ANNUAL LUNCHEON OF THE PARLIAMENTARY AND SCIENTIFIC COMMITTEE

The Annual Lunch of the Parliamentary and Scientific Committee was held on Tuesday 8th November 2011 in the Cholmondeley Room and Terrace, House of Lords.

Lord Jenkin opened proceedings by welcoming Lord Soulsby, past President, and past Chairmen including Ian Taylor, and the many other distinguished guests, scientists and especially the engineers present which has arisen due to the recent merger with the All Party Parliamentary Group on Engineering (APEG). He also referred to the Committee's current programme of events and activities which include a much greater contribution from Engineering. "It is hugely important that people should understand that if you want to make things happen – it is the Engineers that do that! And that is why I am particularly pleased to be able to introduce the speaker, Dr Mike Weightman, HM Chief Inspector of Nuclear Installations and Executive Head of the Office of Nuclear Regulation, who has spent his life as an engineer in the nuclear industry – and long before regulation commenced! His career evolved from working in BNFL, then Principal Inspector of Nuclear Installations in 1988, and he has now become a figure of both national and international distinction this year, with his work following the disaster that struck Fukushima Daiichi, where the safest place to be was in a nuclear power station. Not one life was lost from radiation – a fact that needs to be very widely known indeed. The Japanese handled it with extreme skill and courage. He accepted the remit from the Secretary of State to prepare a report as to what should be the consequences for the UK Nuclear Power Industry. It is to his enormous credit that he was subsequently invited by the IAEA to undertake a similar task for them – thus demonstrating this country's outstanding reputation in the regulation and safety of nuclear power stations. We are very proud to have him here to speak today!"

Dr Mike Weightman rose to respond with the comment "As they say, "Follow that!". "Whenever I am asked difficult questions in Select Committees, the response I usually give is – "I am just a Simple Engineer". However Engineering is what Fukushima is all about, and I am therefore very grateful for the opportunity to address this august group, comprising engineers, scientists and parliamentarians. As HM Chief Inspector of Nuclear Installations one of my prime aims is to embrace openness and transparency. Not only as a Regulator, but also because people deserve to know what is around them, what decisions we take on their behalf, and how they are being protected. It is only by doing that, which enables you to earn the trust and confidence of the people who we serve."

"Let me begin relating the Fukushima Daiichi event by telling you about the Office for Nuclear Regulation (ONR) as this is relevant to one of the prime institutional lessons to come from Fukushima. The ONR was created on 1 April 2011 as an Agency of the Health and Safety Executive (HSE). This is an interim step towards the Government's intention through primary legislation, to set up an Independent Nuclear Regulator as a Statutory Corporation outside the HSE."

"It is intended to provide flexibility to enable us to sustain ourselves as an expert well-resourced, world-leading nuclear regulator for future challenges. It would also bring more independence if the Chief Inspectors role is established by Statute and through our own Board resulting in openness and transparency. This has been praised by the Deputy Director General of the IAEA, with the UK once again, demonstrating world leadership in facing up to future challenges."

"The ONR is deployed across all sectors of the nuclear industry, for regulating nuclear safety, we are also responsible for nuclear security at civil sites and for the safeguarding of nuclear material that otherwise might be used in atomic weapons. To fulfil those responsibilities we have a staff of 450 people, half of whom are very well qualified engineers and scientists and you will perhaps, also be pleased to know that over 95% of the costs are recovered from industry!"

"Let me now provide you with a brief review of the Fukushima Nuclear Accident and what it means for the UK nuclear industry. Eight months ago Japan's east coast suffered the sixth largest earthquake the world has ever seen and Japan within an hour was hit by a series of tsunami waves. Whole towns and villages were swept away. Over 100,000 homes were damaged or destroyed, and tragically some 20,000 people are dead or missing. Severe damage to the Japanese infrastructure also resulted from the impacts of the earthquake and tsunami".

"All the nuclear plants on the east coast of Japan were affected to a lesser or greater extent, with the Fukushima Daiichi site the most affected of all. At this site three reactors were operating, and another three were shut down for maintenance. The operating reactors shut down automatically in response to the earthquake, as they are designed to do. To keep them safe, cooling had to be maintained because of the large amount of heat generated by radioactive decay from the fission products in the fuel. The heat on shutdown would be equivalent to some 20,000 electric fires in a volume equivalent to a couple of double decker buses. However the cooling systems designed to operate during shutdown failed to operate. Six electric grid lines serving the site had been destroyed by the earthquake. The emergency electrical supply was provided by twelve large diesel engines on the site."

"Within an hour the tsunami waves hit the site, inundating it to a depth of 14 to 15 metres. The waves hit the turbine buildings and then splashed into the air half a rugby pitch in height resulting in the loss of all AC power excepting Reactor 6 which is located on higher ground. The diesel electric generators and their electrical controls are all located beneath turbine halls which became flooded and inoperable."

"The operators then faced a nightmare situation due to the loss of AC electric power supply to the reactors, fuels ponds and the loss of the heat sink that is required to remove excess heat. Instrumentation indicating the physical state of the reactors and communications, all broke down. And difficulty of access was caused by the tsunami with cars slung around like driftwood and only the staff they had on site available to help with little hope of outside assistance in the short term."

"The operators did what they could in very difficult circumstances by attempting to vent reactors to stop over-pressurisation and putting in alternative cooling through fire tenders, which included the use of seawater. However, during the next couple of days at Daiichi all effective cooling was lost, with the fuel heating up to over 1000 Degrees C. The Zr-cladded fuel reacted with water which generated hydrogen that rose to the top of Reactor Buildings 1, 3 and 4 in sufficient quantities to cause extensive, massive explosions, with Reactor 2 also causing an explosive event inside containment. A large quantity of radioactive material was released to the atmosphere. The authorities had however simultaneously responded in the environs by evacuating people to safety, firstly those within 3km and then within 20km of the site. As time progressed, large quantities of contaminated water from efforts designed to help cool the reactors began flowing into the sea. Further efforts to stabilise the reactors continue today, but the risk of additional radioactive release has been significantly reduced. Despite all these events there is no evidence of any related public health detriments arising from the accident. However it has caused widespread social impacts and alarm, and billions in damage. So what has our response been as the UK Nuclear Regulator?"

"The first priority was to provide advice to Government on how to protect the 17,000 UK Citizens in Japan. This involved making predictions from limited information of reasonable worst case scenarios in order to feed data into models in order to determine the dispersion of radioactive materials from Fukushima and the likely impact they might have in places like Tokyo. With help from our colleagues in the Met Office and other agencies we were then able to produce four-hourly predictions to John Beddington's Group on Scientific Advice and COBRA."

"The UK Government subsequently adopted a measured approach and decided NOT to evacuate people from Tokyo. Additionally, we sought and received assurances about the UK fleet of nuclear reactors and UK nuclear experts were also required to confirm that all safety systems were operating successfully. I have issued two reports, one in May and one in September, on lessons that have been learnt for the UK Nuclear Industry. These include 17 Conclusions and 38 Recommendations. The final report took account of Japanese Government reports, and the IAEA mission report as well as deliberations of the Advisory Panel that I set up."

"WHAT DID WE LEARN?

1) Need for a robust design basis and periodic safety review of nuclear facilities.
2) They can be made safe from earthquake and flooding risks
3) This is what we do in the UK
4) Continuously review safety of all facilities, as knowledge accumulates and standards improve.
5) Regulatory System in the UK requires this through conditions we attach to nuclear site licences
6) Should prepare on and off site for even more severe events – we can do more
7) Strong independent technically expert Nuclear Industry Regulator required
8) Continue to fulfil duties and responsibilities in line with UK Government intentions for safety"

"Given the differences between the UK and Japanese regulatory systems and the level of external hazards, there is no need to curtail operations of nuclear facilities in the UK and no fundamental weaknesses exist in the UK systems and their regulation."

"However there is no room for complacency and we must seek to learn from events as a fundamental feature of the UK nuclear industry. This is why 38 recommendations have been made with openness and transparency that are based on continuous learning and a strong independent Nuclear Regulator as with this in place, with this the ultimate overall benefit of nuclear power to society remains an option. Thank you!"

QUESTIONS

Q1. Was there any investigation of costs as Nuclear related activities are uninsurable in the UK?

A. The remit of the Regulator is not to examine financial but safety aspects. The market will decide on costs.

Q2. We do have strong links with Japan where people are in fear and terror of everything that has happened. How can the UK help respond to attacks of panic?

A. Sir John Beddington did visit Japan to provide the scientific facts and help with advice on behalf of the British Government.

Q3. How are the costs of energy production linked to costs to human health?

A. These are provided in OECD nea pubs Reports and people also have their own ideas as exemplified by Electricite de France (EDF).

Q4. We live on Risk, what are dangerous levels of radiation and who sets these?

A. For workers in the nuclear industry the annual upper limit is 20 millisieverts (mSv), whereas the worldwide average dose for a human being is about 2.4 mSv per year from the natural radiation background. These data are provided by IAEA and the EU. Evacuees from Japan would have received more radiation from flying to the UK than from nuclear installations.

Andrew Miller MP gave a vote of thanks to the Speaker:

"It is great to be here again after an excellent year due in large part to the contribution from our President, Patrick Jenkin and thanks are therefore due to him for everything that he does to make our work so successful. Thank you also to the members in the audience for their valuable contributions to discussion meetings, *Science in Parliament* and SET for BRITAIN. Transparency is the order of the day, especially the need to inform and provide public confidence in what scientists and engineers do. Thank you all for coming here today and look forward to seeing you all in future meetings."