's internal planning processes over subsequent months and will lead to the release of Version 1 of the 2009 plan on 1 April 2009.

Interested parties are welcome to comment on the document or raise suggestions for future ND attention using e-mail address: nd.strategy@hse.gsi.gov.uk. Alternatively, written comments can be posted to the address below, which can also supply hard copies if there are any difficulties printing the document:

NEWS OF THE NEW HAZARDS FORUM WEBSITE - from the Secretary

The Hazards Forum has been developing a new website during the past months and became "live" just before the AGM in March. The new site is at a new address which is seen to be more appropriate for the Forum. The extension of .co.uk has been replaced by .org.uk. The old website address is still assigned to the Hazards Forum, but trying to access it will result in being redirected to the new site at the new address. An advantage of retaining the old address for the moment is that it is quite high in the Google search hierarchy. The new address is www.hazardsforum.org.uk. – do try it out!

Also, new dedicated e-mail addresses have been created for key Hazards Forum personnel, with the same extension as the new site. As an example the newsletter editor is now available at newslettereditor@hazardsforum.org.uk. There are other addresses for other functions, such as admin@hazardsforum.org.uk for the secretariat at the ICE in Great George Street.

BOOK REVIEW

"Just Culture - Balancing Safety and Accountability" by Sidney Dekker. Published by Ashgate 2007

This new book is a refreshing read. In the Preface Dekker states "If we see an act as a crime, then accountability means blaming and punishing somebody for it. Accountability in that case is backward-looking, retributive. If, instead, we see the act as an indication of an organizational, operational, technical, educational or political issue, the accountability can become forward-looking. The question becomes: what should we do about the problem and who should bear responsibility for implementing those changes?" The prologue gives an account of a nurse unfairly convicted of manslaughter who had given information on the possible cause of the death of a baby. The comment given was "She might have hoped that we all could learn the truth behind the death of the little girl. But there is no such truth to find, to arrive at, to dig out. No final account, no last word - only versions, jostling for supremacy, media-light, popular appeal, legal sustainability. And her version had consistently drawn the shortest straw. Again and again."

Professionals having made an error are often faced with two alternatives. Either they report it and face a reprimand, a disciplinary action or a prosecution. Or they keep quiet and hope nobody notices. A single account cannot do justice to the complexity of the event as often seen in prosecutions. A Just Culture accepts nobody's account as true or right, there are no absolutes. Not wanting to disclose an error makes it look dishonest but the organisation must create a climate in which disclosure is normal, acceptable and a persons responsibility.

Dekker discusses all of these problems including when reporting becomes dangerous but carries on to discuss how to get people to report and to see it as an opportunity for responsibility and learning the lessons from the incident.

"You have nothing to fear if you've done nothing wrong" is discussed with particular reference to

gross negligence but the arbiter of gross negligence is often the judiciary and legal profession who see a limited view.

Criminalising human error is discussed with reference to medical errors. Report the facts and be prosecuted for them or don't report the error and get prosecuted for not reporting them. Dekker concludes that "If you want a people in a system to account for their mistakes in ways that can help the system learn and improve, then charging and convicting a practitioner is unlikely to do that."

The problems in introducing Just Culture are discussed with examples from the medical profession but which could be applied to many other professionally qualified scientists and engineers. Response to a failure is an ethical question but when a mistake is put on trial safety almost always suffers. Calls for accountability are not the same as holding people criminally responsible. The book raises many questions and answers them in a convincing way, if there is a focus on safety then accountability for failure has to be reconciled with learning lessons from that failure.

Dekker concludes that legal proceedings -tort or criminal- in the wake of incidents or accidents could be bad for safety, and may not help in creating a just culture.

The case of the victims of errors is discussed with examples.

This book discusses many of the problems encountered in establishing a Just Culture in a company. Although examples are mainly in the medical profession they can readily be seen in the engineering and science field. It is well worth a read if you are moving into this important safety culture area.

John Bond

The Adventures of the Safety Inspector

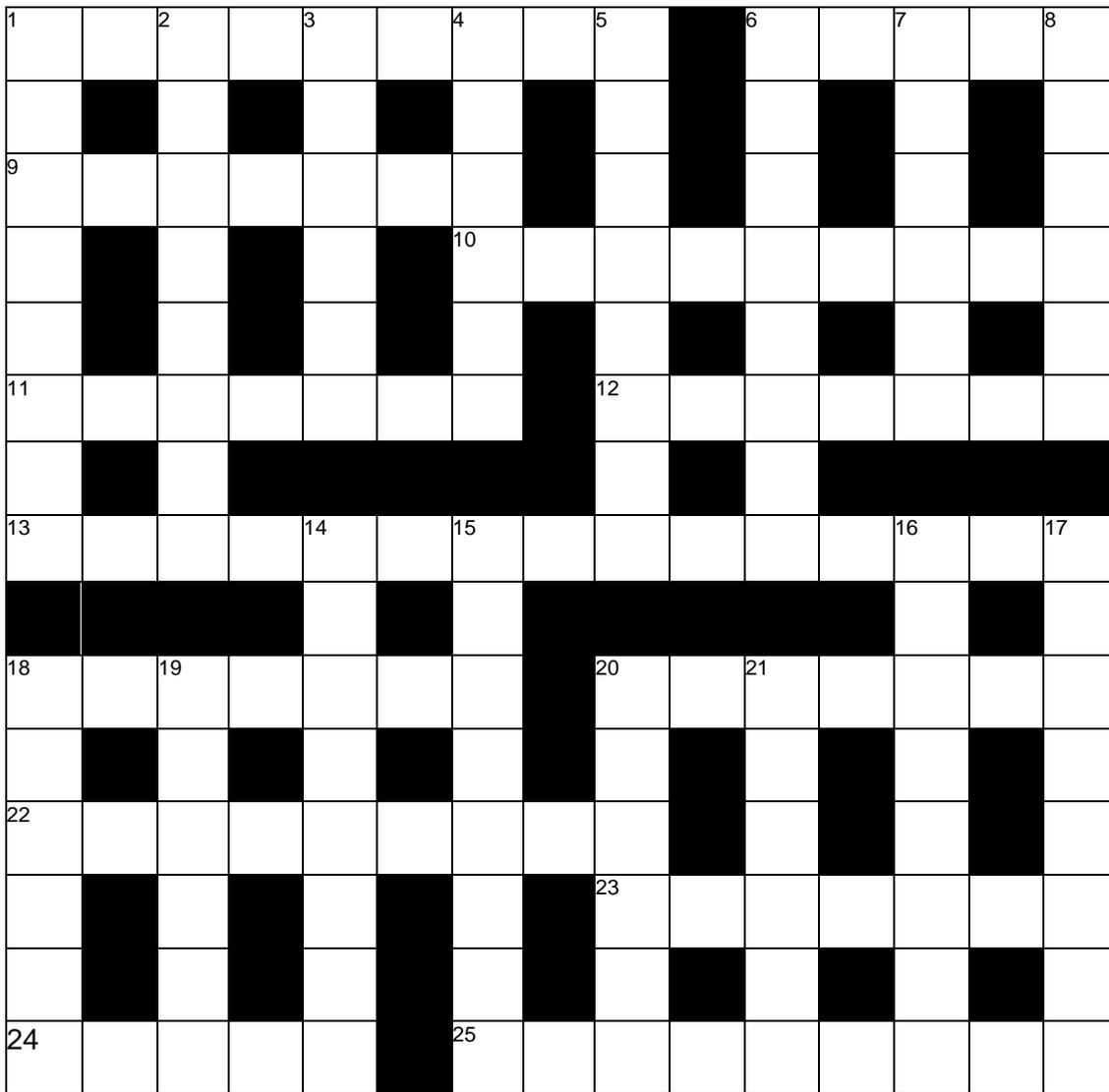
The Big Bang

The Safety Inspector was sent
To look at the Big Bang event.

He pondered for days,
On the question to raise.
"Was it really an accident?"

Your Safety Inspector was right
To query what happened that night;
But the Big Bang occurred
Because I gave the word
And simply said "Let there be Light."

HAZARD FORUM CROSSWORD PUZZLE No. 1



ACROSS

- 1. Could be a disaster of titanic proportions. (9)
- 6. A team of lawyers play this game well. (5)
- 9. Drives a strange way for a consultant. (7)
- 10. What Keeps a torrent at bay was almost a political scandal in the U.S. (9)
- 11. I bet her malady shows a preference for heat. (7)
- 12. Too much fuel on cockney's fire causes obesity. (7)
- 13. In other words, look before you leap. (4, 11)
- 18. To the Navy a party is a stormy affair. (7)
- 20. Cavalry horse can renew source of power. (7)
- 22. They tell me storage somehow needs a large tank. (9)
- 23. Recessed relapse. (7)
- 24. A numeral to hand. (5)
- 25. Shorter than the Long one, this U.S. island is of accidental interest. (5, 4)

DOWN

- 1. A sweater unravels in the salty stuff. (8)
- 2. Guests who don't need to gate crash. (8)
- 3. This asset has teeth to it. (6)
- 4. Unclear fulminations show a tirade. (6)
- 5. Explosive power of a great deal of TNT. (8)
- 6. A nightmare is hardly a good ambition to have. (3, 5)
- 7. A sporting jacket endlessly on fire. (6)
- 8. Specialist who use to be saucy. (6)
- 14. Not exactly an installer of warning systems.(8)
- 15. Quicker way to get a crop. (5, 3)
- 16. Ask again where nuclear activity burst upon the scene. (8)
- 17. What some fire safety systems are designed to do. (8)
- 18. Labelled strange gadget. (6)
- 19. A kind of damp is encircled. (6)
- 20. Some incur sore eyes following this on screen. (6)
- 21. Loosen the strings after a BBC relative. (6)

CALENDAR OF EVENTS

Please check the Hazards Forum website at www.hazardsforum.org.uk under the Events section for more information and to see any updates in the calendar such as additional events or perhaps amendments to these events.

Date	Event	Venue	Contact/further information
2008			
SEPTEMBER 15 - 17	'Sustainable Hydrology for the 21 st Century', by the Institution of Chemical Engineers	Exeter University	Alix Slater, University of Exeter e: bhs.symposium-2008@ex.ac.uk
30	HF Evening Event: Hazards at the road/rail interface, including trams	The Royal Academy of Engineering, 3 Carlton House Terrace, London SW1Y 5DG	Alison at hazards.forum@ice.org.uk
OCTOBER 14	HF Supported event: Challenges for our Ageing Asset Base – Ensuring Safety, Reliability and Operability	Institution of Mechanical Engineers, One Birdcage Walk, Westminster, London, SW1H 9JJ	For further information and to book online please visit www.imeche.org/events/S1284 or contact Diane at d.lorenzelli@imeche.org
NOVEMBER 25	HF Evening Event: Interpretation and enforcement of health and safety legislation – Have we got it right?	Under development and to be confirmed in Central London	Alison at hazards.forum@ice.org.uk
DECEMBER 2 - 4	HF Supported event: 4th International Conference on Forensic Engineering	Institution of Civil Engineers, One Great George Street, Westminster, London, SW1P 3AA	www.forensicengineering2008.com
2009			
MARCH 10	AGM and Evening Event being planned	Provisional – to be confirmed	Alison at hazards.forum@ice.org.uk

Parliamentary & Scientific Committee

The Hazards Forum is a member of the Parliamentary & Scientific Committee and members are able to attend the Committee's meetings in one of the Forum's allocated places. The meetings and events over the next couple of months are listed below. Anyone interested in any of these meetings should contact the former Newsletter Editor, Ian Lawrenson, on ilawrenson@theiet.org for further information on availability of places as he has kindly agreed to continue as the Hazards Forum link with the PSC.

Tuesday, 21st October 2008

17.30 pm in the Boothroyd Room, Portcullis House, Westminster

NUCLEAR WASTE – WHAT TO DO WITH IT?

Speakers:

Richard Waite, *Radioactive Waste Management Directorate (RWMD), Nuclear Decommissioning Authority (NDA)*

Dr Peter Bleasdale, *Managing Director, National Nuclear Laboratory, British Nuclear Fuels plc (BNFL)*

Tuesday, 18th November

17.30 pm in the Boothroyd Room, Portcullis House, Westminster

FOOD SECURITY – IS IT ACHIEVABLE?

Speakers:

Professor Colin Dennis, *Director General, Campden and Chorleywood Food Research Association Group*

Professor Chris Lamb FRS, *Director, John Innes Centre, Norwich*

FOOTNOTE

The Hazards Forum wishes express it's appreciation to Dr John Bond for agreeing to take over the editorship of the Newsletter, this being the first one he has undertaken. You will notice some innovative features and feedback is always appreciated, of course. Dr Bond has a long association with Forum, as does his wife. Please see the next edition for more about John.

In addition, the Hazards Forum wishes to acknowledge all the work that the out-going editor, Dr Ian Lawrenson, put into the role during the many years he was in post and wish to express their thanks. For those who may not be aware Dr Lawrenson was previously secretary of the Hazards Forum and we are pleased to let you know that he will still be involved in Forum activities though both his membership and his continuing link with the Parliamentary & Scientific Committee, as mentioned above.

Brian Neale, Secretary

The Hazards Forum's Mission is to enable government, industry, science, universities, NGO's and individuals to find practical ways of approaching and resolving hazard and risk issues, in the interests of mutual understanding, public confidence and safety.

The Forum was established in 1989 by four of the principal engineering institutions because of concern about the major disasters which had occurred about that time.

The Hazards Forum holds regular meetings on a wide range of subjects related to hazards and safety, produces publications on such topics and provides opportunities for interdisciplinary contacts and discussions.

www.hazardsforum.org.uk

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