

Nuclear Power and Terrorism

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"Nuclear terrorism is still often treated as science fiction - I wish it were. But unfortunately we live in a world of excess hazardous materials and abundant technological know-how, in which some terrorists clearly state their intention to inflict catastrophic casualties."

UN Secretary General Kofi Annan, Madrid 10th Mar 2005. [1]

Summary

The terrorist attacks of 9/11 alerted the world to the potential of nuclear terrorism - making it "far more likely", according to the UN's International Atomic Energy Agency (IAEA), that terrorists could target nuclear facilities, nuclear material and radioactive sources worldwide.

"The willingness of terrorists to sacrifice their lives to achieve their evil aims creates a new dimension in the fight against terrorism," says Mohamed ElBaradei, IAEA Director General. [2]

Facilities at nuclear sites in the UK have not been designed to withstand a deliberate crash by a jumbo jet full of fuel, or many other types of attack. An attack could have widespread and catastrophic consequences for both the environment and public health. The extent of damage caused will depend on the type of nuclear facility, the nature of the attack, the weather conditions and the emergency measures in place, such as evacuation and shelter procedures and whether contaminated food is removed from the market.

Nuclear terrorism has the potential to cause enormous numbers of deaths, and the risk of a successful attack will increase if more nuclear power stations and stores for highly radioactive spent fuel are built. A terrorist strike targetting the storage tanks holding dangerous radioactive waste at Sellafield in west Cumbria could kill over two million people. [3]

So great is the risk of a terrorist attack on nuclear facilities that the highly respected Oxford Research Group has told the House of Commons Environmental Audit Committee that nuclear power should not be part of the UK's energy supply - precisely because it presents a major threat to our national and international security and increases the risk of nuclear terrorism, by creating opportunities for terrorist organisations. [4]

Public concern over the growing threat of nuclear terrorism has led to calls from the nuclear industry to withhold information on nuclear reactors and plans for managing radioactive waste for security reasons. Such moves would serve to prevent public scrutiny of safety assessments for new reactors and of how the industry will cope with the highly radioactive spent fuel the reactors will produce over coming the decades. [5]

Background

The tragic events of 9/11 finally forced the nuclear industry to acknowledge that nuclear reactors and stores were recognised terrorist targets. Following the attacks, the US Nuclear Regulatory Commission sent a confidential memo to all US nuclear power plants in January 2002 warning of plans for a terrorist attack in which hijackers "*fly a commercial aircraft into a nuclear power plant*". [6] A taped interview shown on Al-Jazeera TV on September 10th 2002, contained a statement that Al Qaeda initially planned to include a nuclear plant in its 2001 attack sites. [7] Nuclear materials and wastes are also terrorists targets. An Al-Qaeda website contains 80 pages of detailed instructions on how to make a "dirty" bomb.

The Government's Office of Civil Nuclear Security (OCNS), in its 2003 Annual Report, mentioned two peaceful Greenpeace incursions into the Sizewell B nuclear power station site in Suffolk on 14th October 2002 and 13th January 2003. These incursions were designed by Greenpeace to highlight the fallibility of security arrangements. Even after the second incursion, the station operator failed to make the necessary improvements to security. OCNS said demonstrators:

"...gained access via a fire door into the Inner Secure Zone. Although they would not have been able to penetrate into sensitive inner areas, this should not have been possible". [8]

Papers released in February 2005, under the Freedom of Information Act, revealed that in the year 2004-05 there were over forty cases of potential security breaches at UK civil nuclear sites. [9]

Several recent events have pointed to the possibility of an attack on a nuclear facility. National newspapers have reported that detailed plans of Britain's most sensitive nuclear sites, including Sizewell, were found in a car linked to one of the London terror suspects. Photographs, slides, maps and detailed information about types of radioactive materials and where they are stored were found in a raid after the July 2005 London bombing campaign. The Metropolitan Police told one nuclear expert that sensitive material, which appeared to come from lectures and talks he gave in 2002, had been found in the car of a woman connected to the July atrocities. [10]

The Lucas Heights nuclear research reactor - Australia's only nuclear reactor - and its spent nuclear fuel store (situated 25 miles south west of central Sydney) may have been a target of suspected terrorists. [11] Three of eight Sydney men currently facing terrorism charges in Australia were stopped by police near the nuclear facility. When interviewed separately by police all three gave different versions of the day's events. This was not the first time the Australian reactor had been the subject of a suspected terrorist plot.

Somewhat more dramatically, a foiled Chechen rebel assault on the Russian city of Nalchik in October was reported to have involved an attempt to hijack five planes that could be flown into various targets, including a nuclear power station. [12]

Mode of Attack

Since 9/11 public attention has focussed on the risk of an aircraft being deliberately crashed into a nuclear facility. IAEA spokesman David Kyd pointed out at the opening of the IAEA's 2001 annual conference that:

"Most nuclear power plants were built during the 1960s and 1970s, and like the World Trade Center, they were designed to withstand only accidental impacts from the smaller aircraft widely used at the time. If you postulate the risk of a jumbo jet full of fuel, it is clear that their design was not conceived to withstand such an impact." [13]

He also told CNN on 18th September 2001 that:-

"[Reactors] are built to withstand impacts, but not that of a wide bodied passenger jet full of fuel. . . . These are vulnerable targets, and the consequences of a direct hit could be catastrophic". [14]

The OCNS points out that other modes of attack should also be considered, such as attacks involving vehicles loaded with explosives, or suicide bombers. [15]

Consequences of an Attack

The consequences of a successful attack on a nuclear facility would depend on a wide range of variables, such as the extent of the damage and the size of any radiation release, weather conditions and the efficiency of countermeasures. As mentioned in the summary, a terrorist attack on Sellafield could result in over two million deaths.

A terrorist attack on Sellafield could dwarf the consequences of the Chernobyl accident in 1986. The most damaging radioisotope in the Sellafield waste storage tanks, both to human health and the environment, is called caesium-137. 25 kilograms of caesium-137 were released at Chernobyl, just 4% of the massive 625 kilograms that could be released by a terrorist attack on Sellafield.

A report by the Parliamentary Office of Science and Technology (POST) looks at various studies which examine the consequences of an attack, including a study by the National Radiological Protection Board (NRPB) of a release from the Sizewell B reactor. [16] This suggested over a thousand fatal cancers from a larger release and said that crop restrictions might be necessary over 1,000km².

In addition to the reactors themselves, nuclear power plants harbour radioactive materials in spent fuel ponds which may be in buildings even more vulnerable to attack than the reactor. In most cases spent fuel is transported to Sellafield after a period of cooling. Spent fuel from most of British Energy's reactors is clad in stainless steel, but at Sizewell B, the spent fuel is stored in ponds on site and is clad in flammable zirconium. In worst-case scenarios, a successful attack could result in the loss of water from spent fuel storage ponds, leading to ignition of the fuel. [17] According to a US nuclear security specialist, this could result in large releases of radioactivity just 100 miles from London. POST cites a US Nuclear Regulatory Commission study which suggests an accidental fire in a cooling pond might result in 3,500 to 15,000 cancer deaths.

Previous Incidents

To date, it is known there have been six direct attacks on nuclear power plants in France, South Africa, Switzerland, the Philippines, and Spain (there may have been others which have not been made public). Fortunately, all of the reactors were in the early stages of construction and were not operational. The International Policy Institute for Counter-Terrorism (ICT) database includes some 167 terrorist incidents involving a nuclear target for the period 1970 – 1999. Between 1966 and 1977 there were 10 terrorist incidents against European nuclear installations (reactors plus other types of nuclear facility). Between 1969 and 1975 there were 240 bombing threats against US nuclear facilities, and 14 actual and attempted bombings. According to a Russian intelligence official, during the years 1995-1997 there were 50 instances of nuclear blackmail in Russia. Most of them were hoaxes.

Increased Security

Armed police now patrol civil nuclear sites, including those run by the privatised nuclear operator, British Energy. But increased security is beginning to provoke a debate about the impact it will have on civil liberties. Visitors to the beach near Sizewell have been made uneasy by armed officers patrolling outside of the perimeter fence. The Civil Nuclear Constabulary has also refused to say whether it has a "shoot to kill" policy. Local town councillor, Colin Ginger said "as long as Sizewell A and Sizewell B are there, they'll be focal points" and potential terrorist targets. [18]

Despite the need to be more security conscious, last October a cargo of radioactive nuclear waste from Hinkley Point nuclear power station sat unprotected in a railway siding near Bridgwater in Somerset for hours, near houses and less than 100 metres from a school. Nuclear engineer, Dr John Large, says "Every one of these trains would be a potential target for terrorists. The flasks of fuel rods could be easily penetrated by a rocket-propelled grenade. If a flask was penetrated it would cause radiation over a wide area. The contents are intensely radioactive. Exposure for just 30 seconds would mean death." [19]

Contingency Planning

If the worst did happen then the results of emergency planning exercises give little cause for comfort. According to confidential reports obtained by the New Scientist, and the Sunday Herald, UK authorities are not fully prepared to protect people from being exposed to radioactivity.

Regular assessments of the problems thrown up by civilian nuclear exercises are conducted by the government's Nuclear Emergency Planning Liaison Group (NEPLG). Its latest report highlights 48 "areas for improvement", prompted by more than 20 exercises at nuclear sites over the last five years. The exercises involve the emergency services, nuclear operators, local authorities and regulatory agencies. Critics say the NEPLG report details an astonishing catalogue of fundamental and recurring failures - agencies still can't get even the basics right after years of practising. Failures include inadequate radiation monitoring, communication breakdowns and poor planning. [20]

For more information, contact the Greenpeace press office on 020 7865 8255.

- [1] BBC 10th March 2005 <http://news.bbc.co.uk/1/hi/world/europe/4336713.stm>
- [2] IAEA press release 1st November 2001 Calculating the New Global Nuclear Terrorism Threat
http://www.iaea.org/NewsCenter/PressReleases/2001/nt_pressrelease.shtml
- [3] Nuclear Terrorism: The Risks and Realities in Britain, by Dr Frank Barnaby, Oxford Research Group, February 2003
<http://www.oxfordresearchgroup.org.uk/publications/CDRs/Barnaby.pdf>
- [4] Secure Energy: Options for A Safer World. Oxford Research Group.
<http://www.oxfordresearchgroup.org.uk/programmes/nuclearissues/secureenergy.htm>
- [5] Terror fears draw veil over nuclear plants, by Richard Norton-Taylor, Guardian 6th May 2005.
http://www.guardian.co.uk/uk_news/story/0,3604,1477455,00.html
- "Finding a Balance: Guidance on the Sensitivity of Nuclear and Related Information and its Disclosure", Office of Civil Nuclear Security, DTI, April 2005.
http://www.dti.gov.uk/energy/nuclear/safety/disclosure_guidance.pdf
- [6] Nuclear Power Plants Possible Terror Targets Memo warns, CNN 1st February 2003
<http://www.nci.org/02NCI/02/cnn-02.htm>
- [7] Nuclear Power Plants: Vulnerability to Terrorist Attack by Carl Behrens and Mark Holt, Congressional Research Service, 9th August 2005.
<http://www.ncseonline.org/NLE/CRSreports/05aug/RS21131.pdf>
- [8] The State Of Security In The Civil Nuclear Industry and The Effectiveness Of Security Regulation
April 2002 – March 2003, OCNS, 2003
http://www.dti.gov.uk/energy/nuclear/safety/dcms_report2.pdf
- [9] The Organisation and Work of the Office for Civil Nuclear Security, OCNS, Feb 2005 www.dti.gov.uk/about/foi/documents/ocns.pdf
- [10] "Nuke Bomb Plot" by Alan Rimmer, Sunday Mirror, 16th October 2005
http://www.sundaymirror.co.uk/news/tm_objectid=16254342&method=full&siteid=62484&headline=nuke-bomb--plot--name_page.html
- [11] "Nuclear Link to Terror Suspects", BBC 14th November 2005
<http://news.bbc.co.uk/1/hi/world/asia-pacific/4434270.stm>
- [12] "Chechen attack was grandiose attempt to copy September 11" by Andrew Osborn, Independent 29th October 2005.
<http://news.independent.co.uk/europe/article323186.ece>
- [13] "Nuclear stations 'remain vulnerable'", Ananova 17th September 2001.
- [14] "Nuclear Terrorism" by Ira Helfand et al, *BMJ* 9th February 2002; 324:356-359
<http://bmj.bmjournals.com/cgi/content/full/324/7333/356#B3>
- [15] "Assessing the risk of terrorist attacks on nuclear facilities" Parliament Office of Science and Technology Report 222, July 2004
<http://www.parliament.uk/documents/upload/POSTpr222.pdf>
- [16] as [15] POST
- [17] "Nuclear analyst highlights risks of terror attack at power plants", Nuclear Free Local Authorities Press Release 7th March 2005
http://www.nuclearpolicy.info/Latest_News/Pr05/050307.htm
- [18] East Anglian Daily Times 14th ,17th & 18th October 2005
- [19] "Nuke Train Wait is Loco" by Alan Rimmer, Sunday Mirror 30th October 2005
http://www.sundaymirror.co.uk/news/tm_objectid=16311796&method=full&siteid=62484&headline=loco---name_page.html
- [20] "Nuclear accident planning plagued by 'recurring failures'" by Rob Edwards, Sunday Herald, 21st August 2005, <http://www.sundayherald.com/51386>