Nuclear's insecurities

"More than 10 years after the 9/11 hijackers considered flying a fully loaded passenger jet into a Manhattan area nuclear reactor, U.S. commercial and research nuclear facilities remain inadequately protected against two credible terrorist threats – the theft of bomb-grade material to make a nuclear weapon, and sabotage attacks intended to cause a reactor meltdown – according to a new report prepared under a contract for the Pentagon by the Nuclear Proliferation Prevention Project (NPPP) at the University of Texas at Austin's LBJ School of Public Affairs, and released today (15 August 2013)."

By Dr David Lowry, NWAA,

Stoneleigh, 20 September 2013

What is true in the US on the inadequacies of nuclear security is true, even more so, in the UK.

On 30 August this year, the official nuclear security and safety regulator, the Office for Nuclear Regulation explained in an introduction to its new *Nuclear Research Needs* 2013-14 report[1]:

"In 2012, ONR undertook to publish an integrated statement of Nuclear Research Needs (NRN) to identify the requirements for nuclear related research across the whole of ONR's regulatory remit. This was partly in response to a review and report on nuclear research and development capabilities produced in 2011 by the House of Lords Select Committee on Science and Technology, which questioned the limited scope of the NRI. ONR committed to reviewing the NRN and expanding it to cover our entire regulatory remit: this is the first integrated NRN published to fulfil that commitment."

It goes on to say:

"This NRN describes the current ONR view on the need for research related to issues that might undermine safe and/or secure operation of UK nuclear facilities if not properly managed."

And further states:

"This document covers the nuclear research needs of ONR's six operational programmes, namely:

- Civil Nuclear Security - regulates security at civil licensed nuclear sites, and all other locations where sensitive nuclear information is held; and the movement by road and rail within the UK, and globally within UK flagged vessels of nuclear and other radioactive material."
- Civil Nuclear Reactor Programme/New Build - regulates the safety of operating and defueling nuclear power stations and licensing and permissioning of proposed new build nuclear power stations.
- Sellafield Programme - regulates the safety of Sellafield and Windscale nuclear licensed sites in Cumbria.
- Decommissioning, Fuel and Waste Programme - regulates safety on a variety of nuclear fuel sites, including fuel cycle, nuclear research, waste management and decommissioning sites.
- Radioactive Materials Transport - regulates safety during the transport of radioactive material by road and rail in Great Britain, and advises on its transport by air and sea within the UK territorial waters.
- Defence Programme - regulates safety at defence sector nuclear sites, including submarine and atomic weapons facilities, working closely with the Defence Nuclear Safety Regulator (DNSR).

All of which is encouraging, until you read on page 2 of the full 165 page document:

"... not all of the above technical areas have detailed research project requirements, therefore: Nuclear Fuel Research, Civil Nuclear Security and the Environment Agencies *have not included any research projects* within this detailed research needs document." (My emphasis)

When I read this, I had a double take. It could not really assert that, could it? But actually, it does.

With a prospective new -build power reactor programme, a possible export of plutonium in MOX fuel, a possible plutonium burner reactor and a certain decommissioning programme involving huge quantities of radioactively contaminated materials being transported nationwide by road, rail and probably ship for many years from protected licensed nuclear sites, in a climate of unresolved security concerns and terrorists threats, it is incomprehensible that ONR would have no need to do any research on security issues.

At the ONR's own stakeholder meetings held over the past few years, it has been recommended several times that ONR specialists read the final reports of the BNFL Stakeholder Dialogue (1998-2004), in particular on Plutonium and Nuclear Materials & Facilities Security, which outlined many research areas requiring attention. ONR seem to have ignored its own stakeholders' stated concerns[2].

Here are some nuclear security issues, from many, that US researchers consider essential to be researched, and where relevant, implemented, in a post 9/11 world[3]:

They are grouped into two main categories—first, direct steps to implement security upgrades at specific facilities and to interdict nuclear smuggling, and, second, steps to strengthen national and international security standards.

Nuclear industrial states should review, and strengthen as necessary, the accuracy and effectiveness of its state system of accounting and control—as control and accounting systems are an important part of preventing and detecting insider theft.

Post September 11, 2001, at a minimum, it is difficult to argue that there is any country with major nuclear facilities where an attack by a small group of well-armed, well-trained terrorists, using at least a lorry/truck bomb and having the assistance of one insider, is not a plausible threat against which security systems should be prepared to defend. National standards and regulations should include regular, realistic, independent testing of the performance of security systems in defeating intelligent, well-trained insider and outsider efforts to overcome them.

In 2006, the US Congress commissioned the US National Academies of Science to produce a report looking "conflicting public claims about the safety and security of commercial spent nuclear fuel storage at nuclear power plants". Their conclusion was that "there were indeed credible concerns about the safety and security of spent nuclear fuel storage in the current threat environment."[4]

A new research paper prepared in August 2013 by the Institute for Resource and Security Studies in Cambridge, Mass, USA, which critically assesses the US Nuclear Regulatory

Commission (NRC)'s 2013 Draft Consequence Study [of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool] points out that the "NRC should focus its initial attention Exclusively on establishing a solid technical understanding of phenomena directly related to a potential pool fire." There is a direct read-across from hazards from natural phenomena, such as earthquakes, and deliberate disruption of nuclear installations. Both aims and capacities of determined malevolent adversaries need research

The before and after photographs of the use of a shaped-charge penetrator found at Figure IV-4 on page 36 are particularly impressive in demonstrating the complete vulnerability of non – hardened spent fuel stores to attack by well-armed determined terrorists.[5]

Each of these US security concerns require detailed research in a UK nuclear industry context too.

The International Atomic Energy Agency (IAEA) annual report 2013, released on 20 September 2013 just before its annual conference in Vienna, projects an increase in global nuclear generating capacity of 100%, to over 850 reactors from 425 today, by 2030[6]. In a post-Fukushima world, will national nuclear regulators and international watchdogs such as the IAEA together have sufficient trained and qualified personnel to police a nuclear world with such a massive increase of risk that will go with such a doubling of nuclear output capacity.

For the UK's own nuclear security watchdog to see no need to sponsor any research on nuclear security for the next two years is very difficult to comprehend.

1. http://www.hse.gov.uk/nuclear/research/2013/documents/nrn-2013-part-2.pdf

2. http://www.wiseinternational.org/node/2885

3. http://iis-db.stanford.edu/pubs/20377/Bunn_nmm_02.pdf

4. Safety and Security of Commercial Spent Nuclear Fuel Storage, National Academies Press, 2006. (http://www.nap.edu/openbook.php?isbn=0309096472)

5. Declaration of 1 August 2013 by Dr Gordon R. Thompson, director, IRSS, Cambridge, Mass. Comments on the US Nuclear Regulatory Commission's Draft Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a US Mark I Boiling Water Reactor

6. http://www.iaea.org/About/Policy/GC/GC57/GC57Documents/English/gc57-3_en.pdf

Further reading on unresolved nuclear security issues

http://www.publications.parliament.uk/pa/cm200506/cmselect/cmenvaud/584/584we58.htm