Energy law and policy issues: A critical analysis of the recurring law and policy issues of nuclear power as an alternative source of low-carbon in the United Kingdom.

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ENERGY LAW AND POLICY ISSUES: A CRITICAL ANALYSIS OF THE RECURRING LAW AND POLICY ISSUES OF NUCLEAR POWER AS AN ALTERNATIVE SOURCE OF LOW-CARBON ENERGY IN THE UNITED KINGDOM

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STATEMENT 1

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SUMMARY

This thesis analyses the recurring law and policy issues of nuclear power as an alternative source of low carbon energy supply in the United Kingdom (UK). In so doing, it starts by examining the justifications for the use of nuclear power in the twenty-first century. These include: the issue of climate change and energy security; both of course have been extensively debated at the international and national levels to require urgent action.

However in light of the recent Fukushima nuclear power disaster in Japan, this thesis explains that there has been a rethinking of the use of nuclear power by some countries, while others such as the UK are adamant to expand its use despite the safety concerns that are associated with it. Against the background of these concerns and its inherent issues, I consider in depth the various international, European Union (EU), and national regulations that are applicable to the safe use of nuclear power.

Thus, this thesis concludes that these safety concerns and its inherent issues must be addressed for nuclear power to have a place in the UK society.

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FOREWORD

Nuclear power has been talked about for decades because of its environmental attractions as nations are beginning to fret about the effects of the approaching scarcity of energy from fossil sources that take millions of years for their renewal, and also the concern over climate change. The development and use of nuclear power is, therefore, one of the solutions expected to solve these enormous problems.

A comparison of government awareness reinstates that nuclear power is a preferred solution to the issues of climate change and energy security. For example, the European Union (EU) proposed a transparent and objective debate on the future role of nuclear power for those Member States concerned. So also is the United Kingdom (UK) government, which has concluded that nuclear power has a role to play in energy generating mix alongside other low carbon generating options. Having said this, the nuclear power option is in danger of being phased-out. Beside the impacts of the Chernobyl nuclear disaster which casts doubts on the continuous use of nuclear power, the recent Fukushima nuclear disaster in Japan has also impacted the way the public and the government of some nuclear states see the use of nuclear power. Of course and as explained in this thesis, this is in contrast to the situations in the early 1950s where nuclear power was seen as an attractive source of energy supply.

As to the above, the more obvious concerns which the Fukushima nuclear power disaster clearly illustrates are the risks that are associated with the use of nuclear power which sometimes appear too great to comprehend. As a result, it is of great concern for lawyers and environmentalists that these risks may present some legal and practical challenges in environmental risk regulation. With regards to this, one is poised to analyse the law and policy issues of the safe use of nuclear power.

My analysis of the UK nuclear power safety regulations on one hand also matches the actual importance of nuclear power in the UK considering the slow growth of other low carbon sources of energy. On the other hand, the reason for my choice of country also lies in the fact that despite the safety concerns that are associated with the use of nuclear power (these include: the risk of the occurrence of a catastrophic disaster;

the release of radioactive materials during the transportation of nuclear materials; some substantial national security issues; and also, the risk of the release of radioactive materials from nuclear waste) the arguments for its development remains the same in the UK. From this stand point, one area that has been analysed specifically is the issue of nuclear waste management because it appears not to reflect developments of the safe use of nuclear power in the UK. As such, this thesis considers this aspect as the foremost and currently insurmountable concern of the development and use of nuclear power in the UK. This even becomes more interesting as it is yet to be seen whether recent developments in nuclear waste management in the UK can actually succeed in addressing the waste challenges and promote the development of nuclear power, perhaps to include also the issue of public acceptability of its risks.

In light of the above, my aim is to contribute to the study of nuclear safety in the UK. In so doing, what this thesis does is to examine the justification of the use of nuclear power and the scale of challenges that beset the nuclear power industry, upon which it then examine a number of nuclear power safety regulations at both the international, EU and national level.

CHAPTER 1

NUCLEAR POWER, CLIMATE CHANGE AND ENERGY SECURITY

1.1. INTRODUCTION

This research attempts to give answers to the "problem of legitimacy" arising from the development and use of nuclear power as an alternative source of low carbon energy supply in the United Kingdom (UK). By saying "problem of legitimacy", this research examines the concern over the safe use of nuclear power. This is of great importance because energy plays an important role in the economy of all nations as it is used in almost all daily human activities such as transportation, domestic heating and electricity. Arguably, just like transportation or other core major infrastructural sectors of the economy, if the energy industry does not function, much of the rest of the economy cannot function.

Having noted the relevance of energy, it should be noted that societies have always sourced for various means of generating the required energy to cater for their needs. The common source of energy supply is through carbon fuels – particularly, coal, petroleum, and natural gas. However more recently, nations are now beginning to seek alternative means because of the environmental concerns that are associated with the use of carbon sourced energy as well as energy security concerns. This stems on one hand from the fear that carbon source energy is being depleted and that it would take millions of years to be renewed. The second concern stems from the impact of carbon fuels on climate change.

Regarding the climate change concerns, the Inter-governmental Panel on Climate Change[1] (IPCC) established in 1988 by the World Metrological Organization (WMO) and the United Nations Environmental Programme (UNEP) which provides information relating to global warming, concluded that it is likely that anthropogenic warming has had a discernible influence on the environment. It also concluded that the most observed

[1] Alcamo, J., et al, *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* M.L. Parry, et al, Eds., (Cambridge University Press, Cambridge, UK 2007)

increase in the globally average temperature is very likely due to the observed increase in human-induced activities in Green-House Gas (GHG) concentrations, to which coal fired power stations and burning of fossil fuels make a significant contribution. The IPCC report states that the effects of temperature increase affect marine and freshwater biological systems; snow ice systems (that is, melting glaciers and changes in the arctic system); hydrologic systems (increased and earlier runoff and warming of waters); and terrestrial biological systems (earlier springs, pole ward and upwards shifts in ranges of plants and animals). The report adds that further future impacts of climate change are projected to be increased droughts in many areas, increased frequency of heavy precipitation and flooding, increased extinctions and also death and injury to humans.[2] Findings also reveal that Europe is sensitive to extreme condition of climate change. For example, there may be extreme seasons particularly exceptional hot and dry summers and wild winters, short duration events such as windstorms and heavy rains, long-term changes in climate which among other impacts, will put particular pressure on coastal areas.[3] In addition to this, the environmental effects of climate change have also been linked to both global and national security. There are arguments that the varying impacts of climate change such as the rising sea levels, widespread shortages of food and water, and other driving migrations presents climate change as a more serious issue in the fragile parts of the world. This is based on the assumption that the likely social, political and economic consequences of the impacts of climate change might in turn interact with each other and lead to further challenges such as environmental insecurity and conflict.[4]

On the other hand, the debate about the security of energy supply has also risen up the global energy policy agenda during the past few years. There are many reasons for this. This includes the rapid increases in oil and gas prices, heightened awareness of terrorism, national security concerns in oil producing countries (for example, tension in the Middle East), and the blackouts that have hit several security networks. The key

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[2] Ibid, Chapter 17
[3] Ibid
[4] Paper from the High Representative and the European Commission to the European Council, *Climate Change and International Security*, 14 March 2008, S/113/08. Page 2

threats are however the price of energy and its availability.[5] Also in particular jurisdictions such as the UK, energy security has been driven by the decline in coal production and projections of declining production of oil from the North Sea. This has resulted in projections of rapidly rising dependence upon imported fossil fuels.[6]

In light of the above, there are arguments that by providing domestic supplies of electricity through low carbon energy sources the government could reduce the concerns over climate change and energy security. Helm[7] for example argues that using nuclear energy may on one hand ease Europe's growing gas dependency from Russia, and over time as electricity provides a greater share of the transportation sector, it will also reduce reliance on oil imports too. On the other hand, he adds that the use of nuclear energy may also help mitigate the environmental effects of climate change because it is one of the very few large-scale deployable technologies producing low carbon energy.

In this regard, there is a continuous worldwide debate as to whether nuclear energy really addresses the above carbon concerns. The position of the UK government is that it does. This has been encouraged by the expected closure of most of its existing nuclear power stations by the year 2023 as they reach the end of their expected working lives, coupled with the possible closure of coal and oil power stations over the next decade. The government maintains that without existing nuclear power stations, the UK's total annual carbon emissions from all energy use would be 5-12% higher than they are today if gas or coal power stations had been built instead.[8] In its Nuclear Energy

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[5] J. Watson and A. Scott, *New Nuclear Power in the UK: A Strategy for Energy Security?*, Upergen/RCEP/UKERC Conference: Sustainable Energy UK: Meeting the Science Engineering Challenge, (Oxford, May 2008)

[6] M. Grubb, et al, *Diversity and Security in UK Electricity Generation: The Influence of Low Carbon Objectives*, University of Cambridge (Cambridge Working Papers in Economics), available at <http://www.dspace.cam.ac.uk/bitstream/1810/131626/1/ep74.pdf> last accessed 10 November 2011

[7] D. Helm, Nuclear Power, Climate Change, and Energy Policy, in D. Helm and C. Hepburn, The *Economics and Politics of Climate Change*, (Oxford University Press, Oxford 2009) 253

[8] Department of Business, Enterprise and Regulatory Reform (BERR), *Meeting the Energy Challenge: A White Paper on Nuclear Power*, CM 7296, (The Stationery office (TSO), 2008) Para. 14. Oldbury 1 and 2(started operation in 1968 and it is expected to shut down by February 2012; Wylfa 1 and 2 (started operation in 1971-2 and expected to shut down by the end of 2012 or September 2014; Dungeness B 1 and 2 (started operation in 1985-6 and it is expected to shut down 2018); Hartlepool 1 and 2 (started operation in 1984-5 and it is expected to shut down 2019); Hinkley Point B 1 and 2 (started operation in 1976-8 and it is expected to shut down by 2016); Sizewell B (started operation in 1995 and it is expected to shut down by 2035) – See World Nuclear Association, '*Nuclear Power in the United Kingdom*' at <http://www.world-nuclear.org/info/inf84.html> last accessed 11 of August 2011

White Paper, the government adds that "nuclear energy should have a role to play in the country's energy portfolio alongside other low-carbon sources in meeting green house gases (GHG) emissions targets, and that it would be in the public interest to allow energy companies the option of investing in new nuclear power stations, with the government taking active steps to facilitate this".[9] While this is the UK's current view on the use of nuclear energy, it should be remembered that this is not the first time the government is treading the nuclear path.

In the 1950s, the UK government embarked on a programme of nuclear power for electricity generation. It published a White Paper[10] – "*A Programme for Nuclear Power*" which highlighted the growing energy demand and proposed three programmes in it.[11] It is also during this period that cooperation among European States in nuclear energy production began. This ultimately led to the creation of the European Atomic Energy Community Treaty 1957,[12] signed by six founding members namely: Belgium, France, Germany, Italy, Luxembourg, and Netherlands. At this point, nuclear energy seemed to be the fuel of the future and the Joint European action on the nuclear front appeared as an attractive prospect in the mid-1950s to reduce dependence on Middle East oil and American coal, and also the worries of the cutting off of Europe's oil supplies in the wake of the 1956 Suez crisis.[13]

Having said this, the use of nuclear energy has nevertheless been on the back foot for some time now because of environmental safety concerns such as the proliferation of nuclear materials and reactor accidents which exposes humans to the various risks that are associated with the use of nuclear energy. The problem of proliferation is the risk of the production of nuclear weapons to cause havoc to the

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[9] Ibid, p.7. See also: House of Lords Select Committee on Science and Technology: *Nuclear Research and Development Capabilities: 3rd Report of Session 2010-2012* (TSO, London. November 2011)

[10] Ministry of Fuel and Power, *A Programme of Nuclear Power*, (1954-55) (Cmd. 9389) HMSO

[11] The first programme dealt with the construction of two nuclear power stations which were to start in mid 1957, followed by the construction of two further power stations in 1958, and the third programme was a proposed construction of four more stations which were to commence in 1960 with a further two in 1961. Note: the government also published – *The Second Nuclear Power Programme*, (1964) (Cmnd. 2335) HMSO

[12] The European Atomic Energy Community Treaty (EURATOM) 1957

[13] M.J. Dedman, *The Origins and Development of the European Union 1945-95*, (Routledge, London 1996) 98

environment. This includes the destructive use of nuclear power through the act of terrorism. This has gained global condemnation, and it remains one of the leading issues on the international security agenda that was created by the end of the Cold War and the break-up of the Soviet Union.[14] With respect to reactor accidents there is a fear of the release of radioactive materials into the environment and this has been heavily scrutinised by the public over time especially after incidents such as the Windsacle accident of 1956, the Three Mile Island accident (TMI) of 1979 and of course the Chernobyl disaster of 1986. These accidents and other environmental safety concerns have however led to the creation of various nuclear power laws and policies as a response.[15] In part also, the creation of these laws and policies has not only served as a constraint to the development of nuclear energy but in some instances promote its development.[16] In what turns out to be a more recent event is the Fukushima nuclear power disaster in Japan which put these nuclear power laws and policies back into the spotlight.

For present purposes, the extent to which the Fukushima nuclear power disaster may impact environmental safety concerns of the use and development of nuclear power is better construed through an examination of the events prior, during, and after the disaster.

1.2. THE FUKUSHIMA NUCLEAR DISASTER AS A MATTER OF PERSPECTIVE

The earthquake and tsunami waves that struck Japan on March 2011 led to widespread devastation across a large part of Japan, with more than 14,000 lives lost and at least 10,000 people remain missing, with many more being displaced from their homes as towns and villages were either destroyed or swept away. As well as other industries and economic infrastructures, several nuclear power facilities were affected by the severe earthquake and large multiple tsunami waves; The Tokai, Higashi Dori, Onagawa, and

[14] M. B. Maerli and S. Lodgaard, Nuclear Proliferation and International Security,(Routledge, London 2007) 2

[15] For example, see Chapter Four below for international conventions and regional safety measures adopted after the 1986 Chernobyl disaster

[16] P. Cameron, 'The Revival of Nuclear Power: An Analysis of the Legal Implication', *J. Environmental Law* (2007) 19 (1): 71-87, 14

TEPCO's Fukushima Dai-ichi and Dai-ni nuclear power plants were all affected. The large tsunami waves affected all these nuclear facilities to varying degrees, with the most serious consequences occurring at TEPCO's Fukushima Dai-ichi.[17] The disaster however surpassed other nuclear power disasters in that it shows a new way in which nuclear power disasters may occur.

Due to the large tsunami waves that swept through the Japanese province, the disaster was principally a result of flooding. At the time of the earthquake, the three reactors operating at Fukushima shutdown automatically and the shut down cooling systems commenced as they were designed to do until some minutes later when the tsunami hit the site. As a result, all power to the cooling systems for the reactors and reactor fuel ponds were lost including that from backup diesel generators. Consequently, the operators were faced with unprecedented operational difficulties with no power, reactor control or instrumentation, and severely affected communications systems both within and external to the site. They had to work in darkness with almost no instrumentation and control systems to secure the safety of the reactor, associated fuel pool, and spent fuel storage facilities. With no means to control or cool the reactor units, the reactor units that were operational up to the time of the earthquake quickly heated up due to usual reactor decay heating. Despite the brave and sometimes novel attempts of the operational staff to restore control and cool the reactors and spent fuel over days, several large explosions and fires occurred. This was as a result of the fuel heating up the fuel cladding, and reacting with water, steam, and hydrogen being released. The explosions caused considerable damage to the reactors as the site struggled to put cooling water into the reactors and the reactor fuel ponds by previously untried and unplanned means for over a week. These explosions caused further destruction at the site, making the difficulties faced by the operators even more demanding and dangerous, with radioactive materials also spreading into the environment. These events were later determined by the International Atomic Energy Agency (IAEA) to be of the highest rating on the International Nuclear Event Scale.[18]

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[17] IAEA, Fukushima Nuclear Accident Update Log. Available at <http://www.iaea.org/newscenter/news/tsunamiupdate01.html> accessed last 15 September 2011

[18] Ibid

Earlier on in the chain of events, the Japan authorities instigated severe measures around the site area. It imposed a 3km evacuation zone, then a 10km zone, and later a 20km mandatory evacuation zone around the sites, including the evacuation of people from certain more distant towns and villages. In similarity to the Chernobyl disaster, there were also restrictions on agricultural food stuffs and drinking water at distances more than 100km, and further measures on environmental monitoring and its evaluation.[19]

Arguably, the impact of the earthquake and tsunami on the Japanese nuclear plants was no surprise. This is because of the nature and design of the nuclear reactors at Fukushima which shows the lack of preparedness for a nuclear disaster. The tsunami which was larger than 14 meters high and was clearly in excess of the design of the Fukushima plants which is only designed to withstand tsunami waves of approximately 6 meters high.[20] Ideally in this regard, one would have thought that the Sumatra-Andaman earthquake in the Indian Ocean, with an estimated 9.2 magnitude resulting to a tsunami that caused more than 200,000 fatalities, should have provided adequate evidence to Japan's nuclear regulators that wide spread and unimaginable devastating earthquakes are possible along the Pacific Rim, and that facility accident response capabilities should be strengthened against this kind of natural threat.[21] In addition to this, the fact that the reactors was also designed to accommodate spent fuel in ponds on site may have exacerbated the impact of the disaster. For example, hundreds of thousands of tons of highly radioactive spent fuel rods were stored on site just like most of other nuclear power nations, and it is believed that a number of spent fuel related activities were also carried out on site at any particular time. With these activities been carried out on site, it was clear that a catastrophic disaster was inevitable as the tsunami

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[19] IAEA <http://www.iaea.org/newscenter/focus/fukushima/japan-report/chapter-5.pdf> last accessed 1 November 2011

[20] M. Ragheb, Fukushima Earthquake and Tsunami Station Blackout Accident, available at <https://netfiles.uiuc.edu/mragheb/www/NPRE%20402%20ME%20405%20Nuclear%20Power%20Engineering/Fukushima%20Earthquake%20and%20Tsunami%20Station%20Blackout%20Accident.pdf> last accessed 10 December 2011

[21] H. L. Hall, Fukushima Daiichi: Implications for Carbon-Free Energy, Nuclear Non-proliferation, and Community Resilience, *Integrated Environmental Assessment and Management*, Vol.7, No.3, pp.406-408, 406

waves, which reached areas deep within the reactor units, left little hope of assistance in shielding the spent fuel stored on site.[22]

Surely it is too early to fully determine the effects (to include trans-boundary effects) of the Fukushima nuclear power disaster because threats of these kinds have unknown effects that often take years to manifest. The disaster nevertheless provides a strong argument for reconsidering nuclear power policy among different countries. It has been a warning sign to alert countries that had been planning to build new nuclear power plants, or extend the lives of existing ones, about the risks and spatial dimension of the dangerous situations that may arise from a nuclear power disaster. As a matter of fact, the disaster has helped these countries to rethink their plans on how best to protect their citizens from not only the possible effects of the trans-boundary release of radioactive materials into the environment as a result of a nuclear disaster, but also to prevent any future nuclear power disaster from occurring. For example, China which is developing no less than twenty-seven of the world's sixty-two new reactors have proclaimed a suspension of nuclear expansion programme. In response to the aftermath of the Fukushima disaster, the government has suspended the approval of all new nuclear power stations, with further plans to carry out comprehensive safety checks on all existing plants, and also review all nuclear projects including those under construction.[23] Reports however indicate that China would still continue with its plan to build further nuclear power stations because the government believes that Chinese nuclear power stations are newer and safer than those in Japan.[24] So also is the United States (US) which announced that it would conduct a review of its nuclear power reactors so as to identify obvious and potentially critical issues posed by the Fukushima disaster, and then a longer term assessment to identify other less obvious issues.[25] On the other hand the UK, which currently has a programme to commission eleven new reactors, also kept the situation in Japan under review. Based on its policy to favour nuclear power, it is not surprising that the government in its Fukushima report concluded that the situation in

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[22] M. Ragheb, n 20 above

[23] Foreign and Commonwealth Office, *China Nuclear: Response to Fukushima*, (British Embassy Beijing, March 2011)

[24] Ibid, Para. 2

[25] C. Clement-Davies, The After-Shocks of Tsunami: Nuclear Loss and Renewable gain? *I.E.L.R.* 2011, 3, 63-64, 63

Japan does not have any substantial implication on its nuclear industry, but admitted that this does not stop the industry from taking further preventive measures both for natural accidents along coastal regions in relation to erosion and flooding possibilities.[26] Despite the regulator's assurance that a nuclear accident on the scale of Fukushima could never happen in the UK mainly because of its geographical location, it is nevertheless still a matter of concern that the risks of accident from operation of nuclear reactors cannot be completely ruled out. This is because of human behavioural factors in operation management which may induce accidents. Also because most of the functioning reactors in the UK are not of modern design; although they are of different design from those used at Fukushima. This is based on a shared stand point of nuclear pioneers (to include the government) that modern nuclear reactor designs are expected to reduce the very small risks of accident still further.[27]

Also within the sphere of environmental protection from the harmful effects of the risks of nuclear power, anti-nuclear groups in the form of the wider public[28] and Non-Governmental Organisations (NGOs) continue to argue to halt its development in that the environmental negativities attached to the use of nuclear power makes it unsafe no matter where the reactors are built or how they are built.[29] As explained further in this thesis, the involvement of these groups in nuclear safety discourse is a material consideration in terms of decision-making and the acceptability of the use of nuclear power.

1.3. THEMATIC STRUCTURE

Considering the sequence of events above, this research argues that the safety issues of nuclear power recur and as such may hinder its development as an alternative source of low-carbon energy supply; with an attempt to find a solution to these issues at the international, regional, and national level. The reason for this is because it is clear that

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[26] Office for Nuclear Regulation, *Japanese Earthquake and Tsunami: Implications for the UK Nuclear Industry: Final Report*, September 2011. Available at <http://www.hse.gov.uk/nuclear/fukushima/final-report.pdf> lasted accessed on 4 November 2011. See: Para. 386-401, 549, and Annex F respectively

[27] DTI (2006), *Energy Review. The Energy Challenge*, (Cm 6887) July, HSMO. Para. 5.121

[28] European Commission, EUROBAROMETER 234: *A Report on Europeans and Nuclear Safety*, March 2010. Page 11

[29] Greenpeace International, "Safety" <http://www.greenpeace.org/international/en/campaigns/nuclear/safety/> last accessed 20 November 2011

there are still major environmental safety concerns associated with the use of nuclear power. The Fukushima disaster has shown that there are important safety lessons to be learnt, and ideally such safety lessons should ultimately help in shaping further our understanding of how to prevent and manage a nuclear power disaster.

As to the above, this research examines: the inherent characteristics that make nuclear power distinct from other low carbon sources of energy; the role of law in ensuring the safe use of nuclear power; the adequacy and effectiveness nuclear power safety regulations; and whether we need to review these safety regulations.

In addressing these issues, this research is divided into six chapters, this introduction being the first. Chapter Two is risk-based and it examines societal responses to the risk of nuclear power. It looks at the risk of nuclear power as a social issue; and the approach taken in environmental risk decision-making, to include inherent issues such as public participation. Chapters Three and Four looks at the legal responses to the risk of nuclear power. However to avoid repetition, the former examines the principles of environmental risk regulation. It starts by examining the various risks that are associated with the use of nuclear power, so as to put into context the principles of environmental risk regulation in light of the threats posed by these risks. The latter however examines nuclear power safety regulations. It looks at international, EU, and national nuclear safety regulations, so as to determine whether there is need for regulatory review. Chapter Five is a case study. It looks at the UK nuclear power planning regime and the issue of public participation which is far becoming an unavoidable part of discussions on the development of nuclear power. Chapter Six which is the conclusion summarizes the arguments of all chapters.

CHAPTER 2

SOCIETAL RESPONSES TO THE RISK OF NUCLEAR POWER

2.1. INTRODUCTION

As discussed in the introductory part above, the defining features of this century, that is, the issue of climate change and energy security has changed nuclear power's place in the UK. This should not come as a surprise. It is because nuclear energy has been tipped to reduce the concerns of global warming caused by self induced human activities in the environment, and also to help in the diversification of energy supply. However while nuclear energy may stand to address these concerns, there are arguments that nuclear energy is not entirely carbon free. For example, Ping argues that in energy production, use, and disposal, "There Ain't No Such Thing as a Free Lunch" (TANSTAAFL). In his analysis, he explains that no form of energy provides us a "free lunch" energy use that is free from negative environmental, public health, and other social costs. With no exception, he argues that nuclear energy produces carbon from the mining of uranium, to the transportation of nuclear materials, and also in the construction of nuclear reactors.[1] Nonetheless, one may still find it easy to contend that nuclear energy is far less carbon consuming because it produces carbon only from the processes mentioned above, and not in reactor operation.

Having said that, the inherent characteristics of the environmental risks that are associated with the use of nuclear energy clearly differentiates it from other fossil or low carbon energy source. These include: risk to human health, the environment, and national security; and they are present in the different stages of the nuclear process starting from uranium extraction, to fuel fabrication, to accidental release from plant sites, to transportation accidents, and nuclear waste.[2] The outcome of the existence of these risks has been that in general, fear has alternately preoccupied the minds of the wider public, and as a result there are varying views on the continuous use of nuclear

[1] G Pring, A. Hass and B. Drinkwine, 'The Impact of Energy on Health, Environment, and Sustainable Development: The TANSAAFL Problem' in D Zillman, and Others, (Eds) *Beyond the Carbon Economy*, (Oxford University Press, Oxford 2008) 15. The adage TANSFAAFL means individuals and societies cannot get something for nothing.

[2] Ibid. See Chapter Three below for further analysis of the risks of nuclear power

energy. The accidents of Windscale, the TMI, the Chernobyl, and the Fukushima nuclear power disaster have seemed to ignite their fears as it shows that there are unavoidable risks across national boundaries. In this regard, there is also continuous opposition by Non-Governmental Organisations (NGOs) towards the development of nuclear power, and it seems inevitable as it is with most major environmental infrastructural projects that the participation of these groups may continue to lead to legal challenges in various aspects of its development of nuclear power.[3] At the same time, the nature of the risks that are associated with nuclear energy and the participation of both the NGOs and the wider public, also broaden the possibility for environmental re-examination of risk, with increasing questions of risk more likely to be raised in the various nuclear development processes.

However in the present context, it is more or less impossible to have any discussion on risk without discussing Beck's influential theory of the "risk society".[4] His work put into context the heightened concern over risk, particularly technological risks as it is based on the idea that post-industrial risk which is caused by innovations in science and technology is far more multifaceted than that of pre-modernity.

Beck's contribution that the risk we face in contemporary society are manufactured[5] coupled with our wider understanding of the risks of nuclear power opens a discussion on risk in the twenty-first century. This chapter thus examines the societal responses to the risk of nuclear power in the UK. How these responses affect the acceptability of risk and the development of nuclear power also remains an objective within the premise of this chapter. In so doing, it is divided into three parts. Across these parts, I focus respectively on risk as a social issue; how we deal with risk in the society; and also the issue of public participation and the acceptability of risk.

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[3] For example, see Chapter Five of this thesis for discussion in environmental planning context. Also, S. Tromans, Nuclear Waste Management and New Build, *Environmental Law Review*, Vol. 11, Iss. 4 (2009) 233-245, 233

[4] U. Beck, *Risk Society: Towards a New Modernity* (Sage Publications, London 1992)

[5] Giddens refers similarly to contemporary risks as 'manufactured risk'. See A. Giddens, '*Risk and Responsibility*', (1999) 62 Modern Law Review 1-10, 4

2.2. RISK AS A SOCIETAL ISSUE

Risks both natural and man-made are part of the human society. We seem to be bombarded with risk and information about risk because there is a degree of risk in everything we do. For example, there is risk in the mode of travel we embark on, in the food we eat and also in the air we breathe. As a consequence, we are afforded with opportunity to participate in environmental risk discussions and perhaps to examine scientific/technical information;[6] either through active or passive engagement.

Where nuclear energy is concerned as an example, the public view is that its use for electricity generation poses risks to the environment.[7] Attention has however been drawn to this and it is continuously been argued by nuclear pioneers and regulators that nuclear material and technology also hold the promise of significant benefits in a variety of fields, from medicine to the agricultural industry.[8] Nonetheless, there is still wide spread disbelieve among the public.

To gain further understanding of risks that are imposed on societies as a whole, attention will now be drawn to Ulrich Beck's contribution. For sociologists such as Beck, a central feature of contemporary society is the introduction of risks. In his seminal work, he argues that new technologies and their related risks are creating a new era of advanced modernity that we live in, and as a result he adds that the society is freeing itself from the formations of the classical industrial society and establishing a

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[6] J. Parkins and R. Mitchell, 'Public Participation as Public Debate: A Deliberative Turn in Natural Resource Management', *Society and Natural Resources* (2005), 18: 529-540, 531

[7] Parliamentary Office of Science and Technology, Public Opinion on Electricity Options, October 2007, Number 294

[8] IAEA, <http://www.iaea.org/Publications/Factsheets/English/radlife.html> last accessed 14 October 2011. Note: there are other environmentalists who support the use of nuclear energy with perhaps considerable expertise. An example James Lovelock, a writer, scientist and an advocate of nuclear power who is hardly mainstream with his ideas gave his view that radiation does not affect wild plants and animals. While this may sound too extreme to anti-nuclear groups, he backed up his writing by arguing that the best sites for nuclear waste disposal are the tropical forests and other habitats in need of a reliable guardian against their destruction by hungry farmers and developers. In his recent publication, he adds that unreasoning fear prevents an immediate build of new power; voicing out concerns over what he referred to as 'concatenation of lies', and that the risks associated with nuclear power are massively exaggerated. He concluded that while nuclear power may not be an ideal solution to the problem of non-polluting power sources in respect to the waste produced, it is the most efficient at present if handled properly. See J. Lovelock, The *Revenge of Gaia: Why the Earth is Fighting Back – and How We Can Still Save Humanity* (Penguin Books, London 2006) 91; and also, J. Lovelock, *The Vanishing Face of Gaia: A Final Warning* (Penguin Books, London 2009)

new phase. This phase he called the "risk society"; which is also a third stage of his analysis on social change, following pre-modernity and simple modernity as reflexive modernity.[9]

In his analysis, Beck explains that the risk society is a new phase of development where the logic of risk production and distribution replaces the logic behind wealth. At the same time, he agrees that risk is not new in the society; however, he argues that techno-scientific risks are different.[10] In so doing, he puts forward an interesting claim. He contends that in pre-modernity, social order was centred on the distribution of goods which were directly tied to social class; while the risk society is no longer concerned with this distribution of these goods but rather with the distribution of risks that poses far greater hazards because of their global nature. It is to this that he was able differentiate the hazards of early modernisation which includes famines, plagues and other natural disasters which he perceived as non-human forces that have been continually reduced compared to those that are associated with the risk society, which includes environmental hazards such as radiation exposure, toxins, and the risks inherent in our everyday lifestyle, which are introduced by industrial decisions on the development of agents such as nuclear power and genetic modified organisms (GMOs).[11]

Although Beck did not explicitly suggest that the risk society is more hazardous than the pre-modern society, he however argues that contemporary risks challenges the basis of calculations of environmental risk.[12] That is, a situation where risks elude the control and protective measures of the society. Arguably, this is an important point where one agrees with Beck when assessing the effects and impacts of risk in the society. For example, there is little doubt that the characteristics of a nuclear disaster has pointed out to a symbol of risk society where everyone is potentially exposed to man-made technological disasters.[13] That is, nuclear power has created a global connectivity through the creation of risks that we are all exposed to. Surely, this may be in the event

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[9] U. Beck, n 4 above 9
[10] Ibid
[11] Ibid 183
[12] Ibid 22
[13] A. Liberatore, *The Management of Uncertainty: Learning From Chernobyl*, (Gordon and Breach Publishers, Amsterdam 1999) 2

of the occurrence of the release of radioactive materials into the environment from nuclear power installations which affects the society at large. For example, there are signs that there are still a number of farms that are affected by the aftermath of the Chernobyl nuclear disaster across Europe. Indications are that, places such as Cumbria in England are still being tested for radiation twenty three years after the incident which polluted the ground with radioactive substances.[14] Additionally, it is also the case that these risks have uncertain distributional effects on the environment as they are not contained in one locality.[15] In their nature, they may be unpredictable and catastrophic but when they occur they have no regard for members of society. This is perhaps what Beck explains as new forms of risk which can act back upon the producers of risk in the society. According to him, these risks sooner or later strike those who produce or profit from them, and that the rich, poor, and powerful members of the society are not safe from their effects because they are hazards that affects the whole society equally.[16] In other words, everyone is a potential victim in the risk society. Considering the uncertain nature and spatial dimension of contemporary risks as seen here, it is not surprising that Beck argues that these risks challenge society control measures. Arguably, this is because as seen in Chapter 3 below, it is still the same society which has developed management basis for dealing with visible problems such as famine that will also adapt itself to address the invisible problem of risk that is created by the society itself. As such, it is perhaps right to say that the society is pressurised to minimize risks and manage them effectively.

In sharing Beck's view, Giddens adds that these risks are expanding in most dimensions of human life. He agrees that risk is associated with a side of science and technology which the early industrial society did not foresee, and that science and

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[14] Andrew Simms, 'Unnatural Disasters' available at <http://www.guardian.co.uk/environment/2003/oct/15/guardiananalysispage.climatechange> accessed 8 September 2010. There are also indications that nuclear power causes a problem it cannot resolve. An example is the radioactive contaminated areas in Scotland will remain polluted despite attempts made. See: R. Edwards, Scottish Nuclear Fuel Leak 'will Never be Completely Cleaned up', available at <http://www.guardian.co.uk/environment/2011/sep/21/scottish-nuclear-leak-clean-up> assessed 22 September 2011

[15] S. Jasanoff, *Learning from Disaster: Risk Management After Bhopal* (University of Pennsylvania Press, Philadelphia 1994) 122

[16] Beck n 4 above 23

technology create many uncertainties which cannot be solved in any simple way by yet further scientific advance.[17] So also is Luhman who accepts that we live in a society that has no choice but to run risks; although his view on critical sociology of risk varies.[18] However, the concern over risk management takes us back to the fundamental question of environmental safety measures because safety and risk run alongside. As discussed further below for present purposes, any ineffectiveness in dealing with technological risk may lead to lack of public confidence in the government and consequently in environmental risk decisions that are made.

While it has been established above that Beck's theory brings to fore the formation of contemporary risks, it has however not been without criticisms. Turner[19] for example argues that Beck's arguments would be to suggest that risk has not changed so profoundly and significantly over the last three centuries. For example, he questions whether the epidemics of syphilis and bubonic plague in earlier periods are different from the modern environment illnesses to which Beck draws our attention; or whether his criteria of risk, such as their impersonal and unobservable nature, really stand up to historical scrutiny. Besides, some commentators also find Beck's theory of the risk society difficult to recognise in that it lacks empirical studies. For example, Olofsson and Ohman[20] carried out a survey by comparing people with different life contexts and experiences, so as to investigate how these people view risk, and if new risks are perceived differently. Their findings reveal that new risks are not something people worry about, and that risk is associated with personal experiences and life context. As such, they argue that this indicates a traditional or at least modern way of viewing risk, and it contradicts the idea of Beck's view of risk.

Nevertheless, Fisher[21] points out that the nature and existence of the distributional effects of technological risk often depends on human behaviour. She explains that a cause of any particular adverse effect may be the combination of

[17] A. Giddens, n 5 above 4
[18] N. Luhmann, *Risk: A Sociological theory* (Walter de Gruyter & Co., Berlin 1993) 218
[19] B.S. Turner, *Orientalism, Postmodernism and Globalism* (Routledge, London 1994) 180
[20] A. Olofsson and S. Ohman, Views of Risk in Sweden: Global Fatalism and Local Control-An Empirical Investigation of Ulrich Beck's Theory of New Risks, *Journal of Risk Research*, Vol. 10, No. 2, 177-196, March 2007
[21] E. Fisher, *Risk Regulations and Administrative Constitutionalism* (Hart Publishing, Oxford 2007) 8

mutually interacting variables, such as that of the TMI and Chernobyl disasters, where accidents occurred due to numerous inter-linked factors including management, maintenance, operational error and technical failures, and the design of the technology. The Fukushima disaster however raises further concern by identifying a new way in which risk may occur. The earthquake and tsunami disaster that struck Japan and cut out the electricity that powers the cooling system of Fukushima nuclear reactors demonstrate that the occurrence of technological risks may also be triggered by both natural disasters and human behaviour. As a result, it is far more apparent that we do not fully understand the nature of the occurrence of the risk that we face even though we may be able to estimate or predict their pattern of occurrence.

This therefore raises a dilemma in environmental risk analysis because it is obvious from the Fukushima nuclear power disaster that an accident can go beyond the imaginations of risk analysts. Also in specific context such as nuclear power, it has come to the fore that we can never rule out every possible human error, natural accident or unpredictable events.[22] Nonetheless, we may continue to develop preventative safety measures in the society. For example, the International Atomic Energy Agency (IAEA) in response to Fukushima disaster has suggested that technology designers and operators should appropriately evaluate and provide protection against the risks of all natural hazards; they should update assessments and assessment methodologies of new information, experience and understanding of the environment; and also, that severe long time combinations of external events should be adequately covered in design, operations, resourcing and other emergency arrangements.[23] The IAEA response is at the same time a recognition that human activity is of great importance and must be dealt with adequately in the society because it may exacerbate, avoid or even mitigate accidents.

[22] M. Venables, 'Nuclear power after Fukushima', *Engineering & Science*, vol. 6, issue 4, April 2011.
[23] International Atomic Energy Agency (IAEA), IAEA International Fact Finding Expert Mission of the Nuclear Accident Following the Great East Japan Earthquake and Tsunami, Tokyo, Fukushima Dai-ichi NPP, Fukushima Dai-ni NPP and Tokai NPP, Japan, 24 May – 1 June 2011, Preliminary Summary.

2.3. DEALING WITH RISK IN THE SOCIETY

According to Strydom,[24] the extended discussions that followed in the wake of the development of an atomic weapon at Los Alamos, the bombing of Hiroshima and Nagasaki, and Soviet and American atomic tests in 1949 and 1954 respectively, provided a pervasive background for environmental risk discourse. In brief, he explains that the contemporary risk discourse dates back to the 1950s in the era of nuclear power development which featured related questions about the safety of nuclear technology and its destructive potential which was largely conducted by experts. He adds that the increasing concern about the environment from the 1960's onwards however, saw a shift in environmental risk discourse from experts to include other social actors.

Strydom's analysis of risk discourse offers an overview of the shift in the approach of environmental risk discourse to include political engagement and the public rather than solely for the experts to instinctively decide. However, it should be noted that this development did not change the orthodox role of science in environmental risk analysis, but rather it complements the role of science and defies any understanding of risk as purely a domain for science or experts.

Indeed, a general conclusion which can be drawn from both past and recent debates in the European Union (EU) is that risk analysis is based upon the practice of scientific evaluation in the form of Risk Assessment (RA), and by political Risk Management (RM). These two processes feature a distinction between the role of science in informing decisions on the acceptability of an activity, and the political process to determine the necessary acceptability and regulatory action to be taken.[25] There are however ongoing debates as to the roles of both RA and RM processes. In arguing for an overhaul of this approach, commentators tend to align themselves into two groups. There are those who argue that science and expertise should be the primary basis for environmental risk decision-making and those who argue that democracy and

[24] P. Strydom, Risk, *Environment and Society* (Open University Press, Buckingham 2002) 13
[25] M. Douglas, *Risk Acceptability According to the Social Sciences* (Routlegde & Kegan Paul, London 1985)

ethical values should be the primary basis.[26] Below are some of the underlying issues of debates.

2.3.1. Risk Assessment

RA plays a vital role in the regulation of activities that can cause harm to the environment. Many environmental problems cannot be perceived, let alone understood or addressed without sophisticated scientific expertise. For example, this could be in addressing the consequences of global warming on the environment and also the identification of acceptable levels of environmental pollution.

In an illustrative manner, Ruckelshaus[27] defines RA as the scientific device that society has adopted to indicate the possible effects of risk, and an attempt to quantify the degree of hazard that might occur from human activities. Examples are the risks to human health and the environment from industrial chemicals. Going by this definition, the way in which scientific RA is approached means that it must form the starting point in considering responses to questions of risk. This scientific method indicates whether the risk of an activity is of a relatively well-understood type; and if it is unfamiliar, an attempt should be made to identify the most nearly analogous threats and the aspects which are not understood before considering whether to reject, accept, reduce the risk, or to mitigate the effects.[28] As it pertains to nuclear energy, the UK Nuclear Installations Inspectorate (NII) uses RA to determine acceptable levels of radiation in setting environmental and safety standards. In practice those who control the plant are compelled by regulation to carry out an assessment of the threats it poses before additional precautions are drawn upon.[29]

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[26] E. Fisher, n 21 above 12. See also: S. Breyer, *Breaking the Vicious Circle: Toward Effective Risk Regulation* (Cambridge, Mass, Harvard University Press, 1993). See also: K.S. Shrader-Frechette, *Nuclear Power and Public Policy: The Social and Ethical Problems of Fission Technology* (D. Reidel Publishing Company, Holland 1980) 153

[27] W. Ruckelshaus, 'Risk, Science, and Democracy', *Science and Technology*, (1985) Vol. 1, 19-38

[28] Department for Environment, Food and Rural Affairs, (DEFRA), *The Government's Response to the Royal Commission on Environmental Pollution's* 21st Report (November 2000) Para. 9.44

[29] Health and Safety Executive (HSE), *Safety Assessment Principles for Nuclear Reactors* (HMSO, 1982); and HSE, *Safety Assessment Principles for Nuclear Facilities* (HMSO, 2006). See also: Regulation 7(1) of the Ionising Radiations Regulations (IRR) 1999. IRR SI 1999 No. 3232

Having said this, the process of RA has been a subject of severe scrutiny most especially as the focus of environmental risk shifts from visible hazards to more uncertain and invisible ones. As an outcome, the uncertainty that is characteristic of science raise series of questions in regard to the role of science in identifying environmental risks, its accuracy and validity in environmental risk decision-making. Also as discussed in the next segment and in Chapter 3 below, such uncertainty may as well raise further political questions and the issue of the risk that the future generations are left with.

In RA, a prevailing feature is that analysis and some form of prediction is important to assess what the adverse effect of an activity may be and what measures will successfully reduce it.[30] In doing so, RA relies upon methodology such as experiments and sampling to predict, and also relies on modelling tools in collection of data. There is a continuous argument that relying on modelling tools makes it difficult to assess whether a model is a constructive simplification or a misunderstanding of the reality it is attempting to present. This creates a legitimate concern about the estimates or quantifications of RA in environmental risk decision-making.[31] Moreover, it is also believed that using experiments and samplings to assess risks may create methodological problems that are related to health. The concern is on whether animal studies or experiments fully represent an accurate analysis of the risk caused by exposure to radiation.[32] Arguably, this is true of past events that have demonstrated the flaws of science. Of particular resonance was the huge mistake made by UK scientists in 1986 in predicting the behaviour of radio-caesium in the environment after the Chernobyl disaster.[33]

Also, the methodology used in RA is a concern for prominent feminist environmental justice movements and NGOs who have begun to play an increasingly visible and influential role in environmental risk decision-making. Their involvement

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[30] E. Fisher, Drowning by Numbers: Standard Setting in Risk Regulation and the Pursuit of Accountable Public Administration, *Oxford Journal of Legal Studies*, Vol. 20, No.1 (2000), pp. 109-130, 115

[31] E. Fisher, n 21 above 7

[32] National Research Council, *Science and Judgement in Risk Assessment*, (National Academies Press, Washington 1994) 26

[33] N. Hawkes and Others, *The worst Accident in the World* (Pan Books Ltd, London 1986) 155

has however not gone unnoticed. Jasanoff and Wynne,[34] argue that the contributions made by these groupings have not only created new facts to display methodology used in RA, but has exposed the manoeuvrability of the boundary between nature and culture or science and society. They contend that in such cases there are many reasons to doubt the efficacy of RA. According to Verchick[35] for example, feminist environmental justice advocates challenge the model used in RA on three levels. Issues raised by this group are: whether scientific assessments are value-neutral, i.e., free of societal bias or prejudice, or even in extreme cases that it does not presuppose the acceptance of a particular value. In this regard, they argue that western science may be infused with its own ideology in its assessment process. Also, they argue that even if such inquiry by itself were value-neutral, environmental decisions that are based on such scientific inquiry would still contain subjective elements such as bias, concessions, and self-interest. They further add that scientific inquiries involving the risk of death and disease should not even aspire to value neutrality. This is based on the perception that decisions which affect not only today's generations but future generations should be made with all related political and moral considerations. In addition to the above, they also argue that the obsession with scientific concepts and technical methods are not to be relied upon at all because the practice represents a male bias process, and as a result they contend that the process of identifying and evaluating environmental risk does not sufficiently represent a social inclusive process. Also, that the health studies currently used for RA fail to consider the variation in vulnerability to environmental threats, such as sociological and geographical factors among different groups.[36] Although it may be difficult to adhere to these arguments because there is hardly any environmental group without a specific mandate or purpose of establishment, be it negative or positive attributions. However, it is definitely the case that the translation of scientific information into environmental rules and standards of conduct reinforce the concern over the natural environment and its inhabitants, and thus allow for scientific findings to be contested at different stages of assessment.

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[34] S. Jasanoff and B. Wynne, Science and Decision-making in S. Rayner and E. L. Malone, *Human Choice and Climate Change: The Social Framework*, Vol. 1, (Battelle Press, Ohio 1998) 46

[35] R. R. R. Verchick, 'In Greener Voice: Feminist Theory and Environmental Justice', (1996) *Harvard Women's Law Journal*, Vol. 19, 23-88, 76

[36] Ibid 40

In addition to the above, the dichotomy that exists in risk analysis has also been a subject of intense debate. It has been argued that the division between RA and RM has the tendency to distance the public, and in some cases even elected or appointed policy makers from major environment decisions.[37] This is a considerable concern and indeed possible in situations where the complexities of scientific inquiries are conducted in isolated scientific realm. For some, it is assumed that such division may help scientific inquiries to escape public and political scrutiny, thereby allowing the values and uncertainties of RA to ultimately go uncontested, or even assume primacy in decision-making rather than acting as an important element of the process of risk analysis.[38] This is a major concern when viewing the role of science in both the formation of energy policy and in risk decision-making. It is also an issue that continues to gain extreme publicity in environmental management. A practical example is from documents of the Inspector General of the United Sates (US) department of the Interior, a Report of Investigation.[39] This report indicates that scientific environmental inquiries on which decisions are based upon can be manipulated by individual interests in applying the "Best Available Science". An insight of the document reveals that Julie MacDonald, the former deputy assistant secretary of interior for fish, wildlife, and parks regularly intervened at the earliest stages of scientific review and bullying the staff to reach her desired result.[40] It was concluded that her actions in part led to the overturning of the Fish and Wildlife Service's decision on Greater Sage-Grouse in the USA. The USA's federal court however held that the service had not applied the "Best Available Science" in reaching the decision.[41] The decision of the Court is convincing that scientific inquiries can be manipulated by individual interests, and this is of concern because

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[37] W.E. Wagner, The Science Charade in Toxic Risk Regulation, *Columbia Law Review*, Vol. 95, No. 7, 1613-1723, 1673

[38] K. Morrow, Genetically Modified Organisms and Risk, in L. Bodiguel and M. Cardwell, *The Regulation of Genetically Modified Organisms: Comparative Approaches*, (Oxford University Press, Oxford) 56

[39] Office of Inspector General, Department of the Interior, Report of Investigation, Julie MacDonald, Deputy Assistant Secretary, Fish, Wildlife and Parks 2 (2007). See: <http://www.lb9.uscourts.gov/webcites/10documents/HomeBuilders_conflict.pdf> accessed 15 September 2011

[40] Ibid

[41] *W. Watersheds Project v U.S. Forest Service*, 535 F. Supp. 1173, 1183-85 (D. Idaho 2007). See also: H. Doremus, Scientific and Political Integrity in Environmental Policy, 86 *Tex. L. Rev.* 1601-1653, (2007-2008) for a critical analysis of the report

scientific inquiries have the possibility of shaping environmental risk regulations. As a result, there is little doubt that there may be negative consequences on the environment when false or misleading scientific information is submitted; the outcome of which cannot be overstated in extreme cases.

Furthermore, personal values are not the only thing that affects scientific evaluations. Houck's[42] article on scientific inquiry raises the awareness of yet further concern. In his analysis, he explains that there is a significant difference between the opinions of scientists who receive corporate funding and those who do not during assessments. Quite simply, an understanding of this reveals that the process of scientific RA may also be overridden by financial interest. Regarding this, many commentators believe that this can literally be found in various subsidiary scientific institutions. An example is Mark Simmonds, a scientist and an employee of NGO Greenpeace who once expressed concerns and gave precise indication as to how such interest develops. He explained that universities become more dependent on building external earnings and reckons that such an act put pressures on scientists to produce data that favours their sponsors. He emphasised specifically that because it is usually big companies who can afford such financial obligations, there is a danger that their vested interests will prevail.[43] In respect to this, one may begin to doubt the recent recommendations of the House of Lords Select Committee on Science and Technology. The report recommended that the Board of Business Innovations and Skills on nuclear research should have the right to attract financial support from the nuclear industry and elsewhere.[44] As to this, it may as well be the case that the outcome of such nuclear research may be to favour research sponsors rather than the nation as a whole.

In view of these criticisms, it is strongly emphasised that there is the need to ensure that scientific inquiry does not go uncontested. One way of achieving this may be to ensure openness and transparency in scientific processes,[45] or peer review which in

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[42] O. Houck, 'Tales from a Troubled Marriage: Science and Law in Environmental Policy', 12 December 2003, Vol. 302, 1928, *Science Magazine*. See also: H.T. Stelfox et al., 'Conflict of Interest in the Debate over Calcium-Channel Antagonists', *N. Engl. J. Med.* 338, 101-6, (1998)

[43] S. Yearley, The Environmental Challenge to Science Studies, in S. Jasanoff et all, *Handboook of Science and Technology Studies* (SAGE Publications, London 1995) 477

[44] House of Lords Select Committee on Science and Technology: *Nuclear Research and Development Capabilities: 3rd Report of Session 2010-2012* (TSO, London. November 2011) Para. 143

[45] E. Fisher, n 30 above 126

turn has been argued to increase scientific integrity.[46] Of course, there are many ways in which either of the above could be done. For example, it may be by creating an independent scientific body to compulsorily oversee scientific inquiries by requesting for the submission of all findings to it. The UK Research Integrity Office for example squarely falls within this ambit. Its effectiveness in a variety of scientific processes may however be limited because its concentrates more on the medical health industry.[47]

To this point, it is therefore not hard to imagine that the faith in science to define and solve complex environmental problems leaves many sceptical. For example, the uncertainty, which is the various problems involved (e.g. methodological problem) in determining the level of danger of the risk of nuclear energy points to the direction that science, may not be able to cope effectively with a large-scale nuclear disaster. If so, could this then be the case of us doing without scientific RA in environmental risk decision-making? In answering this question, it should be noted that the role of science cannot be separated from the decision-making process; rather, they co-evolve in response to each other because the existence of scientific methods is what helps trace the causes of environmental problems. In this regard, Ruckelshaus[48] adds that there appears to be no substitute for RA, in that some sort of risk finding is what tells us that there is any basis for regulatory action in the first place. He adds that the alternative to not performing RA is to adopt a policy of either reducing all potential toxic emissions to the greatest degree technology allows or banning all substances for which there is any evidence of harmful effect. In response to this, it is arguable that the continuous adoption of policy for reducing the agents of risk appears more realistic than banning because environmental law is much more of regulation. Banning these agents through the introduction of novel environmental laws will completely eliminate the agents of the risk and may also suppress important benefits of nuclear power. Although in some cases, the risks associated with these agents will still be a cause for concern. For example, a decision to ban the use of nuclear power in existing nuclear states would still leave concerns of risk unresolved. This is because half a century of nuclear activities has left considerable waste for disposal and these wastes are still prone to sabotage, theft or

[46] H. Doremus, n 41 above 1646
[47] UK Research Integrity Office (UKRIO) at < http://www.ukrio.org/> accessed last 17 September 2011
[48] W. Ruckelshaus, n 27 above

accidental radiation release.[49] Also for present purposes, a decision to terminate the use of nuclear power or stop its development may have implications in addressing the carbon concerns.

2.3.2. Risk management

RM is the next stage in the decision-making process on risk and it concerns the potential use of findings based on RA to make decisions about risk. It supports the statute and regulatory arrangements and it has been defined as a process of decision-making that integrates scientific findings within the broader structure of policy and law.[50] In this stage, the primary function is to reduce risk, particularly those that are associated with the cutting edge of science. Surely, the major reason for this is to decide how risk is to be controlled and to what extent if any based on the estimate of RA.

RM seems to be carried out across a wide division of authority amongst decision-makers. For example, legislators determine the range and statutory basis of applicable regimes; policy makers provide guidance on their operation; while regulators administer permits and the day to day running of regulatory systems.[51] In the UK as an example, the starting point in the management of industrial risk is to consider whether a given risk is so great or the outcome so unacceptable that it must be refused altogether; or whether the risk is, or has been made, so small that no further precaution is necessary; or if a risk falls between these two states, that it has been reduced to the lowest level practicable, bearing in mind the benefits flowing from its acceptance and taking into account the costs of any further reduction.[52]

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[49] D. Zillman, 'The Role of Law in the Future of Nuclear Power' in D. Zillman and Others, (eds) *Beyond the Carbon Economy*, (Oxford University Press, Oxford 2008) 322. See also the Twenty-second of The Royal Commission on Environmental Pollution on Energy-The Changing Climate 2000 (Cm 4749) at Para. 7.13. Without looking too far, there are also indications that radiation contaminated areas in Scotland will remain polluted even though attempts are made to ban the development of nuclear power; and Committee of Radioactive Waste Management (CoRWM), 'managing our radioactive waste safely: CoRWM's recommendations to the government', Doc 700, July 2006. As at the time of writing, the estimated tonnes of nuclear wastes stored on various nuclear sites across the UK was over 100,000 tonnes

[50] L.D Guruswamy, 'Sustainable Agriculture: Do GMOs Imperil Biosafety?' (2001 – 2002) 9 *Ind. J. Global Legal Stud.* 461, 480

[51] K. Morrow, n 38 above 55

[52] HSE, *The Tolerability of Risk from Nuclear Power Stations* (Rev. 1992) 5

Even though these tests are based upon the estimates of science, the decision to proceed with an activity remains within the political sphere which at the end of the day may also shape political agenda.[53] Thus, it is possible for a country to make environmental risk decisions for political reasons. If so, then it is arguable that the government has an interwoven role of minimising risk and also creating risk. For example where nuclear power is the subject, the driving force behind the government thinking of RM is the pressing issue of climate change and energy security. Here, the nuclear new build decision[54] may be seen as an aspect of the fundamental duty of the state to protect the state by minimising as far as it is able, the risks to which the state is exposed from other fossil sources of energy.[55] It is also the case that the production of risk goes hand-in-hand with the effort to protect the environment from the effects of energy supply from fossil sources. Hence, the government's role in the creation of risk is equally evident when viewed alongside the nuclear option. Furthermore, it has been argued that there is the "do nothing" option in governance for any given environmental problem. That is, to leave matters as they stand or perhaps to choose from review developments at some point in the future. However where new nuclear power decision is concerned, "doing nothing" may not be a welcome option as it may be seen as the creation of risk or rather, the acceptance of risk of fossil sources of energy.[56] Besides in this political sphere, "doing nothing" may as well be a consequence of political misuse of science. For example as seen in the US report above at 2.3.1, scientific inquiries may also be misinterpreted politically to give effect or to prevent certain environmental decisions. And in this case, it is usually the members of the public who do not get their preferred environmental policy outcome that often raises such concern.[57]

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[53] L.D Guruswamy, n 50 above 481

[54] DTI (2006), *Energy Review. The Energy Challenge*, (Cm 6887) July, HSMO

[55] J. Ash, Another Man's Poison: 'Risk Management and Nuclear Power Generation', Electrical Policy Research Group, Judge Business School. Available at <http://www.cessa.eu.com/sd_papers/wp/wp2/0209_Ash.pdf> assessed 10 September 2010

[56] Ibid. This is argued based on the speech of - Alan Johnson, former Secretary of State for Trade and Industry (GNN, 2008) – "we need to look at the risks to security of supply, our climate change commitments and, to long term, to make sure we take the necessary action. There is not a do nothing option".

[57] H. Doremus, n 41 above 1639

Having said this, there are also various criticisms relating to RM. For example, there is the argument that decision-makers should no longer rely on science as the basis for environmental risk decisions because of the uncertainty inherent in RA as discussed above.[58] As a result, this has over the years led to public distrust in RM. The Bovine Spongioform Encephalopathy (BSE) outbreaks when the government announced that they have been linked to health effects in humans after initially rejecting such claims is an example of situations where public distrust had grown in RM.[59] Besides, BSE scenario also represents circumstances where not only the legitimacy of risk regulation but the whole administrative process has been called into question by the public.[60] Also, there is the concern that making decisions based on science may forcefully impose specific assertions on people. For example, the latest piece of work by Ben Goldacre titled - Bad Science,[61] which discusses "Brain Gym" as a string of complicated and proprietary exercise for children and which enhance the experience of whole brain learning is a classic example of scientific evolution that has been imposed on members of the society.

In relation to the above, nuclear power raises further concern. The concern here relates to the secrecy that engulfs the industry of which events in the nuclear industry has done little to dispel.[62] It is arguable that where there is secrecy, there is very real difficulty in testing levied criticisms against the government or perhaps contesting questions of risk that is of increasing concern to the public. In the UK as an example, secrecy had long existed in the nuclear power industry since the creation of an *ad hoc* committee of certain cabinet ministers called the GEN 163[63] and also provisions of the Atomic Energy Act 1964. The Atomic Energy Act for example states that "any person

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[58] E. Fisher, n 30 above 110

[59] The Royal Commission on Environmental Pollution (RCEP), 21st Report 1998 (Cm 4053); The BSE Inquiry: The Report – Vol. 1, Findings and Conclusions: Executive Summary of the Report of the Inquiry, 3. The Cause of BSE at <http://collections.europarchive.org/tna/20090505194948/http://bseinquiry.gov.uk/pdf/volume1/Cover.pdf > last accessed 10 June 2011

[60] E. Fisher, n 30 above 109. See also: Cabinet Office, *Modernizing Government*, Cm 4310 (1999) 16

[61] Ben Goldacre, *Bad Science* (HarperCollins, London 2009) 13

[62] See also: J.G. Palfrey, The Problem of Secrecy, Annals of the American Academy of Political and Social Science, Vol. 290, The Impact of Atomic Energy (Nov. 1953), pp. 90-99; W.C. Patterson, *Nuclear Power*, 2nd edition (Pengiun Books, England 1986) 12, for a better understanding of the secrecy issue in the nuclear industry

[63] T. Hall, *Nuclear Politics* (Penguin Books Ltd, Middlesex 1996) 26

who without the consent of the Minister communicates to any other person except an authorised person any document, drawing, photograph, plan, model or other information whatsoever which to his knowledge describes, represents or illustrates any existing or proposed plant used or proposed to be used for the purpose of producing or using atomic energy; the purpose or method of operation of any such existing or proposed plant; and any process operated or proposed to be operated in any such existing or proposed plant, shall be guilty of an offence under the Act".[64] It is towards this that Hill and Vielvoye[65] argue that secrecy in the nuclear industry is by all means essential so as to be cautious in releasing information because the nuclear technology developed as an extension of nuclear weapons. Even though one may accept that such precaution is deemed necessary in the modern day society where the variety of terrorist attacks over the last decade have centred attention on the international misuse of the nuclear process,[66] making decisions in esoteric ways is however, confronted with a variety of international Conventions. These Conventions allow for the dissemination of information and the participation of the public in environmental risk decision-making.

[64] Art.11(1) of the Atomic Energy Act 1964
[65] P. Hill and R. Vielvoye, *Energy Crisis* (Robert Yeatman Ltd, London 1974) 186
[66] D. Zillman, n 49 above 323

2.4. PUBLIC PARTICIPATION AND ENVIRONMENTAL RISK DECISION-MAKING

Public participation means different things to many people. In the past, the term was often used to refer to opportunities for providing comments at public hearings, voting in referenda, or being a member of a social movement. More recently, the meaning of public participation is far more ambiguous and it refers to a variety of procedures for enabling diverse members of the public to be participants on issues about preferred policy options, and in some cases decision-making processes.[67] This development, that is, a move to more participatory procedure is now almost an instinctive response to concerns about the legitimacy of environmental risk decisions.[68] Such procedures are reflected in the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters 1998,[69] various EU environmental directives,[70] and also national initiatives such as the UK Government's Cabinet Office Code of Practice on Consultation.[71]

In principle, these procedural laws should allow members of the public to partake in and influence environmental decisions. However in practice, there are still concerns that public participation gains little capacity in environmental decision-making process for it to influence decisions that are made. One way of examining this concern is to consider public participation through the lens of Arnstein's ladder of citizen participation[72] which categorizes participation processes according to the degree to which decision-making involves the public.

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[67] T. Webler and S. Tuler, 'Public Participation in Watershed Management Planning: Views on Process from People in the Field', *Human Ecology Review*, (2001) Vol. 8, No. 2, 29

[68] M. Lee, *EU Environmental Law: Challenges, Changes and Decision-Making* (Hart Publishing, Oxford 2005) 113

[69] The Convention was signed at Aarhus, in Denmark, in 1998. The EU has been a party to the Convention since 2005 (following Decision 2005/370/EC). The UK ratified it in 2005. Hereinafter referred to as the Aarhus Convention

[70] Dir. 96/61/EC concerning Integrated Pollution Prevention and Control, [1996] OJ L257/26; Dir. 85/337/EEC on the Assessment of the Effects of Certain Private and Public Projects on the Environment, [1985] OJ L175/40, as amended by Dir. 97/11/EC amending Directive 85/337/EEC on the Assessment of the Effects of Certain Public and Private Projects on the Environment, [1997] OJ L73/5

[71] Department for Business Enterprise and Regulatory Reform, Code of Practice on Consultation, (July 2004). Available at <http://www.berr.gov.uk/files/file47158.pdf> accessed on 24 June 2011

[72] S. Arnstein, 'A Ladder of Citizen Participation' (1969) 36 *Journal of American Planning Association* 216

According to Arnstein, the bottom rungs of a ladder in citizen participation are: (1) Manipulation and (2) Therapy; these two rungs describe levels of non-participation that have been falsely substituted by some to be a form of genuine participation. Their real objective is not to enable people to participate in programs, but to enable power holders to educate or cure participants. Rungs (3) Informing and (4) Consultation, progress to level of tokenism that allow the have-nots to have a say, but they lack the power to ensure that their views will be heeded by the powerful. Rung (5) Placation is simply a higher level tokenism because the ground rules allow have-nots to advice, but retain for the power holders the continued right to decide. She added that further up the ladder are levels of citizens' power with increasing degrees of decision-making clout. Citizens can enter into a (6) Partnership, which enables citizens to negotiate and engage in trade-offs with traditional power holders; (7) Delegated Power and (8) Citizen Control, where it is possible for the have-nots citizens to obtain the majority of decision-making seats, or full managerial power.

Although, Arnstein's ladder of citizen participation may be argued to be outdated because it focused on 1960s America's society, for current purposes, it shows the extent to which the public has the ability to influence environmental risk decisions. In her analysis, the upper rungs of the ladder such as delegated power and citizen control provide an opportunity for public participation with greater influence on decisions that are made, and it is possible for them to improve the quality of decisions by contributing a wide range of expertise and values upon which decisions are based. In contrast, those processes near the lower rungs of the ladder such as informing and consulting face the problem of not having their opinions taken into consideration when decisions are made. Under these processes, decision-makers are likely to overlook a range of knowledge and values presented to it, and participation may not necessarily be seen as improving the quality of decisions that are made. Further, these processes are also likely to have a trend of consistency in decisions when they often reflect the continuous opinion of the decision-makers. In the language of Kirk and Blackstock, the process of participation near the bottom rungs are best regarded as a way of improving the range of the quality of

information the regulator has before it, which may not be quite the same thing as improving the range of information and values upon which decision is actually based.[73]

As discussed in this part, there is a growing consensus about the significance of public participation in environmental risk decision-making because the way in which risk is presented in the decision-making process assumes particular importance in terms of its acceptability. Against this background, one area that will be specifically looked at is the decision-making process for the development of nuclear power in the UK. In so doing, I will discuss the attractions of public participation so as to contextualize its effect on the acceptability of the risk of nuclear power and its development.

2.4.1. Identifying the Public

Notwithstanding its wide use so far, it is necessary to determine the identity of the public as there are different people who care, positively or negatively, about environmental decisions. Who they are may also depend on their ethical, moral, interest, and welfare viewpoints.[74] To aid this process the following questions may be asked: who will potentially be affected by the risk and the consequences of any management decision?; which parties or individuals have knowledge and expertise which may be useful to inform any discussion or decision?; which parties or individuals have expressed an interest in this particular, or similar type of, risk management problem?: and, who will be prepared to listen, respect diverse viewpoints and be prepared to negotiate?[75] For present purposes, the identity of the public is: industry bodies, non-governmental organizations (NGOs), and also the wider public.

2.4.2. Arguments for Public Participation

The arguments for public participation in environmental risk decision-making where nuclear power is concerned are not surprising. They include the following:

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[73] E. Kirk and K. Blackstock, 'Enhanced Decision Making: Balancing Public Participation against 'Better Regulation' in British Environmental Permitting Regimes' *JEL* (2011) 23 (1): 97-116

[74] M.K. Ewing, Public Participation in Environmental Decision Making, (2003). Available at <http://www.gdrc.org/decision/001-Thesis.pdf> accessed 4th July 2011

[75] DEFRA, 'Guidelines for Environmental Risk Assessment and Management' (1995) Para. 3.8. available at <http://archive.defra.gov.uk/environment/quality/risk/eramguide/index.htm> last accessed 10 August 2011

First, public participation is often driven by the complex and dynamic nature of science. This is particularly important on the basis that scientific discourse is often highly technical and esoteric. As such, it may cause problems in the context of participatory approaches. For example, scientific evidence can prove difficult for the public to comprehend, let alone engage with critically. This is further complicated by the fact that in risk analysis, science plays an undeniable role in decision-making. Thus, it is arguable that if the public is to understand the complexity that surrounds science, the pervasiveness of these problems demands transparent decision-making that is flexible to changing circumstances and embraces a diversity of knowledge and values of the public.[76] This however, bears some resemblance with the EU principle which reiterates that scientific RA alone cannot in some cases provide all the information on which environmental decisions should be based. The EU principles acknowledges that other factors such as societal, economic, traditional, ethical and environmental factors and the feasibility of controls should be considered to ensure that decisions made are clearly made.[77]

Second, it is also arguable that participation of the public in environmental decision-making is highly welcome so as to understand environmental complexities as known to science in situations where the media play a role in marketing fear and in shaping the public perception of risk. For example, this may be by portraying environmental risks probably more serious than estimated by scientist,[78]and it is usually the case that the media put fear in the minds of the public as regards the impacts of technological risks when threats are oversimplified by the media itself.[79] We are all familiar with this. An example of past events in which the media have played a huge part in amplifying people's perception of a particular risk with considerable practical consequences includes the reporting of the malfunctioning in the nuclear power station at Three Mile Island in the US,[80] and more recently the Fukushima disaster.[81] The

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[76] M.S. Reed, 'Stakeholder Participation for Environmental Management: A Literature Review', *Biological Conservation* 141 (2008) 2417-2431

[77] European Communities, *White Paper on European Governance*, COM (2001) 428 final

[78] DEFRA, n 73 above at Para. 3.6

[79] See: AgBio View Special, 'Waiter...There is a Gene in My Soup!'... Communicating with the Public, Media and Policymakers on AgBiotech Issues', available at <http://www.agbioworld.org/biotech-info/articles/biotech-art/communicating.html#working> accessed 4 August 2011

[80] RCEP, n 59 above.

Fukushima disaster may as well be the opportunity for the media to re-assert itself in environmental risk issues. As to this, the marketing of fear by the media may be of disadvantage in situations where there is increased public anxiety about the use of nuclear power. While this remains an issue, it would also be wrong to say that it is only towards the nuclear industry that environmental fear is being marketed. Examples extend to other areas such as Genetic Modified Organisms (GMOs) where the media also raises awareness of issues relating to GMO products.[82] However, in response to the role of the media as it relates to environmental disaster, Cutter[83] argues that the problem of media influence on the public lies in the inability of scientists and journalists to communicate with one another and understand the pressures and constraints under which they both operate. Indeed, science and journalism are two distinct disciplines and significant steps will need to be undertaken on both sides to facilitate communication between the two disciplines. Such steps if undertaken could perhaps have reduced the fear of the government in releasing BSE information to the media. For example, the fear was that releasing information about BSE to the media would have caused disproportionate alarm, would be seized on by the media and dissident scientists as demonstrating that BSE was a danger to humans, and would lead to a food scare or, even more serious, a vaccine scare.[84] At the same time care must be taken because any improved relationship between scientist and journalist might also lead to further consequence.

Third, another factor that engages the public in environmental risk decision-making process is the scepticism at the marriage between the government and industrial scientists; yet it is the government and industry scientist who have prominent roles in environmental risk decision-making.[85] For example, a survey of public opinion on environmental issues in the UK[86] found that the public have less confidence in

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[81] BBC, 'Japan's Fukushima Nuclear Plant Opened to Reporters', available at <http://www.bbc.co.uk/news/world-asia-15705303> last accessed 6 December 2011

[82] L. Bodiguel and M. Cardwell, Genetically Modified Organisms and the Public: Participation, Preferences, and Protest in L. Bodiguel and M. Cardwell, *The Regulation of Genetically Modified Organisms: Comparative Approaches*, (Oxford University Press, Oxford) 11

[83] S.L. Cutter, Living with Risk: Geography of Technological Hazards, (Edward Arnold, London 1992) 48

[84] BSE n 59 above at Para. 1197

[85] L. Bodiguel and M. Cardwell, n 57 above 12

[86] Department for Business Innovations and Skills (BIS), Market and Opinion Research International (MORI): Public Attitudes to Science 2011 – Summary Report

government and science itself due to series of events relating to the hazards of nuclear waste, ozone depletion, and even global warming.[87] As such, public faith in the ability of science in particular to deliver solutions to risks has been reduced, and science is now viewed as not so much as a solution to the problems of risk but also the cause of risk.[88] Thus from this stand point, it is arguable that such scepticism necessitates the need for a transparent decision-making process and a way of ensuring transparency may be to allow the public to participate in the decision-making process.[89]

2.4.3. Benefits of Public Participation

For present purposes, there are many claimed benefits for public participation. These include the following:

It is often asserted from a substantive point of view[90] that involving diverse groups of the public as well as technical expertise in environmental decision-making will provide essential information and insight into environmental risk. It is believed that the public can contribute ideas, concerns, and even information that will make environmental decisions richer and more realistic. Such an input has been argued by Lee[91] to create alternative, less technocratic expertise that is thought to be necessary in environmental decision-making. One way in which this can be achieved may be by

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[87] E. Hiruo, Exploding waste Theory Part of effort to Derail Repository, NUCLEAR FUEL, (March 1995) 9

[88] N de Sadeleer, *Environmental Principles: From Political Slogans to Legal Rules* (Oxford University Press, Oxford 2002) 152

[89] Additionally, the focus of the government on sustainable development as the basis of environmental standards also suggests the need to engage the public in environmental related issues. This is reflected in the UK government development strategy (Department of the Environment, Transport and the Regions (DETR), *Building A Better Quality of Live: A Strategy for more Sustainable Construction*, (HMSO, London 2000) Chapter 3 where the Government identified the benefits of the input and influence of public in the development of environmental activities. Similarly, the emphasis on public participation in sustainable development is also a core concern of the Rio Declaration which acknowledges that only if ordinary members of the community, particular those in disadvantaged groups, take part in decision-making processes can the outcomes of those processes be regarded as good. (Agenda 21 Rio Declaration. Available at <http://www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163> last accessed 4 August 2011)

[90] Substantive rationale for public participation focuses on the quality of the outcome of decision-making, on substance. It rests on arguments that public participation improves the outcome of decision-making processes. See: J. Holder and M. Lee, *Environmental Protection: Law and Policy*, 2nd eds, (Cambridge University Press, Cambridge 2007) 87

[91] M. Lee, Public Participation, Procedure, and Democratic Deficit in EC Environmental Law, (2003) 3 *Year Book of European Environmental Law*, 193-226, 204

raising important questions of fact that scientists have not addressed, and by offering knowledge about specific conditions that can contribute more realistic assumptions to risk analysis.[92] In this way, the public could have their values integrated in decisions that affect them and it seems likely that this may promote public trust in environmental decisions that are made.

Consequently, it has been argued that public input in environmental risk decision-making should increase the quality of decisions that are made as decisions are based on more complete environmental information.[93] This can also be linked to the preamble to the Aarhus Convention which clearly identifies that improved access and public participation in decision-making enhance the quality and the implementation of decision. In this regard, Beierle's[94] research on the input of stakeholders participation in environmental decision-making suggests that citizen participation may improve the quality of decisions that are made in majority of the cases studied. This research was conducted over 239 cases by examining for example, whether the stakeholders introduce a more holistic perspective in the decision-making process; or perhaps whether there was adequate access to information and expertise. Likewise, Sultana and Abeyasekera[95] analysed thirty-six cases of community management of fisheries facilitated by NGOs and found evidence that public participation led to collective action in the decision-making process. Although these studies suggest that public participation may improve the quality of decisions that are made, nevertheless, even if it does not, such an input may clear up misunderstandings about some technological controversies that exist in the nuclear power sphere.

Also, it is continuously being argued that public participation in environmental risk decision-making will promote the acceptability of risk when decision-makers understand public attitudes and concerns and are capable of responding to them effectively.[96] For a risk to be acceptable in the present context, it means the willingness

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[92] C. Stern and V. Fineberg, *Understanding Risk: Informing Decisions in a Democratic Society* (National Research Council, 1996) 23

[93] Ibid

[94] T.C. Beierle, The Quality of Stakeholder-Based Decisions, (2002) *Risk Analysis* 22, 739-749, 747

[95] P. Sultan and S. Abeyasekera, Effectiveness of Participatory Planning for Community Management of Fisheries in Bangladesh, *Journal of Environmental Management* (2007) 86, 201-213, 204

[96] M.S. Reed, Participatory Technology Development For Agroforestry Extension: An Innovation-Decision Approach, *African Journal of Agricultural Research* 2, (2007) 334-341

to take a risk well as it is.[97] Such willingness may however depend on the attitude of decision-makers and the attitude of the public towards the risk in question. In relation to this, there is a coherent body of academic literature that examines various procedures of participatory processes. Stern and Fineberg,[98] for example, favour a deliberative approach to public participation for building understanding, public trust and values, and acceptance of environmental risks. They explain that because deliberation involves scientist, technical specialist, and the wider public, people are able to confer, ponder, exchange views, consider evidence, reflect on matters of mutual interest and concern, and negotiate; and also there is an attempt to persuade each other in decision-making processes. In essence, the public is not simply called on to inform those with greater expertise but rather becomes deliberators in their nature, with the view that their opinions are heeded to.[99] The Royal Commission on Environmental Pollution (RCEP) in its 21st report also called for more deliberative techniques in recognizing public values. This report however goes further by giving a precise indication as to when the public should be involved in the decision-making process. It states that "public values should be articulated at the earliest stage possible in setting standards and developing policies; that the public should be involved in the formation of strategy rather than mere being consulted on already drafted proposals. The report concluded that openness at this framing stage allows people to question assumptions about the characteristics of environmental issues and the scientific understanding upon which analysis is based".[100]

2.4.3.1. Deliberative Participation

It is arguable that deliberative participation is an appealing approach in environmental risk decision-making to promote the acceptability of risk of nuclear power where there is public anxiety towards government agencies and the nuclear industry itself. Indeed such an approach may produce a number of advantages. These include: promoting public institutional trust; familiarity with the issues of the industry; and also diverse perspectives and opinions on related issues. All of which could be achieved if perhaps

[97] HSE, n 52 above at Para. 10
[98] C. Stern and V. Fineberg, n 92 above 74
[99] J. Steele, 'Participation and Deliberation in Environmental Law: Exploring a Problem-Solving Approach' (2001) 21 *Oxford Journal of Legal Studies* 415, 427-8, 428
[100] RCEP, n 59 above at Para. 7.22

the public have confidence in regulatory controls to safeguard them against the various risks which they fear. In this regard, there are already indications that the government aims to adopt deliberative approaches in nuclear energy matters. An example is the issue of radioactive waste management where the Committee on Radioactive Waste Management (CoRWM) hopes to involve the public at the policy formation level in order in gather their views and thus inform on policy formation.[101] The method of their involvement gives a precise practical explanation of how a deliberative process could be conducted to achieve the above advantages. This includes holding a number of its meetings in public, providing opportunities for people to challenge information, for example by making clear the sources of information and points of view on which the Committee advice is based, and also encouraging people to ask questions or make their views known and listening to their concerns.[102] I contend that these processes are essential for a sustained commitment to development of nuclear energy, most especially as the acceptability of risk is a political question which is likely to be disputed at a number of levels among participants.[103] An example is the management of nuclear waste where past events at both international and domestic level ended with the hint that any approach to providing nuclear disposal facility will have to include public opinion and values in the policy, and decision-making process for it to be successful.[104] These can be seen in the Yucca Mountain project in Nevada; the attempt by the UK Atomic Energy Authority (UKAEA) proposal to find suitable sites for disposing of high level waste in Scotland, Cornwall, Wales and Northumberland; and the proposal to assess the suitability of sites at Billingham on Teeside, and Elstow, for low level waste repositories by the Nuclear Industry Radioactive Waste Management Executive (NIREX). In particular, the two cases of UKAEA and NIREX were described as the gulf that existed between the views of those attempting to take forward the technocratic policy

[101] CoWRN is an independent body appointed by the UK Government to scrutinise plans for managing UK higher activity radioactive waste now and in the future. CoWRN, Managing our Radioactive Waste Safely: CoWRN's Recommendations to the Government, Doc. 700, July 2006, Chapter 7

[102] See: CoWRN, Proposed Programme of Work 2010-2013, CoRWN doc. 2800 final (31 March 2008), Annex A, Para. 17

[103] M. Lee, n 91 above 205

[104] P. Simmons and K. Bickerstaff, (2006) The Participatory Turn in UK Radioactive Waste Management Policy. In Proceedings of VALDOR-2006. Congrex- Sweden AB, Stocklholm, pp. 529-536. Available at <http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/37/101/37101543.pdf> accessed 10 July 2011. Note: NIREX is now Nuclear Decommissioning Authority (NDA)

programme, and those of the host communities which stood to be affected by the implementation of the programme because of its lack of public involvement in the policy formation and transparency in the decision-making process.[105] Against this backdrop, both proposals were however abandoned in 1981 and 1987 respectively.[106]

2.4.3.2. Risk Communication

However, the extent at which a deliberative approach will be helpful in creating a better informed public may prove challenging as it also involves the communication of risk. As to this, the cases of UKAEA and NIREX above also indicate the significance of risk communication. It reaffirms that if people are going to accept and have trust in environmental risk decisions, they need information on risk issues and the different choices available.[107] NIREX for example, was criticized for its exclusive focus on communication from experts and government officials to the affected public.[108] Reports are that during consultation, attempts at site investigation were presented to communities and local planning authorities as being "research" activity and quite distinct from any consultation for respiratory construction. And as a consequence, the proposal encountered sustained and co-ordinated local opposition, while its neglect of relations with local authorities resulted into distrust and a tendency towards non-cooperation.[109] Thus with some confidence, one can say that competently prepared and delivered communications can change the public's beliefs about how a technology operates and what risk it produces.[110]

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[105] Ibid, 532. See also: R. Kemp, *The Politics of Radioactive Waste Disposal* (Manchester University Press, Manchester 1992) for the a lengthy discussion on the public inquiry in relation to the UKAEA proposal and the consultation exercise of NIREX

[106] P. Simmons and K. Bickerstaff, n 104 above

[107] See: DEFRA, n 75 above at Para. 3.7. for a list of general importance of risk communication. See also: BSE, n 57 above for the consequences of lack of risk communication

[108] R. Kemp, n 105 above 66-77

[109] Ibid

[110] M. Maharik and B. Fischhoff, Risk Knowledge and Risk Attitudes Toward Regarding Nuclear Energy Source in Space, *Risk Analysis*, Vol. 13, No. 3, 1993, 345-353, 534

2.4.4. Improvements in Participatory Strategies

In view of the above, Atherton and Dalton[111] argue that lessons have been learnt in areas of participatory strategies. They grouped these lessons under three themes namely: structure, the organisational arrangements and institutional framework must be designed to give issues visibility and place public interest at the heart of long-term management; process, the way policy is developed and implemented must be open and accountable (there must be a stepwise approach, with clear decision points and wide stakeholder consultation and involvement); and also behaviour, the different organisations involved must interact with each other and stakeholders in an informed, open and responsive manner.

Some elements of these strategies can be seen in the European Strategic Environmental Assessment (SEA) Directive[112] and the Environmental Impact Assessment (EIA),[113] which has to some extent been amended to comply with the provisions of the Aarhus Convention to enable early and continuous public involvement and clarifying the role of environmental interest groups in decision-making process. The SEA Directive states that "authorities with environmental responsibility and the public shall be given an early and effective opportunity within appropriate time frames to express their opinion on the draft plan or programme and the accompanying environmental report before the adoption of the plan or programme". The EIA provision is quite similar to this but relates to the project level rather the strategic level.[114] Case law and the critical understanding of the duty of the licence applicant[115] as it pertains to

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[111] E. Atherton and J. Dalton, Moving Forward with Lessons Learned About Long-term Radioactive Waste Management. In Proceedings of VALDOR-2006. Congrex- Sweden AB, Stocklholm. Page 2-10. Available at <http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/37/101/37101543.pdf> accessed 10 July 2011

[112] Directive 2001/42/EC on the Assessment of the Effects of Certain Plans and Programmes on the Environment; implemented into the UK law by: HSMO, The Environmental Assessment of Plans and Programmes Regulations 2004, Statutory Instrument 2004 No.1633

[113] Directive 85/337/EEC on the Assessment of the Effects of Certain Public and Private Projects on the Environment, amended by Council Directive 97/11/EC. See also Chapter 4 for requirements under the planning regime

[114] See: Art. 6(1) of the SEA and Art. 3 of the EIA respectively

[115] See: UK NIREX Limited, NIREX Report: Environmental Report 2001-2003, NIREX Report No. N/102, October 2003. Para. 4 available at <http://www.corporateregister.com/a10723/Nirex03-env-uk.pdf>; NIREX believes that these Directives may be used to structure the decision-making process relating to long-term radioactive waste management in the UK. Also in Sweden, it is the case that the working out of an EIA should include consultations with authorities, organisations, and the public (Chapter 6 of the Swedish Environmental Code). The House of Lords also held in *Berkeley v Secretary of*

new nuclear build and as discussed in Chapter 5 below, shows that these Directives are also used to engage the public in dialogue. This may be on issues of radioactive waste, and integrating scientific and social research on radioactive waste management into the decision-making process. Nonetheless, there are still concerns as practices in nuclear waste management also reveal that public involvement in the decision-making process as required under these directives is not a compulsory act for the industrial promoters by law.[116] For example, the German legal system does not foresee extensive legally binding direct participation at local levels. Even if at all such provision exists, they may be limited when it comes to projects that require a formal planning approval procedure as it is the case with a radioactive disposal repository.[117]

Having said this, the UK's voluntarism approach for nuclear waste management[118] also indicates further commitment by the government to improve participatory strategies on matters of nuclear energy. The approach signifies that the problem of nuclear waste management is more of a social one than a technical one. In so doing, it involves the authorities of the local government of the host community (i.e. the community in which nuclear waste disposal facility will be built and it include the population of that area and the owners of the land) to signify interest in having a deep disposal waste facility built in their community. The aim is however to target early public participation through their community representatives in the decision-making process of site selection.[119]

However, while it is possible to argue that the voluntarism approach is one solution to issues of public participation as regards to nuclear energy, only time will tell

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State for the Environment [2001] 2 AC 603, Para. 15 "that EIA requires the inclusive and democratic procedure...in which the public is given an opportunity to express its opinion on the environmental issues".

[116] Note: the UK SEA legislation does recommend that consultation bodies and the public are informed and given the opportunity to forward their opinion within a reasonable time. (Section 15, Para. 3 of The Environmental Assessment of Plans and Programmes Regulations 2004, Statutory Instrument 2004 No.1633). Although this may not necessary be required as explained in Chapter 5 at para. 5.3.4.1.1.

[117] R. Barth and G. Arens, Further Development of Public Participation in the Site-Selection and Approval Process of a Final Repository in Germany; In Proceedings of VALDOR-2006. Congrex- Sweden AB, Stockholm. Page 107-114.
<http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/37/101/37101543.pdf> accessed 10 July 2011

[118] BERR and DEFRA, *Managing Radioactive Waste Safely: A Framework for Implementing Geological Disposal*, Cm 7386 (TSO, June 2008)

[119] Ibid, at Para. 6.8 and Chapter 6 respectively

whether such far recent procedural development which aims to enable key stakeholders including nuclear operators, local government representatives, regulators and non-governmental organisations to observe and provide input to the programme,[120] will be sufficient to address particular issues of public participation in matters of environmental risk. So far, only three communities have shown interest in the approach to site selection,[121] and this suggests that such an approach may not be effective after all. Besides, the literature on voluntarism in siting methods reinforces further concerns. Hunold[122] for example, argues that the voluntarism approach is diminished by the excessively local conception of public participation that typically informs voluntary siting attempts. He explained using Canada's development of deep and geological disposal facility for low and intermediate radioactive waste as example. He argues that the approach limits democratic legitimacy because only the consent of a subject of citizens who will share the proposed facility's risks is being sought, rather than those who live beyond the city limits. Thus, there is a sense of understanding here that the voluntarism approach limits participation to only those within particular geographic vicinity of the proposed waste disposal activity that signifies interest in the process. Conversely these groups may also be the most vulnerable to immediate risks. However, it is arguable that this goes against the idea of a wider public inclusiveness in environmental risk decision-making; that is, the basic idea that a range of public should be involved on an ongoing basis. This includes those who do not support the project or proposal in question, so as to ensure that all viewpoints are considered in making decisions.[123] In this regard and for a voluntarism approach to be effective in the manner in which it is hoped for, it may become necessary to involve a wide range of public in pursue of its objectives. After all the uncertain nature of the risk of nuclear power suggests that the whole environment and its inhabitants are potentially vulnerable to any adverse consequence that may occur.

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[120] DECC, Managing Radioactive Waste Safely,: Implementing Geological Disposal Annual Report April 2010-March 2011, (DECC, June 2011) Para. 9

[121] Department of Energy and Climate Change (DECC), *Managing Radioactive Waste Safely: Implementing Geological Disposal Annual Report*, April 2010 – March 2011 (June 2011) Para. 20

[122] C. Hunold, Canada's Low-Level Radioactive Waste Disposal Problem: Voluntarism Reconsidered, *Environmental Politics*, Vol.11, No.2, (2002) 49-72

[123] Siting Task Force (STF, 1994), *Public Involvement and Communications in the Cooperative Siting Process*, Prepared by the STF Secretariat for the STF Canada

Elsewhere in Europe, there are examples of governments facing similar public participatory challenges. In the background, these countries, like the UK, have signed up to the Aarhus Convention which is strongly supported by the EU and it may exert some influence on national approaches to public participation.[124]

2.4.5. Public Participation and the Aarhus Convention

The promotion of public participation in environmental risk decision-making has also been enhanced in recent years by the Aarhus Convention. The Convention deals with environmental participation in decision-making at three stages, namely: decisions on specific activities; plans, programmes and policies relating to the environment; and the preparation of executive regulations and/or generally applicable legally binding normative instruments.[125] It sets out requirements for public participation in various categories of environmental decision-making. Article 6 of the Convention establishes certain public participation requirements for decision-making on whether to license or permit activities which may have a significant effect on the environment.[126] It includes participatory requirements such as timely and effective notification of the public concerned, reasonable timeframes for participation, including provision for participation at an early stage, a right for the public concern to inspect information which is relevant to the decision-making free of charge, an obligation on the decision-making body to take due account of the outcome of the public participation, and prompt public notification of the decision, with the text of the decision and the reasons and considerations on which it is based being made publicly accessible. The public concerned is however, defined as the public affected or likely to be affected by, or having an interest in the environmental decision-making, and explicitly includes NGOs promoting environmental protection and meeting any requirements under national law.[127] Article 7 requires Parties to make appropriate practical and/or other provisions for the public to participate during the preparation of plans and programmes relating to the environment. Although the convention does not specify the environmental programmes in question, however, there

[124] P. Cameron, 'The Revival of Nuclear Power: An Analysis of the Legal Implication', *J. Environmental Law* (2007) 19 (1): 71-87, 82
[125] Art. 6, 7, and 8 of the Aarhus Convention respectively
[126] See: Annex I of the Aarhus Convention for list of prescribed activities
[127] Art. 6(2) of the Aarhus Convention and Art. 2(5) of the Aarhus Convention respectively

is every reason to believe that such programmes includes nuclear energy projects and other areas such as transportation. Article 8 also applies to public participation during the preparation by public authorities of executive regulations and other generally applicable legally binding rules that may have a significant effect on the environment.

The EU and its Member States have signed the Aarhus Convention and it is part of the EU law through Council Decision 2005/370/EC.[128] Also, the Convention has been implemented in the EU through Instruments such as Directive 2003/4/EC on access to information and Directive 2003/35/EC on public participation.[129] As a signatory, the Convention obliges the EU to ensure that there is compliance not only within its Member States, but also within the EU institutions as provided for under article 2(2)(d) of the Convention.[130]

Having said this, implementing the Aarhus Convention's public participation requirements on decisions on specified activities theoretically represents challenges in fulfilling the requirements of the Convention.[131] For example, this is because decisions permitting activities covered by article 6(1)(a) and Annex I of the Convention, where public participation is mandatory, such as granting consent for the construction of nuclear power stations, are not made at the EU level, rather at Member State level. Furthermore, it is also because the European Atomic Energy Community Treaty (EURATOM) 1957 is not a signatory to the Aarhus Convention. Nonetheless, it should be noted that the EU law implementing the Aarhus Convention relates to nuclear activities as stated in Annex I of the Convention.

Considering the above and given the importance of consultation in this area in the UK, the provisions of the Aarhus Convention are increasingly being relied upon by NGOs to challenge environmental policies and decisions. This is usually sought for

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[128] Council Decision of 17 February 2005 on the conclusion, on behalf of the European Community, of the Convention on access to information, public participation in environmental decision-making and access to justice in environmental matters

[129] Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC, and Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC respectively

[130] The EU institutions are by definition public authorities for the purpose of the convention

[131] V. Rodenhoff, The Aarhus Convention and its Implications for the 'Institution' of the European Community, RECIEL 11 (3) 2002, 343-357, 352

when there is disillusionment in decisions that are made or perhaps when participation is viewed as amounting to tokenism. Even when considerable efforts are made to foster effective public participation, there may still be considerable dissatisfaction with the performance of regulatory arrangements and opponents will use such means as are available to them to call the decisions into question in the courts.[132] To what effect this is can be seen in the case of *R. (on the application of Greenpeace Ltd)* v *Secretary of State for Trade and Industry*[133] where Greenpeace initiated a claim for judicial review in respect of the government's decision to support nuclear new build as part of UK's future energy mix.

2.4.5.1. R. *(on the application of Greenpeace Ltd)* v *Secretary of State for Trade and Industry*

It all started in the 2003 Energy White Paper[134] when the government stated clearly that before any decision to proceed with the building of nuclear power stations, there would need to be the fullest public consultation on policy formation and the publication of a White paper setting out the government's proposals.[135] Consequently, because of the challenges facing the UK energy sector, the government initiated a review of the 2003 document. It was announced that a policy statement would be issued in 2006 in effect of the 2003 review with the Secretary of State promising that it would feature an "extensive public and stakeholder consultation".[136] The government began with the publication of a consultation document in 2006.[137] Greenpeace took part in the consultation exercise as a NGO against the use of nuclear energy and sought for a quashing order on the argument that the fairly cursory nature of the content of the 2006 document could not be regarded as a true consultation paper but rather it amounted to an issues paper. This claim was founded on the breach of legitimate expectation by the Government to oblige its promise

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[132] K. Morrow, n 38 above 60. See also: The complaint by Greenpeace to the Market Standards Research Board (MSRB) in respect of consultancy in the events following the Greenpeace case [2007] EWHC 311 at <http://www.greenpeace.org.uk/files/pdfs/nuclear/MRSfindings.pdf> accessed 20th June 2011

[133] [2007] EWHC 311

[134] DTI and DEFRA (2003), *The Energy White Paper. Our Energy Future – creating a low carbon economy*, (Cm. 5761) Feb. HMSO

[135] [2007] EWHC 311, Para. 4.68

[136] Answer to Parliamentary Question, 2 December 2005

[137] Cm 6887

of the fullest public consultation on a change of policy on nuclear new build. It was alleged that the document was vague and unclear as to what the consultees were being asked to respond to; that it lacked adequate information to enable consultees to respond intelligently; and that it was an incomplete document on the basis that a great deal of the information upon which the Government's decision would ultimately be based was not actually available during the duration of the consultation exercise, but after the period.[138]

However, before the Greenpeace claim could be addressed in the judicial review proceedings the issue of justiciability was considered. In this regard, the Government argued that the issue was one of high level policy and was not suitable for judicial review. The case came before Sullivan J who agreed that the matter was indeed a high level policy document; but nonetheless, he took the view that the fact that high level policy was involved did not preclude judicial intervention. He made reference to the relevance of the Aarhus Convention and took the view that, given the huge importance of the nuclear new build issue, only the promised 'fullest public consultation' would have been adequate. He added that "whatever the position may be in other policy areas, in the development of policy in the environmental field consultation is no longer a privilege to be granted or withheld at will by the executive because the UK government is a signatory to the Aarhus Convention. The Preamble of the Convention records the parties to the Convention by recognizing that adequate protection of the environment is essential to human well-being and the enjoyment of basic human rights. "This includes the right to life itself; that is recognizing that every person has the right to live in an environment adequate to his or her health and well-being, and the duty, both individually and in association with others, to protect and improve the environment for the benefit of present and future generations, considering that, to be able to assert this right and observe this duty, citizens must have access to information, be entitled to participate in decision-making and have access to justice in environmental matters, and acknowledging in this regard that citizens may need assistance in order to exercise their rights; recognizing that, in the field of the environment, improved access to information and public participation in decision-making enhance the quality and the implementation of decisions, contribute to public awareness of environmental issues, give the public the

[138] [2007] EWHC 311, Para. 67

opportunity to express its concerns and enable public authorities to take due account of such concerns; and aiming, thereby to further the accountability of and transparency in decision-making and to strengthen public support for decisions on the environment."[139] As to this, he mentioned that even if the government had made no such promise, it was difficult to see how anything less could have been consistent with the obligations of the Aarhus Convention to provide opportunities for public participation.[140] Sullivan J. agreed with Greenpeace that the document constituted an 'issues paper' which lacked clarity and was not therefore adequate for purpose.[141] However, he granted a declaration to the effect that there had been a breach of the claimants' legitimate expectation of the "fullest public consultation" but refused to grant the claimants the quashing order that they sought.[142]

Although the decision is this case clearly indicates the willingness of the court to interfere in matters of "high level" environmental decisions, more importantly, it shows that the decision-making process must involve the wider public and not just NGOs.[143] This is significant in the present context because it appears different from the intention of the drafters of the Aarhus Convention which place too much emphasis on participation by organized interest groups rather than the general public.[144] Surely, one may argue that the domination of NGOs is to some extent an inevitable and appealing approach because they enjoy considerable expertise which allows them to participate meaningfully in the decision-making process which may not necessarily be said for the public at large. Even if individual members could bring a claim, they are likely to be less well-informed and resourced than NGOs. Care must however be taken that it does not displace the broader notion of public participation including individual contributions to environmental matters.[145]

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[139] Ibid, Para. 49
[140] Para. 51
[141] Para. 74 and 79
[142] Para. 120
[143] Para. 113
[144] M. Lee and C. Abbot, The Usual Suspects? Public participation under the Aarhus Convention, *The Modern Law Review*, Vol. 66, No. 1 (Jan., 2003), pp. 80-108
[145] K. Morrow, 'On Winning the Battle but Losing the War....', *Env. Law Review*, Vol. 10, Iss. 1, 65-71, 70. See: *R v Secretary of State for Foreign Affairs, ex p World Development Movement* [1995] 1 ALL ER 611 at Para. 620as it relates to sufficient interests in decisions that are made

2.4.5.2. The Airport Cases

In similar vein, the joint case of *R. (on the application of Medway Council) v Secretary of State for Transport, Local Government and Regions; R. (on the application of Essex CC) v Secretary of State for Transport, Local Government and Regions; and also R. (on the application of Mead) v Secretary of State for Transport, Local Government and Regions*,[146] in which the future development of air transport in the UK consultation document White Paper[147] excluded the options for Gatwick airport development. This cases also point towards the acceptance of an inclusive public decision-making process by the Court. In these cases, M and two other local authorities and two individuals challenged the Secretary of State's decision to exclude any option relating to the expansion of Gatwick airport. This was based on the fact that an agreement not to construct a second runway at Gatwick before the year 2019 had been concluded between the relevant local authority and the British Airports Authority. Without going into much detail, the claimants challenged the decision of the Secretary of State on grounds of judicial review. This includes: irrationality, that the Secretary of State had a "closed mind" or fettered his discretion; unfairness; obligation; human rights; proportionality; and also legitimate expectation.[148] The cases were brought before Maurice Kay, J., who granted the application and quashing order that it was procedurally unfair to operate the consultation process in such a way so as to effectively prevent the applicants from advocating Gatwick as an alternative solution at an early stage in the decision making process.[149]

Overall, the above cases show that environmental policies are predominantly set by the government with less public involvement. Indeed as one commentator puts it, "public participation is recognised at the management stage, it is yet to be accepted at the knowledge-creation phase".[150] This quotation is perhaps the best way to summarise the above cases and to describe public participation in the UK environmental decision-making process, at least where the development of major infrastructures are concerned.

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[146] [2002] EWHC 2516 (Admin); [2003] J.P.L. 583; [2002] 49 E.G. (C.S.); [2002] N.P.C. 152

[147] Department for Transport, The Future Development of Air Transport in the United Kingdom: South East (2002)

[148] [2002] EWHC 2516 (Admin); [2003] J.P.L. 583; [2002] 49 E.G. (C.S.); [2002] N.P.C. 152, Para. 4-48

[149] Ibid, Para. 52

[150] B. De Marchi, Public Participation and Risk Governance, *Science and Public Policy,* Vol. 30, No. 3, June 2003, pp 171-176

This is because it clearly indicates that the public are not usually involved in the policy formation stage, but only after the policy has been made. Thus, one may say that such policy is more likely to reflect the concerns of the government rather than the values of the public; and this has so far proved to be a catalyst for public disapproval of nuclear energy.

2.4.6. Consequences of Public Participation

As to the above, it is clear that public participation may affect environmental decisions that are made. These effects will now be evaluated not from a single viewpoint but from the various groups of the public as categorised earlier at paragraph 2.4.1.

In general, NGOs play a major role in the policy formation of the vast encompassing energy industry. With their observer status, they contribute to the decision-making processes by bringing new additional voices to the fore and shaping energy policy.[151] For example, apart from Greenpeace active involvement in nuclear power decision-making process in the UK as discussed so far, other trans-boundary regional groups such as the Australian Biomass Association and Small Hydropower Association, also play an important role in actor mobilization, coordination and lobbying for Renewable Energy Electricity Source.[152] It is also the case that NGOs have a great deal to contribute to decision-making processes by providing alternatives to the dominant official version of public interest. In addition, they add considerable and varied expertise to the decision-making process through their ability to exploit established decision-making processes which is increased by their ability to exploit established networks to add breadth and depth to their input.[153] However, Morrow[154] makes it clear that the participation of NGOs also introduces new challenges. She points out that there is the danger of the role played by NGOs as it moves gradually from being participative democracy to an alternative form of representative democracy. She

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[151] W. Lafferty and A. Ruud, *Promoting Sustainable Electricity in Europe: Challenging the Path Dependence of Dominant Energy Systems,* (Edwards Elgar Publishing Limited, UK 2008) 196

[152] Ibid

[153] K. Morrow, 'Public Participation in the Assessment of the Effects of Certain Plans and Programmes on the Environment: Directive 2001/42/EC, the UNECE Espoo Convention and the Kiev Protocol' (2004) 4, *Yearbook of the European Environmental Law* 49, pp. 54-57

[154] H. Cullen and K. Morrow, 'international Civil Society in International Law: The Growth of NGO Participation' (2001) 1 Non-State Actors and International Law 7

explains that once NGOs reach a certain critical mass, they cease to become an organ of participative democracy but rather a representative in their function without an electoral mandate. This suggests that NGOs are likely to press forward their innermost ethics and values rather than a collective effort of the public which may be of detriment to the decision-making process.

On the other hand, there are also a number of ways that public participation can affect environmental risk decision-making. The public could either seek for regulations of certain issues to be made in the environment or be against certain environmental decisions.[155] In Austria for example, energy planners in the mid-sixties proposed to construct up to five Nuclear Power Plants by end of the century in order to meet the country's electricity demand. However, in 1976 a very intensive public and political debate about the use of nuclear energy for electricity production began and the Government held a referendum on the use of nuclear power.[156] Although the outcome of the referendum only showed a marginal difference[157] between those in support of nuclear energy and those against its development, it was however enough for the government to stop the development.

Considering the above, the Fukushima fiasco is arguably one event that may hinder the public appetite for the use of nuclear power. Even though the immediate danger of the disaster may have passed, its occurrence however, reminds the public of the Chernobyl disaster, where inhabitants felt the psychological effects of a nuclear disaster, and the consequences which are thought to have affects on the public for years.[158] In this regard, there is no denying that the evidence of what I refer to as "Contemporary Pressure" – meaning that the manifestation of newer forms risks have the power to alter and dictate the level of acceptability of technological risk in the society, is far more obvious in the present day society. In so far, this has led to global criticism as to the use of nuclear power on one hand, and on the other, it facilitates the review of energy policies amongst countries; with questions over the promotion of

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[155] J. Steele, n 99 above

[156] European Commission, EUROBAROMETER 234: *A Report on Europeans and Nuclear Safety*, March 2010. Also refer to W. Lafferty and A. Ruud, n 151 above

[157] In the referendum 50.5% of the population voted against the use of nuclear energy in Austria

[158] European Communities, *Consequences of the Chernobyl Nuclear Accident: Opinion and Report* (Economics and Social Committee, Brussels 1987)

nuclear power dominating political affairs among EU Member States. Arguably, decision-makers now face uneasiness about the use of nuclear energy while the public are demanding for greater safety measures to complement existing ones or perhaps completely phase out its use. For example, in Germany, the Fukushima was linked to the outcome of some state election results and the government through the legitimate expectation of its energy policy review has agreed to stick to the planned moratorium on nuclear power and the country is on the road to shut down all its nuclear plants by the year 2022.[159] In contrast to this and as mentioned in Chapter one above, the UK government has decided to continue with its proposed nuclear power programme. Even though the country is not prone to extreme natural hazards like Japan, the government has not ruled out the possible consequences of natural disaster in severe climate conditions. For example, the government is making plans to ensure that improved arrangements are in place to ensure the safety of its nuclear industry. This includes initiating a review of flooding studies, including from Tsunamis and whether there is the need to improve further site-specific flood risk assessments as part of its periodic safety review programme because existing nuclear stations are on the coast, many at low elevations which are vulnerable to sea level changes.[160] At this point, the question is whether these efforts will allay the fears of the risk of nuclear power and gain public support for its development in the UK.

CONCLUSION

From the above discussions, it is often the case that in making environmental risk decisions, the decision-making process is characterised by political and scientific knowledge, with the political aspect relying or based on science. As a result, it is clear that the dependence on the role and activity of science and greater awareness of the discipline reveals the indeterminacy of scientific knowledge; much to the dissatisfaction of the public in terms of the uncertain effects of environmental risks. At the same time, it is also clear that the uncertain effects of environmental risks and the denial of public role

[159] Guardian Newspaper, Germany Votes to End Nuclear Power by 2022, available at <http://www.guardian.co.uk/world/2011/jun/30/germany-end-nuclear-power-2022> assessed 19 July 2011

[160] Office for Nuclear Regulation, *Japanese Earthquake and Tsunami: Implications for the UK Nuclear Industry: Final Report*, September 2011. Available at <http://www.hse.gov.uk/nuclear/fukushima/final-report.pdf> lasted accessed on 4 November 2011.Para. 343, 355, and 375

in procedural processes of environmental risk decision-making (at least as it pertain nuclear power) remains a fundamental factor likely to shape the acceptability of the risk of nuclear power.

CHAPTER 3

LEGAL REPONSES TO THE RISK OF NUCLEAR POWER

3.1. INTRODUCTION

Having discussed above the societal responses to the risk of nuclear power, I now examine the legal responses to these risks in this chapter and across the next.

From its beginnings, legal response to the risk of nuclear power has been the introduction of various laws and policies to address the risks that are associated with its use. These laws and policies cover in general the need to control radioactive materials, licensing of nuclear facilities, the protection of workers and the general public from harmful effects of radiation, and also the safeguarding of materials and the means of manufacturing materials for nuclear weapons.[1] At the same time, the introduction of these laws and policies demonstrate evidence of the consistent care with which the nuclear process is used. As a result, it is probably accurate to refer to nuclear power as the most legally controlled energy source in the world.[2]

Having said this, addressing the risk of nuclear power also appears problematic as it presents some legal and practical challenges. This is because these risks often have uncertain effects which sometimes appear too great to comprehend. Thus in an era where nuclear power has grown to be a topical issue, one cannot avoid thinking about the gravity of risk and the possible impact on future generations.

In light of these uncertainties, this chapter examines the general principles of environmental risk regulation as it relates to nuclear power. In doing so, it starts by looking at the various risks that are associated with the use of nuclear power, with particular focus on the threats, concerns and challenges of nuclear waste as an example, in order to put into context the principles of the UK regulatory regime. These principles include: the principles of the International Commission on Radiological Protection

[1] P. Riley, *Nuclear Waste Law, Policy and Pragmatism* (Ashgate publishing Ltd, Aldershot 2004) 151
[2] D. Zillman, 'The Role of Law in the Future of Nuclear Power' in D. Zillman and Others, (eds) *Beyond the Carbon Economy*, (Oxford University Press, Oxford 2008) 16 and 326

(ICRP), other fiscal policies such as Cost Benefits Analysis (CBA), Risk-based Approaches, and the Precautionary Principle as applied to unknown risks.

3.2. RISK IN THE CONTEXT OF NUCLEAR POWER

The various risks that are associated with the use of nuclear power continue to generate controversy in environmental risk regulation. While some commentators argue that these risks are over emphasised,[3] others disagree[4] and the Fukushima disaster seems to have confirmed their fears.

According to Ping,[5] the various risks that are associated with the use of nuclear power includes: First, there is the risk of the occurrence of a catastrophic meltdown. Although it has been argued that the likelihood of the release of radiation from a nuclear plant may be remote, it does happen as illustrated by the Windscale disaster, TMI disaster, the Chernobyl disaster, and the Fukushima disaster.

Second, there exists the possibility of the release of radioactive materials during transportation of nuclear materials. The key concern here is the numerous control mechanism and health and safety controls which ought to be followed in the nuclear fuel cycle. For example, this is from mining to milling to conversion, to enrichment, to fuel fabrication, to plant operation, and finally, to waste processing and storage. The concern here is that these processes involve separate facilities that necessitates many miles of materials movement, exposure, and accident potential, which exposes humans to the harmful effects of radiation.

Third, nuclear power also raises very substantial national security issues. It is widely accepted that there is the risk of diversion of uranium materials and reactor waste products by terrorists to make higher grade weapons. This risk is further magnified when one thinks about the porous security systems in many countries that are now seeking nuclear energy, and also the situation in countries such as Iran where it is believed that the development and use of nuclear power might be diverted for other purposes other

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[3] J. Gray, Choosing the Nuclear Option: The Case for a Strong Regulatory Response to Encourage Nuclear Energy Development, 41 *Ariz. St. L.J.* 315-348, 2009. See also the n 148 above

[4] Parliamentary Office of Science and Technology, Public Opinion on Electricity Options, October 2007, Number 294

[5] G Pring, A. Hass and B. Drinkwine, 'The Impact of Energy on Health, Environment, and Sustainable Development: The TANSAAFL Problem' in D Zillman, and Others, (Eds) *Beyond the Carbon Economy*, (Oxford University Press, Oxford 2008) 25

than civil use.[6] Also, the variety of terrorist attacks in countries such as the USA over the last decade has now centred attention on the possible international misuse of the nuclear process. For example, it is believed that terrorists may directly attack the nuclear generating plant or fuel fabrication facility, expecting to release large quantities of radiation in populated areas, and which is thought to involve potential damages far worse than the nuclear industry's disaster at Chernobyl. Some commentators however dispute this threat. Cohen[7] for example, once argued that there is no credible terrorist threat. He argued that terrorists have not killed on a mass scale through the use of nuclear weapon, something they could do by means such as simple introduction of poison gas into the environment. However, Cohen's claim stands to be challenged as it is based more on statistical evidence; that is, the occurrences of events over time in predicting the occurrence of a disaster.[8] In this regard, recent studies continue to contest that nuclear risk from plane crashes is higher than estimated. For example, studies submitted to the inquiry to expand Lydd airport in Kent late last year concluded that the risk that planes will crash into nuclear plants and release potentially lethal clouds of radioactivity is significantly higher than official estimates.[9]

There is also the risk of the release of radioactive materials from nuclear waste. This is a major issue in countries such as the UK because of the lack of a final disposal facility for managing nuclear wastes that are produced. Currently, nuclear wastes are temporarily stored on sites pending the time that a suitable permanent disposal site will be found. As a result, it is believed that as stored nuclear wastes grow larger the threat grows too. As the disposal of nuclear waste remains a practical issue to be solved, it is certainly the case that waste produced will continue to be radioactive for years. The wastes stored on site may even be vulnerable to sabotage, theft, or even in the event of accidental release of radiation through the combination of human error and the

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[6] Guardian, 'Iranian Nuclear Power Station Begins Generating Electricity', available at <http://www.guardian.co.uk/world/2011/sep/04/iran-nuclear-power-bushehr-plant> last accessed 2 December 2011

[7] B.L. Cohen, The health Risks of Nuclear Power, in K.S. Shrader-Frechete, ed., *Environmental Ethics* (Pacific Grve, CA: Boxwood Press, 1981) 329-337

[8] J. Beattie, 'The Assessment of Environmental Consequences of Nuclear Reactor Accidents' in B. Wade et al, *The Environmental Impact of Nuclear Power* (British Nuclear Energy Society, London 1981) 4

[9] R. Edwards, "Nuclear Risk from Plane Crashes is Higher than Estimated, Inquiry Shows", available at < http://www.guardian.co.uk/environment/2011/feb/21/nuclear-risk-plane-crashes> last accessed 18 December 2011

occurrence of natural disaster as in the case of the Fukushima disaster which have effect on wastes stored in ponds on sites. Although, it should be remembered that there are some other man-made and natural sources such as medical x-ray equipments and materials in soils and rocks that also emit radiation.[10] The concern is however the spatial dimension of the effects of the release of radioactive materials from both legacy and future wastes.[11]

In view of the above, the next part will focus more on the various risks that are associated with nuclear waste; and it is considered in this chapter as the most challenging issue facing the UK nuclear industry.[12]

[10] HSE, *The Tolerability of Risk from Nuclear Power Stations* (Rev. 1992)
[11] P. Riley, n 1 above 96
[12] See also: British Government Panel on Sustainable Development, Second Report (1996) p.8 – how to dispose of radioactive waste safely has also been considered to be one of the most intractable problems currently facing other nuclear power nations

3.3. THE RISK OF NUCLEAR WASTE IN THE UK

The history of managing the risk of nuclear waste in the UK is not a particularly happy one. Prior to 1970, very little thought had been given to the question of how to deal with the nuclear waste produced. It was in 1976 that the Sixth Report of the Royal Commission on Environmental Pollution (RCEP) pointed out that "it would be wrong to commit future generations to the consequences of fission power on a massive scale unless it has been demonstrated beyond reasonable doubt that at least one method exists for the safe isolation of these wastes for the indefinite future".[13] The government's response to the RCEP report was six main objectives.

These are: to minimise the creation of waste from nuclear activity; to deal with waste management problems in principle before any large scale programme of nuclear power was undertaken; to carry out handling and treatment of waste with due environmental considerations; to dispose of wastes at nuclear sites in accordance with a programme; to provide adequate research and development on methods of disposal; and to dispose of wastes in appropriate ways, at appropriate times and at appropriate places.[14] Arguably, the government's response meant a lackadaisical approach towards the management of nuclear waste because it added little to finding a solution to the waste problem that besieges the industry. At the same time, it would be fair to say the concerns expressed in the Flowers report led to the creation of the Radioactive Waste Management Advisory Committee (RWMAC) in 1978 to offer independent advice to Ministers on radioactive waste issues[15] and the search for waste disposal sites for high level radioactive wastes in the following years. However, such plans were abandoned partly because of the reason stated earlier.[16] Yet, almost thirty five years on, the issue of radioactive waste disposal is still as it was. As a result, the government has been accused

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[13] Royal Commission on Environmental Pollution, Sixth Report, Nuclear Power and the Environment, (Cmnd. 6618) (1976) at Para. 181

[14] Radioactive Waste Management, Cmnd. 8607 (1982), Para. 13

[15] RWMAC <http://collections.europarchive.org/tna/20080727101330/defra.gov.uk/rwmac/> last accessed 12 August 2011. See also: See: S. Tromans and J. Fitzgerald, *The Law of Nuclear Installations and Radioactive Substances*, (Sweet & Maxwell, London 1997) 204

[16] See Part three of Chapter 2 above at 2.4.3.1. An alternative view was because of the general election just a month away and so the programme was dropped for political reasons.

of showing a mixture of procrastination, indecision and more importantly, a failure to grasp the nature of the problem associated with nuclear waste disposal.[17]

Having said this, it is important to note that the government's decision to support nuclear new build on one hand, and the lack of any real market for spent nuclear fuel disposal in the UK on the other, is a step further in creating new wastes. As such, this decision is also likely to fuel public anxiety over nuclear waste as there are already concerns over what to do with the tonnes of wastes stored at nuclear plant sites around the UK, needless to mention the consequences of the creation of new ones. As to this, it becomes paramount to establish the most appropriate and acceptable waste disposal method in which the public will have confidence. Moreover, the need for a suitable disposal method is clear in terms of the impact of the occurrence of a nuclear disaster as in the case of the Fukushima disaster where nuclear waste was stored on site.

In regards to the issue of a nuclear waste disposal facility in the UK, the conclusion of the CoRWM has been to follow other international standards and practices by identifying geological disposal as the way nuclear waste will be managed in the long term. However, a safe and secure interim storage will continue to be used until a geological disposal facility is built.[18] In theory, this initiative may be described as a huge step forward towards finding a solution to the issue of nuclear waste disposal that has plagued the UK nuclear industry for years now. Nonetheless in practice, there is more to a geological disposal repository as seen in other nuclear power countries than the mere identification of such method.

3.3.1. Concerns and Challenges of Nuclear Waste Management

To start with, it is worth mentioning that the disposal of nuclear waste continues to generate considerable concerns and challenges on future generation at both international and EU level. Under article 11 of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management for example, contracting states are to take necessary steps to avoid actions that impose reasonably

[17] 2006 (4th report, HL paper 109) Hansard
[18] CoRWN, Managing our Radioactive Waste Safely: CoRWN's Recommendations to the Government, (July 2006) doc. 700

predictable/undue burden impacts on future generations which are greater than those permitted for the current generation. According to Tromans,[19] this implies an exercise of judgement rather than an attempt to avoid any risk at whatever cost. He argues that no one knows what may represent an "undue burden" over the timescales concerned, and any more than what may be the "needs and aspirations" of the future generation. With little doubt and as explained at paragraph 3.4.3.1. below, this is perhaps one reason why the interests of future generations are always heavily discounted. Further, the term undue influence sounds rather vague. It may be argued to extend to the cost of storage of nuclear waste (the cost of supporting and ensuring safe storage facilities for example, may be enormous as it may take decades for the completion of a disposal facility), or even the cost incurred by operators of nuclear installations to run an installation. As to this, it may as well be the case that the UK policy on radioactive waste disposal to store radioactive wastes pending the construction of a geological disposal respiratory facility may nevertheless also create a cost burden for future generations who will have to deal with the long-term waste stored considering the time-scale that may be involved in the construction of such facilities.[20]

Likewise at the EU level, the genesis of the concerns and challenges of radioactive waste disposal can be traced to the provisions of the European Atomic Energy Community Treaty (EURATOM) which looks rather vague for such an important issue. For example, as discussed in Chapter Four as part of the limitations of the EURATOM, Member States are only required to provide the European Commission with such general data relating to any plan for the disposal of nuclear waste in whatever form. The aim is to make it possible to determine whether the implementation of such a plan is liable to result in the radioactive contamination of water, soil or air space of another Member State. Upon providing the Commission with the required information, the Commission shall deliver its opinion after consulting the group of experts stated in

[19] S. Tromans, Nuclear Law: *The Law Applying to Nuclear Installations and Radioactive Substances in its Historic Context*, 2nd Eds, (Hart Publishing, Oxford 2010) 375

[20] See also: The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management as discussed in the next Chapter for an analysis of further issue of radioactive waste and spent nuclear fuel

the Treaty.[21] Undoubtedly, this provision represents a way by which the Commission can obtain information about radiological protection within the EU and also to assess whether any planned nuclear waste disposal activity is liable to cause significant damage to the environment. Although at the same time, this provision looks stronger than the requirements of international law as it suggests that an action may otherwise be unlawful without informing the Commission, the decision in the case of *Land de Sarre and Others v Ministre de l'Industrie,*[22] which deals with the interpretation of the provision of article 37, nevertheless provides the opportunity to argue that the EURATOM fall short on nuclear waste related issues. The decision of the Court of Justice in this case was that although the Commission has to be provided with general data before a disposal of radioactive waste is authorised by competent Member State and it opinion brought to the notice of that State before the issue of any such authorisation, the State is however, not obliged to conform with the opinion.[23] Thus, Member State to whom the opinion has been addressed is not legally bound by it and may disagree with any opinion that is been made. In this regard, it is only logical to be concerned about the management of nuclear waste in the EU most especially as Member States have competence over disposal methods. The question now is, what happens if something does go wrong either in the event of non-compliance or over compliance with the Commission opinion? Neither this nor the many other questions of nuclear waste have easy answers anyway.

In addition to the above, NGO Greenpeace has launched a broadside against European repository plans. This attack is directed to the International Atomic Energy Agency (IAEA) four general criteria of an appropriate deep geological disposal site. These criteria are: long-term (millions of years) geologic stability in terms of major earth movements and deformation, faulting, seismicity and heat flow; low groundwater content and flow at repository depths, which can be shown to have been stable for periods of at least tens of thousands of years; stable geochemical or hydro-chemical

[21] Article 37 of the EURATOM Treaty. Note: Subsequent attempts by the Community to impose some sort of European wide framework for radioactive waste have not been forthcoming. These includes- Council Decision 75/406/EURATOM of 9 July 1975 on the management and storage of radioactive waste; and also Council Resolution [1980] OJ C51/1 implementing a Community plan of action in the field of radioactive waste, and [1980] OJ C51/4 relating to the reprocessing of irradiated nuclear fuels

[22] Case 187/87, 22 September 1988, ECR, 5013

[23] Ibid, Para. 14-16. See also: 92/269/Euratom: Commission Opinion of 30 April 1992 concerning the nuclear fuel reprocessing plant Thorp of the Sellafield establishment (United Kingdom). [1992] O.J. L138.

conditions at depth, mainly described by a reducing environment and a composition controlled by equilibrium between water and rock forming minerals; and good engineering properties that readily allow construction of a repository, as well as operation for periods that may be measured in decade.[24] It is to these that Greenpeace argues that there are safety issues, particularly those relating to groundwater contamination which makes a geological repository less favourable as a permanent disposal option of nuclear waste.[25]

Also, the concern over nuclear waste in jurisdictions such as the UK is further apparent within the parameters of the management of nuclear waste and the construction of a geological disposal facility. As to this, we cannot ascertain yet whether the government policy on geological repository will succeed or fail as numerous factors must be put into consideration. However, what we know is that regardless of whether or not it succeeds, it is surely the case that high level waste will remain radioactive for years or even much longer than expected by the government. The reason for this is the time-scales involved in the construction of a geological repository. Drawing on overseas geological repository programmes as example, the processes to be analysed and evaluated in site selection, demonstrating the suitability of a site, obtaining the necessary planning and regulatory approvals, constructing the repository to the point at which it can accept waste may be complex, and also scientific understanding of geological processes and engineering design, may take as long as forty years.[26] Also because of the lack of predictability in the disposal of nuclear waste and the consequences of the risk of an accident or failure of the system, any proposed solution deserves serious consideration from the technical and policy community on one hand, and on the other, the science studies community in terms of the stability of any proposed region.[27] This may also take time. In addition, the time taken to complete a geological facility may

[24] International Atomic Energy Agency (2003), *Scientific and Technical Basis for the Geological Disposal of Radioactive Waste*, Technical Report Series No. 413 (Vienna, IAEA)

[25] The Telegraph, 'President Barack Obama's Yucca Mountain Decision is a Blow to US Nuclear Power', available at <http://www.telegraph.co.uk/finance/newsbysector/energy/8012171/President-Barack-Obamas-Yucca-Mountain-decision-is-a-blow-to-US-nuclear-power.html> last accessed 15 November 2011

[26] CoRWN, n 18 above at Chapter 16, Para. 12

[27] A. Macfarlane, Underlying Yucca Mountain: The Interplay of Geology and Policy in Nuclear Waste Disposal, *Social Studies*, Vol. 33, No. 5, Earth Sciences in the Cold War (2003) 783-807

even be longer than expected depending on the outcome of serious intermingling of technological and political factors as demonstrated by the Yucca Mountain Project in the United States (USA) where scientific knowledge, politics, and policy have co-evolved, with each affecting the other in the developing process.[28] Or even in cases where the construction of a repository has already been completed as seen in Finland, a core of nuclear wastes may still not necessarily be disposed immediately as they are allowed to be cooled for some years before the final disposal process can proceed.[29]

However in the event that a geological disposal is being constructed, some commentators are on the opinion that there are still threats attached to it. Grossman and Cassedy[30] argue using historical illicit retrieval such as recovery of buried Pharaohs treasures to explain that it would be an act of hubris in the extreme for any nation to expect that it will be able to maintain a geological disposal facility for thousands of years, that even the most extreme vigilance maintenance methods are vulnerable to a single lapse. It is to this that they argue in favour of burying nuclear waste in deep rock in deep ocean trenches. As such, they believe that this will pose far fewer technological problems and would have such significant natural barriers in which the foreseeable future wastes could be buried and left with minimal reliance on guardianship.[31] Grossman and Cassedy's argument against a geological repository facility also creates room for an exercise of objective judgements on whether there are adequate protective measures against the risk of nuclear waste from nuclear energy producing states. For example, the threat here may be the risk of a terrorist attack against disposal repositories, thereby causing severe damage such as the catastrophic release of radiation. This is of great concern as there are indications that nuclear installations in many countries of the world such as the USA are not adequately protected.[32] However where the UK is

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[28] Ibid, above 802

[29] Finnish Energy Industries, Nuclear Waste Management in Finland, page 10. Available at <http://www.energia.fi/en/publications/nuclear%20waste.pdf> last accessed 10 August 2011

[30] P.Z. Grossman and E.S. Cassedy, Cost-Benefit Analysis of Nuclear Waste Disposal: Accounting for Safeguards, *Science and Technology, & Human Values*, Vol. 10, No. 4 (1995) 49

[31] Ibid 50

[32] Starr, 'NRC Memo Warns of Attacks on Nuclear Plants', CNN, 31 January 2002. Available at <http://archives.cnn.com/2002/US/01/31/ret.terror.threats> accessed last 12 September 2011

concerned, such protective measures may specifically query the role, functions and effectiveness of the Civil Nuclear Constabulary in safeguarding nuclear materials.[33]

Having said this, it is to the concerns and challenges discussed above that some commentators have termed the UK government's policy to adopt a geological disposal method for the permanent disposal of nuclear waste as a "quick fix" for the development of nuclear power.[34] They consider the government's decision as haste to approve a new generation of reactors before solving the existing nuclear waste problems as advised by the RCEP. This is not surprising. After all, the government's position is that the current lack of a final disposal should not be a barrier to the development of nuclear power.[35] Besides, the recommendations of the CoRWM's also add further scepticism. It is because these recommendations are directed to existing and committed waste arising only and not from nuclear new build. In its view, should a new build programme be introduced, it would require a quite separate procedure to test and validate proposals for the management of the wastes arising from such a programme.[36] In view of this, it therefore appears to be the case that the government is concerned more with legacy wastes than those that will be produced. Arguably, this may not only have implications for future generations as discussed so far but also appear to be yet another partial solution to the issue of nuclear waste in the UK. Hence, it is considered necessary at this point to examine the role of law in addressing the concerns and challenges of nuclear power that are imposed on the society as a whole.

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[33] Civil Nuclear Constabulary, available at <http://www.cnc.police.uk/> last accessed 17 September 2011
[34] D. Lowry and others, 'No Quick Fixes on Nuclear Waste', available at <www.guardian.co.uk/politics/2007/aug/07/greenpolitics.nuclear> accessed 15 July 2011
[35] DECC, *Revised Draft National Policy Statement for Nuclear Power Generation*: Vol. II (HSMO, 2010)
[36] CoRWN doc. 2749, CoRWN Statement of its Position on New Build Wastes, Final (2 March 2010)

3.4. GENERAL PRINCIPLES OF THE UK RISK REGULATORY REGIME

Having highlighted the nature of the risks, and also the concerns and challenges of nuclear power by using nuclear waste as an example, attention is now drawn to the principles of environmental risk regulation that minimises and set the level of risk we can live with. As we will see below, these approaches appear problematic as they pose further environmental concerns in terms of the unknown/uncertain effects of the risks of nuclear power.

3.4.1. International Commission on Radiological Protection

The radiological protection principles underpinning the government's policy take account of the ICRP.[37] According to the ICRP protection system, any practise involving the exposure to radiation should be based on three major practices. The first is a practise of justification, that is, no practise involving exposure to radiation should be adopted unless it produces sufficient benefit to the exposed individuals or to society to offset the radiation detriment it causes. The second is the optimisation of protection. That is in relation to any particular source within a practice, the magnitude of individual doses, number of people exposed, and the likelihood of incurring exposures should all be kept "As Low As Reasonably Achievable" (ALARA)[38] taking account of economic and social practices. The third is the individual dose risk limits, that is, the exposure of individuals resulting from a combination of all relevant processes should be subject to dose limits, and ensuring that no individual is exposed to radiation risks which are judged to be unacceptable in any normal circumstances.[39] These aspects are considered to be of paramount importance in radiological protection because of the complexity of

[37] ICRP Publication 60 (1990), Para. 112

[38] Note: In the UK the term "As Low As Reasonably Practicable" (ALARP) is commonly referred to. The ALARP approach grew out of the safety case concept developed formally in the UK (The public inquiry into the Piper Alpha disaster: London, HSMO 1990). It requires operators and intending operators of a potentially hazardous facility to demonstrate that the facility is for its intended purposes; the risks associated with its functioning are sufficiently low; and that sufficient safety and emergency measures have been instituted.

[39] See also: S. Tromans and J. Fitzgerald, n 19 above 211

the dose distributions in both time and space, and the presence of natural sources of radiation.[40]

These requirements are indentified in the EU provisions of the Basic Safety Standard Directive 96/29/EURATOM laying down basic safety standards for the protection of the health of workers and the general public against the dangers of ionising radiation.[41] The main provisions of the Directive are the same as those of the ICRP mentioned above. In any case these are: the justification principle, whereby the relevant activity resulting in exposure must be justified in advance by the advantages that would be achieved from the activity; the optimisation principle, that all exposure is to kept as low as reasonably achievable; and the setting of dose limits for exposure to individuals.

3.4.1.1. The Justification Principle

Out of the three principles stated above, the justification principle has so far been the most controversial aspect of the ICRP recommendations in the UK and has given rise to litigation.[42] An example is the case of *R v Inspectorate of Pollution, ex p Greenpeace Ltd (No 2)*[43] which was a challenge to variations granted by Her Majesty's Inspectorate of Pollution (HMIP) and Ministry of Agriculture, Fisheries and Food (MAFF) to allow the temporary testing of new thermal oxide reprocessing plant (THORP) operated by British National Fuel Limited (BNFL) at Sellafield. Greenpeace who opposed the variations were asked whether they wished to request a hearing in the inquiry process, but declined to respond. Following the granting of the variations, Greenpeace sort for judicial review to quash the decision and to grant an injunction to stay the

[40] ICRP, n 37 above, "The Biological Basis of Commission's Policy".
[41] Note: The protection of workers and the general public from hazards of ionising radiation in the UK also relies on the general duties applying to employers under the Health and Safety at Work, etc. Act 1974 and overlaid by the Justification of Practices Involving Ionising Radiations Regulations 2004. Besides, the requirement is also of importance in the licensing of nuclear installations
[42] Note: the question of failure to follow the principle of optimisation has also been tested in the USA. In *James v Southern California Edison Co.* District Court for the Southern District of California. D.C. No CV-94-01085-NAJ. and 94F3d651 US App. LEXIS 37542, the Court ruled that the principle was the standard by which the duty of care should be determined, and that the defendant must demonstrate that the release/exposure was as low as reasonably achievable and it is for the jury to decide if it had been achieved. Also, the ALARA principle has also been scrutinised in terms of the definition of what is reasonable; see: B. Ale, *Risk: An Introduction – The Concepts of Risk, Danger and Damage* (Routledge, London 2009) 110
[43] [1994] 4 A11 ER 329.

implementation of variations so as to prevent testing. The case came before Brooke J. who granted judicial review but refused to impose a stay on implementation. The decision was upheld by the Court of Appeal.[44]

On the ground of challenge by Greenpeace was the absence of justification. The substantive application to quash the variations was heard by Otton J. on two grounds. The first relates to the lawfulness of the way in which the variation procedure was used, and the second relates to the alleged absence of justification of the process from which the waste discharges would arise. In respect of these two grounds, Greenpeace relied upon the Radioactive Substances Act 1960: A Guide to the Administration of the Act, which states that "all practices giving rise to radioactive waste must be justified, that is, the need that such practice must be established in terms of its overall benefits".[45] In addition, Greenpeace also referred to article 6(a) of the Basic Safety Standards Directive 80/836/EURATOM[46] which states that "every activity resulting in an exposure to ionising radiation shall be justified by the advantages which it produces". Otton J. held that "there was a general obligation on the authorising bodies in considering when to permit the discharges necessary for testing to consider the health and safety aspect and in particular whether the amount of radioactive waste to be discharged would pose a significant risk to the health or safety of the public. He added that there was no obligation upon the authorising bodies to consider the wider issues which were already under consideration through the consultation process as extended relating to the main operation".[47] In support, the evidence of HMIP and MAFF also indicated the low levels of discharges involved, and that the discharges were below existing and authorised limits.[48] Otton J. however concluded that the justification requirements of the Guide to Radioactive Substance Act 1960 and Directive 80/836/EURATOM had been satisfied and that it was not necessary to go into social and economic issues arising out of the

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[44] *R v Inspectorate of Pollution, ex p. Greenpeace* [1994] 4 A11 E.R. 321, C.A. See also: Tromans n 21 above 246

[45] The Department of Energy's 1982 Publication, The Radioactive Substances Act 1960: A Guide to the Administration of the Act, Para. 46(a)

[46] Council Directive 15 July 1980 amending the Directives and laying down the basic safety standards for the health protection of the general public and workers against the dangers of ionising radiation, as amended by 84/467/EURATOM

[47] [1994] 4 A11 ER 329, Para. 56

[48] Ibid, Para. 57

main authorisation. This he based on the fact that the justification issues had been considered by Ministers on the main application and there was a distinct possibility would be authorised; that the need for testing was established in terms of its overall benefit and the regulating bodies having taken note of the benefit such temporary testing would produce; and that it was relevant to bear in mind that the need for THORP had been considered at the planning stage and do not require re-evaluation.[49]

The main authorisation process to permit radioactive discharges was strongly challenged in *R v Inspectorate of Pollution, ex p Greenpeace Ltd*[50] in which Greenpeace and Lancashire County Council sought to quash the decision to grant authorisations for the disposal of radioactive waste from THORP. In this case, the hearing was before Potts J. who identified two main issues for the justification process. These are: whether there was a legal requirement to consider justification, and whether the finding that the activities giving rise to the discharges permitted by the authorisation were justified was irrational. Also, other issues that were raised included: issues relating to environmental impact assessment (that is, whether Directive 85/337 applied and whether the essential requirements of the provisions of the Directive were complied within any event); the issue of consultation; and local inquiry (that is, whether the decision not to hold an inquiry was flawed or irrational).[51]

In relation to the first issue, Greenpeace referred to *R v Inspectorate of Pollution, ex p Greenpeace Ltd (No 2)* and the reference of challenge made in the case. It however also made reference to the place of justification in the system of radiological protection recommended by the ICPR above, and to Re-Ionising Radiation Protection in E.C. *Commission v Belgium*[52] where Advocate General Jacobs stated in his opinion that the general principles upon which the system of radiological protection recommended by the ICRP are based in ICRP publication 60 and reflected in article 6 of the Basic Safety Standards Directive 80/836/EURATOM. The question for Potts J. was whether justification must be considered in exercising powers of authorisation and variation

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[49] Ibid, Para. 59-61
[50] *R v Secretary of State for the Environment, ex p. Greenpeace Ltd* [1994] 4 A11 ER 352
[51] Ibid, Para. 32. on the Assessment of the Effects of Certain Public and Private Projects on the Environment, amended by Council Directive 97/11/EC
[52] [1993] 2 C.M.L.R. 513 at 524

under section 13 and 16 of the Radioactive Substance Act 1993 which was silent on the issue. This raised difficulties as to the relationship between article 6 and 13 of Directive 80/836/EURATOM, and Potts J. held that the principle set out in article 6(a) of Directive 80/836/EURATOM must be applied. For instance, a justification exercise of this type must be applied to every consideration of an authorisation of radioactive waste discharge under s13 and 16 of RSA 1993.[53] On the other hand, Greenpeace argued in relation to the second question that the Ministers had failed to consider all relevant information in that they had not checked BNFL's assertions as to future contracts and viability; that they did not insist on seeing a report made for BNFL by Touche Ross (Accountants) on the future viability of THORP and disclose it; and that they did not properly consider possible alternatives to THORP, for example dry storage.[54] Potts J. held that the Ministers were entitled to reach this conclusion on the material available to them; that they were entitled to reach this conclusion without seeing the Touche Ross report.[55]

Furthermore, the issue of justification was also challenged in *R v Secretary of State for Environment, Food and Rural Affairs; ex p Friends of the Earth Ltd and Greenpeace Ltd.*[56] In this case, the Court of Appeal considered the application of the principle that the proposed practice by BFNL of manufacturing mixed oxide fuel (MOX) at Sellafield was justified. Importantly, the case gives an indication as to how major projects in the UK are subject to economic and environmental appraisal and the problems arising from the lack of specific legislation on justification.[57] In this regard, the government had concluded that the manufacture of MOX fuel had only very minor radiological detriments and that it would provide economic benefits that were capable of justifying it as a class or type of practice.[58] As such, the claimants argued that the government had disregarded the sunk costs of building the fuel plant. They submitted that in determining the economic benefits of the new type of practice, it was necessary to include the costs of enabling it to come about. In dismissing the application, the Court

[53] Ibid, Para. 35
[54] Ibid, Para. 49
[55] Ibid, Para. 58-59
[56] [2001] EWCA Civ 1847; [2002] Env LR 24
[57] S. Tromans, n 21 above 249
[58] [2001] EWCA Civ 1847; [2002] Env LR 24, Para. 13

held that the costs incurred in setting up a plant so as to enable the type of practice to be carried out were not to be set against the economic benefits. The Court acknowledged that although it was important to have regard to the process being undertaken, namely the determination of the economic benefit on the basis of economic benefits, however, the capital costs incurred in the construction of the MOX plant were not costs that could be said to be included in the practice itself and should therefore be ignored.[59]

The fact that the Court in this case acknowledged that justification could be best considered when applicants are encouraged to apply for an authorisation at an early stage in a project,[60] raises further concern in the process of justifying the construction of new nuclear reactors. In this regard, it has been argued that there are likely problems because information on how radiation waste, radiation spent fuel, and health impact of radiation discharges, will not be fully assessed until after the justification decision is taken.[61] This may present enormous legal challenges given that justification once concluded may foreclose on any future discussion on issues that are relevant to the development of nuclear power. For example, such challenges may arise under the planning system where the government has taken away safety issues from the public inquiry process. It has however been suggested[62] in relation to this, that the government should hold an independent inquiry as permitted under the regulations governing justification, in order to allow room for further risk considerations by public.[63]

3.4.2. Limits of Risk-Based Approaches

In addition to the above, it is arguable that the outcome of higher level of concern to protect the environment in terms of radioactive discharges has been the move towards newer approaches. These approaches to environmental risk regulation do not however provide a solution to the concern over the nature of the risks of nuclear power.

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[59] Ibid, Para. 17
[60] Ibid, Para. 15
[61] P. Dorfman, 'Justification of New Nuclear Power in the UK', available at <http://blogs.reuters.com/great-debate-uk/2009/05/26/justification-of-new-nuclear-power-in-the-uk/> accessed 15 November 2011
[62] Ibid
[63] The Justification of Practices Involving Ionising Radiation Regulations 2004 (No. 1769), Regulation 17

An example of risk-based approach, that is, the method of radioactive discharge screening levels employed to ensure that discharge levels are not exceeded[64] can be found in the Integrated Pollution Prevention and Control (IPPC) Directive 96/61/EC[65] which mirrors the UK Integrated Pollution Control system (IPC), although to a broader scope. The provisions of the IPPC Directive are specific systems of control that oblige the Member States to take an integrated approach to the protection of the environment by limiting environmental impacts of certain industrial operations. The primary aim is to address pollution problems in an integrated manner that takes account of all three environmental media, i.e., air, water, and land; based on the recognition that substances can move among environmental media as they travel along pathways from sources to receptors, and that controls over releases of a substance to one environmental medium can result in shifting the substance to another medium.[66] At the same time, these objectives reflect the principles of the EU's environmental policy namely, the principle of prevention; the polluter pays principle; and precaution principle. In the nuclear context, the preventive principle can be used to identify known risks and may be seen in operation in decisions to contain a nuclear reactor, to create a pressure boundary and to provide containment to guard against the possibility of accidental escape of radioactive materials; where that is not possible (where risk is unknown), the precautionary principle comes into play as the law must intervene in cases of uncertainty; and where the environment is damaged, the polluter is strictly liable to pay.[67]

The source based control of the IPPC Directive is the "Best Available Technique" (BAT). The BAT is described in the Directive as an "advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent, and where that is not practicable, generally to reduce

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[64] European Commission, Radiation Protection: *Effluent and Dose Control from European Union NORM Industries – Assessment of Current Situation and proposal for a harmonised Community Approach.* Vol. 1: Main Report, Iss. No. 135, page xii

[65] Amended by Directive 2008/1/EC concerning integrated pollution prevention and control. It is implemented in England and Wales by the Pollution Prevention and Control Act 1999, and the Pollution Prevention and Control (England and Wales) Regulations 2000 SI 2000/1973 (PPC Regs) as amended

[66] Ibid, Preamble of the IPPC Directive

[67] P. Riley, n 1 above 16. Note that this principles also provide guidance for UK Environmental Agency in pursuit of radioactive discharge strategy; see DECC, *UK Strategy for Radioactive Discharges*, July 2009

emissions and the impact on the environment as a whole".[68] "Techniques" includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned; "Best" is the most effective in technique in achieving a high level of environmental protection; of which "Available" means the techniques which have been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the cost and advantages, whether or not the techniques are used or produced in the Member State in question, as long as they are reasonably accessible to the operator.[69]

Indeed, the mechanism of BAT signifies the establishment of a legally enforceable standard to which methods of pollution control must be adhered to in the EU. For example, it makes provision that all permits issued in pursuant to the regime must be underpinned by the requirement to use BAT in respect of the technology and methods used to reduce risk and pollution by taking into consideration the costs and advantages.[70] It however looks likely that a technique may be rejected as BAT if its costs would far outweigh the environmental benefits. Besides, the fact that the Directive also requires permits to contain suitable release monitoring requirements, specifying measurement methodology and frequency, evaluation procedure and an obligation to supply the competent authority with data required for checking compliance with the permit,[71] also indicates that nuclear power[72] operators are obliged to achieve the set standards during the operation of nuclear installations, so also are regulators who are guided by it when granting permit for industrial installations. In the event of non compliance with the standards by operators, the BAT could have drastic results and potentially requiring elimination of activities.[73]

In this regard, it is the duty of the UK Environmental Agency (EA) to ensure that BAT is applied accordingly. The EA is to ensure that: the holders of authorisations

[68] Art.2(12) of Directive 2008/1/EC
[69] Art. 2(12)(a-c) of Directive 2008/1/EC
[70] Art. 2 (12) & 9 (1)-(4) Directive 2008/1/EC respectively
[71] Art. 9(5)-(6) Directive 2008/1/EC
[72] Annex I (1.1), and listed in the PPC Regs as a Part A (1) activity subject to regulation by the EA
[73] A. Babich, 'Too Much Science in Environmental Law' 28 *Columbia Journal of Environmental Law* (2003) 119, 127

under the Radioactive Substances Act 1993 adopt these where appropriate; that limits should be set at the minimum levels necessary to permit "normal" operation or decommissioning of a facility; and that in regulating the normal operation or decommissioning of a facility, the EA should take into account the relevant operational fluctuations, trends and events that are expected to occur over the likely lifetime of the facility. Also, the EA is to ensure that waste management decisions by such holders are based on BAT in order to prevent the unnecessary creation of waste or discharges, to minimise waste generation; and to minimise the impact of discharges on people and the environment, and where a legally binding obligation requires stricter conditions and limits than those which would be required by the application of BAT, the EA is to ensure that those stricter conditions and limits are applied.[74]

As it stands, the application of BAT looks relatively developed to integrate and include further measures aimed at facilitating environmental protection (at least beyond the UK IPC systems even though they achieve similar objectives). Nevertheless, it is arguable that over development in regulation may be damaging to the environment. A good example to explain this is the theory that by imposing significant compliance costs, regulation may indirectly cause damage in the environment, such as deaths. In this regard, it has been argued that individuals with more disposable income are less likely to die, to become ill, or to suffer accidental injury. That is, a regulation that imposes significant costs on people could produce a negative health effect that more than counteracts the positive health effect from reduced exposure to harmful substances.[75] Arguably, akin to this is the flexibility approach developed in the BAT which may also compromise its effectiveness. For example, costs and advantages are clearly to be taken into account, but there is no further detail on either which costs and advantages might be relevant or the appropriate response to those costs and advantages.[76] How the costs and

[74] DECC, Statutory Guidance to the Environmental Agency Concerning the Regulation of Radioactive Discharges into the Environment, 2009. Available at <http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/nuclear/radioactivity/dischargesofradioactivity/1_20091202160019_e_@@_guidanceearadioactivedischarges.pdf> last accessed 25 December 2011

[75] Frank B. Cross, When Environmental Regulations Kill: The Role of Health/Health Analysis, 22 *ECOLOGY L.Q.* 729, 730-31 (1995)

[76] M. Lee, *EU Environmental Law: Challenges, Changes and Decision-Making* (Hart Publishing, Oxford 2005) 167

benefits are to be weighed remains open and indeed a major concern in relation to environmental risk matters. However, the European Commission has also made it clear that where authorities of Member States systematically set emission limit values that are too lenient and not based on BAT, the Commission may be forced to introduce Community emission limit values.[77] While this remains an issue yet to be seen, the flexibility given to Member States may also help to justify setting low emissions limit values in that it is necessary in cases where other key government objectives need to be met. For example, this may be in terms of safe and timely decommissioning of existing facilities, securing energy supply through new build, and maintaining defence capabilities.[78]

Having said this, the application of BAT in setting emissions value raises further concern in terms of privatisation of the nuclear industry in the UK. To simply put, private investors may ignore the small probability of serious consequences just because they have their interest devoted to other areas such as profit making. For example, such interest may be connected to waste issues or even the cost of decommissioning in extreme cases. As such, any unnecessary cost may be damaging to the company. My point here is that these companies may have little incentive to design the reactor or even to operate the plant with a view to minimizing risks.[79]

3.4.3. Cost Benefit Analysis

In addition to the issues discussed above relating to the regulation of radioactive discharge into the environment from nuclear installations, further weakness are apparent in the move towards the integration of economic analysis in environment risk regulation. Questions however remain on whether it is appropriate to adopt an economic approach in light of uncertainty. For example, how can the CBA help to improve the protection of

[77] Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - On the Road to Sustainable Production - Progress in implementing Council Directive 96/61/EC concerning integrated pollution prevention and control COM/2003/0354 final

[78] S. Tromans, n 19 above 451

[79] D. Helm, Nuclear Power, Climate Change, and Energy Policy, in D. Helm and C. Hepburn, The *Economics and Politics of Climate Change*, (Oxford University Press, Oxford 2009) 252

the environment? Or perhaps, would the CBA impose unnecessary environmental cost or burden?

In brief, CBA is an appraisal tool for assessing the relative costs and benefits of a project, including non-financial costs and benefits to society and the environment.[80] Under CBA, cost is anything that sacrifices some want or incurs some loss of welfare and which would not have occurred had the project in question not been undertaken. Benefit on the other hand, is any gain in welfare brought about by the project and which would not have occurred in its absence.[81] These are usually measured in the environment as individuals' willingness to pay for a gain or willingness to pay to avoid a loss (revealed preference). For example, it may be by reference to relative property values or individuals' willingness to accept compensation to tolerate a loss, or to go without a benefit (hypothetical preference).[82] In turn, a decision is then justifiable when the net benefit is positive or a benefit to cost ratio is greater than one; and in theory, only measures that are demonstrated to be efficient and create more benefit than cost are to be pursued. The basic rule is however not to sanction anything where the costs exceed the benefits, but rather to choose the option that maximises the difference between benefits and costs.[83]

It is often the case in environmental risk decision-making to employ CBA so as to ensure that better decisions are made and perhaps avoid inefficiency in government, such as making unfavourable environment decisions. For example, the Environmental Act 1995 provides that the EA in considering whether or not to exercise any power conferred upon it by or under any enactment, must take into account the likely costs and benefits of the exercise or non-exercise of the power or its exercise in the manner in question.[84] There are also findings that the practice of CBA long precedes the Environmental Act. An example is the Environmental Protection Act 1990 which

[80] P. Stookes, A Practical Approach to Environmental Law (Oxford University Press, Oxford 2005) 619
[81] D.W. Pearce, Social Cost-Benefit Analysis and Nuclear Futures, *Energy Economics* (1979), Vol. 1, Iss. 2, 66-71, 66
[82] D. W. Pearce, Cost-Benefit Analysis and Environmental Policy, *Oxford Review of Economic Policy* 14, No. 4 (1998), 84-100, 84. See also: M. Lee, n 76 above 5
[83] M.S. Baram, Cost Benefit Analysis: An Inadequate Basis for Health, Safety, and Environmental Regulatory Decision-making, 8 *Ecology L.Q.* (1979-1980) 478
[84] S.39 Environmental Act 1995

provides that in any authorization, there should be specific conditions as the regulator considers appropriate for ensuring that the best available techniques not entailing excessive costs will be used in carrying on a prescribed process.[85] Also in the nuclear industry, the CBA is been used for setting environmental safety standards. For example, the justification principle of the ICRP involves weighing the benefits arising from an activity against the radiation detriment it produces. Thus, it is right to say that CBA aims to set out for government (in this case the nuclear regulators) what the market does for business.[86]

In principle, in order for CBA to be performed in the manner in which it is expected, all costs and benefits must be articulated in a monetary measure, usually in dollars, including things not normally bought and sold on markets, and to which dollar prices are therefore not attached.[87] As examined below, it is not as simple as this description might suggest.

3.4.3.1 Issues Generated by Nuclear Power

The use of the CBA in environmental risk regulation raises many important policy concerns. This includes: first, the concern over the decision-making process itself. It questions whether the full complexity of the value of the environment such as ecological change, and that whether human life and health, that are not goods are capable of expression in monetary terms. Surely, CBA thrives best when market pricing is available to measure the costs and benefits, and when the measurement can be expressed in dollars or some commensurate unit. For example, the direct and indirect financial costs of externalities such as failed crops, ill health or dirty water, can in theory be calculated, but their physical effects and regulation are complex and unpredictable, as well as hard to price.[88] Without the knowledge of environmental physical effects to adequately measure these factors, the CBA may lead to conclusions that are ethically unacceptable.

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[85] S.7 Environmental Protection Act 1990

[86] F. Ackerman and L. Heinzerling, Pricing the Priceless: Cost- Benefit Analysis of Environmental Protection, *University of Pennsylvania Law Review,* Vol. 150 (2002)

[87] S. Kelman, Cot-Benefit Analysis: An Ethical Crittique, *AEI Journal on Government and Society*, (1981 Issue) 36

[88] M. Lee n 76 above 6

The UK Natural Environment White Paper acknowledges this complexity by stating that most of the benefits that are derived from nature are not properly valued, and that when nature is undervalued, bad choices can be made.[89] The government's response however, is to establish an independent Natural Capital Committee to educate and inform it on the state of the environment by providing advice on when, where and how environmental assets are being used unsustainably; on how the government should prioritise action to protect and improve the environment so that there is focus where it will have greatest impact on improving wellbeing in our society; and also to advise the government on research priorities to improve future advice and decisions on protecting and enhancing the environment.[90]

Arguably, one way in which the Committee may carry out its duties in the absence of environmental measurement certainty is to follow contingent economic practices such as individual willingness to pay. For some environmental economists, these practices point towards a solution in finding an economic value for environmental assets. Pearce and Barbier[91] for example, argue that if we know what the economic value of an environmental asset is, we can work towards the capture of that value by creating a market for the asset; and also knowing how people value an asset for example, can help find the price that will be charged to those people for using the asset, and that price translates to a revenue which, in turn, can be used for finance conservation. However, the methods for such contingent economic practices that are usually employed to determine such economic valuations have been criticised. For example, critics argue against the use of economic valuation methods in that the results of contingent valuations are inconsistent with economic theory.[92] It is towards this that Hanemann[93] adds that how a contingent valuation is conducted is definitely crucial to its conclusions. At the same time he raised objections that contingent valuations such as surveys are vulnerable to response effects in the way in which respondents interpret the meaning of

[89] DEFRA, *The Natural Choice: Securing the Value of Nature*, Cm. 8082, (June 2011) Para. 3.11
[90] Ibid
[91] D. Pearce and E.B. Barbier, *Blueprint for a Sustainable Economy* (Earthscan, London, 2000) 2
[92] P. A. Diamond, et al, "Does Contingent Valuation Measure Preferences? Experimental Evidence." In Hausman, J. A., ed., *Contingent Valuation: A Critical Assessment.* (New York: North-Holland, 1993) 41-89.
[93] W. M. Hanemann , Valuing the Environment Through Contingent Valuation, *The Journal of Economic Perspectives*, Vol. 8, No. 4 (Autumn, 1994), pp. 19-43

questions; and that because the survey process creates the values, the issue is whether preferences through surveys are a construct or whether they are a stable construct; and also that such survey responses cannot be verified.[94] To this point, it is clear that using contingent economic valuations may create a market for non-market environmental goods. Yet, this remains an area in which decision-makers must tread carefully because the individual involved in contingent valuations may refuse to give any figure or put figure on environmental resources.[95] In such cases, the survey process may appear problematic for the purposes made for.

Second, the CBA even becomes less attractive if one correlates it with the future impact of uncertainty. For example, the distant future costs and benefits may appear as insignificant present values when the CBA is practised.[96] In view of the provision of article 1(ii) of the IAEA Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management which provides that individuals, society and the environment should be protected from harmful effects of ionising radiation "now and in the future" in such a way that the needs and aspirations of the present generation are met without compromising the ability of future generations to meet their needs and aspirations, and also article 4(vii) which goes further by requiring appropriate steps to be taken to avoid imposing undue burdens on future generations, the question is whether the CBA as currently practised, prevents an undue burden to future generations where nuclear waste for example is concerned. The answer will probably be "no". This is because it seems unlikely that it does not represent an attempt to prevent risk to future generations. To adopt the use of CBA in this regard raises explicit questions about nuclear waste that will be produced and that of the management of legacy wastes. As to this, whether nuclear wastes are stored for some period or reprocessed for further use, or perhaps disposed of permanently, there still exist unknown risks relating to it and which needs to be settled. To have a CBA that provides reasonable judgements, advocates need precise data on risks and benefits. Of course,

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[94] Ibid, 21-29
[95] Ibid
[96] D. Pearce et al, Cost-Benefit Analysis and the Environment: Recent Developments, (OECD Publishing, 2006) 23

producing such information is a difficult task considering the uncertain nature of the risk posed by the storage and disposal of nuclear waste.

Third, discounting is another controversial issue of the CBA. A good example to explain this is to consider it in light of Stern's formidable report.[97] This report makes an economic case for climate change by attributing future values to contextualise the effects of climate change. The report sets out the economics of moving to a low-carbon global economy, focusing on the medium to long-term perspective, and drawing implications for the timescales for action, and the choice of policies and institutions; the potential of different approaches for adaptation to changes in the climate; and also specific lessons for the UK, in the context of its existing climate change goals. The report which used an economic technique to assess the impacts of climate change has been extensively criticised among economists. For example, some have argued that the discount rate adopted for the treatment of risk and uncertainty is inappropriate, and that the calculation and comparison of costs and benefits is done incorrectly.[98] Others also contend that because the attributed values are likely to change, estimates of environmental costs and benefits are likely to be variable and lead to conclusions that are ethically unacceptable.[99]

Indeed, these criticisms suggest that discounting procedures for the costs and effects of the environment understates the possible future impacts and may give rise to unfavourable assumptions over environmental effects and their impacts. For example in the present context where there is increasing concern over the impact of climate change, the use of CBA may make the society even more vulnerable to its adverse effects. Also in nuclear power context, even if the principle of discounting is applied, the rate of discount applied to the appraisal of a nuclear power plant may at the same time not be

[97] N. Stern, *The Economics of Climate Change*, (Cambridge University Press, Cambridge 2007)
[98] See Frank Ackerman, "Debating Climate Economics: The Stern Review vs. Its Critics," report to Friends of the Earth, July 2007, <http://www.ase.tufts.edu/gdae/Pubs/rp/SternDebateReport.pdf> accessed 7 August 2011
[99] P.Z. Grossman and E.S. Cassedy, n 30 above 47

the most appropriate rate for the assessment of additional safety measures for example.[100]

In addition, the CBA also raises distributional concerns as to the manner in which environmental valuables should be distributed.[101] For example, it is arguable that a decision to allow the disposal of nuclear waste in a Community may result in economic benefits to the industrial promoters and the government. On the other hand, it may result in severe health concerns for those living in the vicinity in the event of a catastrophic disaster. With regard to this, Stokey and Zeckhauser[102] noted that a program should only be adopted if it would yield benefits to one group greater than the losses that would be occasioned to another group; or provided that the two groups are in roughly equivalent circumstances and the changes in welfare are not of great magnitude; or if it redresses the discriminatory effects of earlier policy choices, that policy should be undertaken. However, Baram[103] believes that such an approach has the tendency to ignore constitutional precepts underlying the decision-making process. He argues that constitutional guarantees of due process, equal protection, property rights, and representative government should carry greater weight in solving distributional problems than any other assumptions on fairness developed by economists. In light of this arguments, one may draw the conclusion that society already accepts some distributional disparities possibly in terms of scare economic needs and individual wants. However, making environmental decisions based on economic efficiency as argued by Babich may nonetheless qualify as environmental betrayal.[104]

From the above, it is clear that the CBA appears not to attach any significance to environmental risk and this makes it less suitable in environmental risk decision-making. Nonetheless, economists may still find it easy to contend that the CBA has a distinct use in drawing up a list of the pros and cons of an investment without that much analysis

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[100] HSE, n 10 above 51
[101] A. Liberatore, *The Management of Uncertainty: Learning From Chernobyl*, (Gordon and Breach Publishers, Amsterdam 1999) 4
[102] E. Stokey and R. Zeckhauser, A Primer for Policy Analysis (W.W. Norton, 1978) 281
[103] M.S. Baram, n 83 above 488
[104] A. Babich, n 73 above 137

taking place.[105] How far it can go remains controversial once we start to consider the risks of nuclear power and its uncertain nature. It is however in dealing with uncertainty that the precautionary principle appears to be an appealing solution.

3.4.4. The Precautionary principle

Over the past decades, the precautionary principle has been integrated into a number of international agreements and domestic laws. The way in which it has been incorporated into these laws create the path for critiques to voice their concerns as to the varying definitions of the principle. While such criticisms are beyond the parameters of this section, it is indeed vital to highlight some of these definitions. For example, the Rio Declaration states that, 'in order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, the lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation'.[106]

The precautionary principle has also received considerable attention in the EU. The European Commission highlights the fact that the principle should be considered within a structured approach to the analysis of risk and that it is particularly relevant to the management of the risk.[107] The Treaty on the Functioning of the European Union (TFEU) also provides that environmental policies shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventative action should be taken, that environmental damage should, as a priority, be rectified and that the polluter shall pay'.[108] This provision has been applied by the Court, notably in *Pfizer animal health SA v Council*[109] where it was held that 'it is appropriate to bear in mind

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[105] D.W. Pearce, n 81 above 71

[106] Principle 15 of Rio Declaration available at <http://www.environmentandhumanrights.org/resources/Rio%20Declaration.pdf> last accessed 15 July 2011

[107] Commission of the European Communities, Communication from the Commission on the Precautionary Principle, Brussels, 02/02/2000, COM (2000) 1, Summary Para. 4

[108] Article 191 of TFEU (ex Article 174 TEC)

[109] Case T-13/99 [2002] ECR II-3305

that, as the court of justice and the court of first instance have held, where there is scientific uncertainty as to the existence or extent of risks to human health, the community institutions may, by reason of the precautionary principle, take protective measures without having to wait until the reality and seriousness of those risks become fully apparent'.[110]

The precautionary principle also features in the UK Government policy going by the UK Government's 1994 confirmation that it would comply with the suspension of dumping radioactive waste at sea.[111] This is a form of precaution against environmental hazards. Besides, it was a subject of the report of the Inter-Departmental Liaison Group on Risk Assessment (ILGRA) and they recommended that it should be invoked when there is good reason to believe that harmful effects may occur to human, animal or plant health or to the environment; and the level of scientific uncertainty about the consequences or likelihood of the risk is such that the best available scientific advice cannot assess the risk with sufficient confidence to inform decision-making.[112]

According to O'Riordan[113] the precautionary principle has six core elements namely: preventative anticipation, a willingness to take action in the absence of scientific proof of evidence of the need for the proposed action because precaution does not mean preventing manifest or predicted risks that have been scientifically proven; safeguarding of ecological space, that margins of tolerance should not even be approached, let alone be breached; proportionality of response or cost effectiveness of margins or error, to show that the selected degree of restraint is not unduly costly; duty of care on those who propose change, this raises profound questions over the degree of freedom to take calculated risks and to compensate for possible losses by building in ameliorative measures; promoting the cause of intrinsic natural rights, the notion of ecological harm is widened to include the need to allow natural processes to function in such a manner as to maintain the essential support for life on earth; and paying for past ecological debt, that is precaution is essentially forward looking but there are those who

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[110] Ibid, paragraph 139
[111] Review of Radioactive Waste Management Policy – Final Conclusions, Cm. 2919 (1995), Para. 16
[112] HSE, 'The Precautionary Principle: Policy and Application' available at <http://www.hse.gov.uk/aboutus/meetings/committees/ilgra/pppa.htm> assessed 19 April 2011
[113] O'Riordan et al, *Interpreting the Precautionary Principle*, (Earthscan Publications, London 1994) 17

recognise that in the application of care, burden sharing, ecologically buffered cost effectiveness and shifting the burden of proof, there ought to be a penalty for not being cautious or caring in the past.

The application of the precautionary principle however seems quite sensible in the nuclear power industry, possibly as a form of regulatory insurance.[114] For example, Riley[115] points out that the nuclear experience has probably been the paradigm for the development of the precautionary principle. In his analysis, he explained that the core elements of the principle mentioned above, for instance, the preventative anticipation and the safeguarding of ecological space can be seen in operation in the decisions to contain the nuclear reaction, and to create a pressure boundary to provide secondary containment to guard against the possibility of accidental escape of radioactive materials beyond the primary boundaries. That the provision of shielding in anticipation of future activities, the storage of irradiated fuel in shielded and accessible facilities which preserve options without harming the environment are actions in the absence of definitive knowledge of the way ahead. For example, we may say that the precautionary principle was to be in operation when the BNFL were penalised for not responding to the need to provide improved protection for a pipeline transporting potentially radioactive liquid.[116] On the other hand, Mossman and Marchant[117] argue that the application of the precautionary principle is not required in the context of radiation. They make a case that the ALARP principle is already in place to minimize radiation dosage in environmental settings; and as such the principle becomes irrelevant. This is based on the argument that radiation is one of the most thoroughly studied subjects of human health effects and that environmental doses are well-known. They also add that the risk of exposure to radiation does not meet the criteria identified in the EU

[114] C.R. Sunstein, The Paralyzing Principle, *Regulation*, Winter 2002-2003, 32-37, 32
[115] P. Riley, n 1 above 134
[116] Ibid, 137. Also, ENDS Report 276, April 1997, page 44
[117] K. Mossman and G. Marchant, The Precautionary Principle and Radiation Protection, 13 *Risk: Health, Safety & Environment* (2002) 137-149, 142

Communication, and that its existing scientific data lack the requirements identified to trigger the application of the principle.[118]

Although Mossaman and Marchant's argument may not necessarily apply to all nuclear related processes, there is however no doubt that much research has been done on radiation and the nuclear technology, even at times when there are gaps and inconsistencies in the evidence produced.[119] However going back to the definition of the precautionary principle – "in order to protect the environment the precautionary approach shall be widely applied by States where there is lack of full scientific certainty", it may as well be said that the phrase "lack of full scientific certainty' could refer to the "gaps and inconsistencies in any evidence produced", which should trigger the application of the precautionary principle. It may also be that in situations where there is minimum knowledge to the extent of the threat in question, or if we suspect that they could be catastrophic, we have every reason to use precautionary measures. Thus as regards to the issue of carbon concern, the decision to stop the use of nuclear power by some nations because of the risks attached to its use may well be against the precautionary principle.

On the other hand, it has been argued that the precautionary principle if applied may paralyse the development of new technologies, as nothing can ever be proved to be totally safe;[120] the only safe level of exposure is no exposure at all.[121] While also, there are arguments that the application of the principle serves to encourage the development of activities that may be ignored or completely neglected on the basis that the true nature

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[118] Ibid 142. European Commission, n 77 above at Para. 5 of Summary. Note: there are also arguments the Communication of the European Commission on the precautionary principle that the principle itself is ambiguous as to what level of acceptable risk, what role costs should play in risk decisions, what quantum of scientific evidence is sufficient for making decisions, and how potential risk-risk tradeoffs should be addressed. Nevertheless, the Communication still gives the most detailed guidance on the principle. See: L.D Guruswamy, 'Sustainable Agriculture: Do GMOs Imperil Biosafety?' (2001 – 2002) 9 *Ind. J. Global Legal Stud.* 461, 483

[119] K.R. Foster et al, Science and the Precautionary Principle, *Science*, Vol. 288, No. 5468 (2000) Page 979-981

[120] K. Morrow, Genetically Modified Organisms and Risk, in L. Bodiguel and M. Cardwell, *The Regulation of Genetically Modified Organisms: Comparative Approaches*, (Oxford University Press, Oxford) 72. See also Sunstein n 114 above

[121] A. Babich, n 73 above 123

of risk is not known.[122] However where the principle is invoked, it should be understood that it is not the elimination of risk that is sought, rather it is a question of identifying the risk and taking a decision as to what constitutes an acceptable level of risk.[123] Thus, one can conveniently say that in the application of the precautionary principle at policy levels in the field of nuclear power risk such as radiation operations, the principle can also be seen as part of RA and RM. However, the relationship between risk and the precautionary principle may also present some difficult challenges. For example, one may argue that the impossible burden of the continuing attempt to demonstrate that a particular activity is safe destroys scientific credibility; yet it is the ease of identification through science (that is, the reliance on the principle of sound science) that allows for limits to be set and monitored and for preventive measures to successfully operate.[124] Besides, the reliance on science may yet again raise public concern over environmental risk analysis and it should not be forgotten as discussed in Chapter Two above that the role of the public is quite significant in environmental risk decision-making.

CONCLUSION

Many will agree that the inherent risks that lie alongside the use of nuclear energy are major factors that affect its development in the UK and other parts of the world. This is because there are instances where the public (including the government) are sceptical about its use on the ground that it raises various uncertain health and safety problems, including the possibility of a catastrophic disaster; of which the principles discussed above offers little or no help in dismissing uncertainties.

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[122] N de Sadeleer, *Environmental Principles: From Political Slogans to Legal Rules* (Oxford University Press, Oxford 2002)
[123] K. Morrow, n 120 above 72
[124] P. Riley, n 1 above 137

CHAPTER 4
NUCLEAR POWER SAFETY REGULATIONS

4.1. INTRODUCTION

"We will experience big nuclear accidents from time to time, but we can and we will live with them".[1]

When James Lovelock made this statement, many pro-nuclear states would have argued that the management of nuclear safety and developments in nuclear engineering provides adequate protection against any nuclear power accident that may occur. This is true of the UK government who once acknowledged in its Energy Review that modern reactor designs are expected to increase nuclear power safety.[2] In spite of this regulatory assurance, it is by all means arguable that a way of assessing national nuclear power safety measures would be in the event of the occurrence of a nuclear disaster. This sounds rather extreme but there is little doubt that it will put into test, the nuclear power safety regime and installation facilities in operation. This is true of the recent Fukushima nuclear power disaster which provides the platform for the re-examination of nuclear safety regulations and reactor designs in the twenty-first century. In actual fact, such assessments should also lead way in assessing both the regional and international safety standards. For example, it should help assess the level of compliance with international conventions and treaties such as those of the IAEA, most especially as the provisions are not legally binding on contracting Parties. Such assessment may be on issues of nuclear waste for example, were large quantities of highly radioactive wastes were stored in pools on site when the disaster occurred.

Based on the foregoing, this chapter is based on the second half of the introductory quote –"but we can and we will live with them". I consider this important for present discussion because it raises questions in the subject of nuclear power safety measures and standards that are currently employed, to include disaster response management. For present purposes, how "we can live with nuclear power disaster" will be an analysis of nuclear safety regulations. Within this context, there is an array of

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[1] J. Lovelock, The *Revenge of Gaia: Why the Earth is Fighting Back – and How We Can Still Save Humanity* (Penguin Books, London 2006) 91

[2] DTI (2006), *Energy Review. The Energy Challenge*, (Cm 6887) July, HSMO

international, EU, and national legal instruments that address nuclear industrial activities, ranging from the siting and licensing of nuclear installations to the decommissioning of reactors. Thus, the question now is whether the Fukushima disaster reveals anything about nuclear safety regulatory framework; or perhaps whether the safety measures put in place can cope with any highly dangerous situation that may arise.

In answering these questions, this chapter is divided into four parts, and this introduction comes first. Part Two focuses on nuclear power safety measures. It looks at international, EU, and also UK regulations. Part Three follows the same procedure but this time it focuses on disaster preparedness. Both parts however examine the jurisdictional issues involved. Part Four looks at the way ahead. As such it examines whether there is need to review the safety provisions discussed in part two and part three. If so, it questions whether there are constraints.

4.2. DISASTER PREVENTION

The Fukushima nuclear disaster just like the Chernobyl disaster has so far not only been a catalyst for assessing nuclear power safety measures, but it also reminds us that the use of nuclear energy creates unavoidable risks for all states. Generally speaking, the problem for nuclear States is that the effects of the risk of a nuclear disaster may be felt in places separated by distance from the place where the incidence occurred. For example, every state and the environment is potentially affected by the possibility of radioactive contamination, the spread of toxic substances derived from the use of nuclear energy, and the long term health hazards consequent of exposure to radiation.[3]

In this regard, there are varieties of international and bilateral legal agreements, EU, and national instruments addressing nuclear safety; all with a common relationship to prevent a nuclear power disaster. With respect to this, the culture is usually through a licensing procedure that tends to shift the burden of proof of safety to an early point in time. This is the moment before operations have started. Such an approach directly shifts preventive measures to the operators of the nuclear installations, and the regulators enforcing all necessary requirements whether in the design of the reactor or in the operation of installations. As discussed in what follows, the question remains whether this approach to safety is effective in light of the Fukushima nuclear power disaster?; or does the Fukushima disaster reveal any doubt as to the role of the regulators or operators of nuclear installations?

4.2.1. International Regime On the Safe use of Nuclear Power

Art.III.A.6 of the International Atomic Energy Agency (IAEA) statute authorizes the IAEA to "establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger to life and property, and to provide for the application of these standards to its own operations as well as to the operations making use of materials, services, equipment, facilities, and information made available by the IAEA or at its request or under its control or supervision; and to provide for the application of these standards, at the request of the

[3] P. Birnie et at, *International Law & the Environment*, 3rd eds (Oxford University Press, Oxford 2009) 488

parties, to operations under any bilateral or multilateral arrangements, or, at the request of a State, to any of that State's activities in the field of atomic energy".

Having said that, the concern to ensure the safe use of nuclear energy generation and the use of radioactive substances under the IAEA statute is the enabling statute for the establishment of the Convention on Nuclear Safety (CNS), and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the Joint Convention). However, the non-binding nature of these Conventions and their substantive provisions appear to create some concerns in ensuring the safe use of nuclear power among contracting Parties. Below are some of these concerns as contextualised by the obligations of these Conventions.

4.2.1.1. The Convention on Nuclear Safety

The Chernobyl disaster led to the adoption of the IAEA CNS in 1994 to prevent the occurrence of such accidents in the future. It has since become the key instrument at the international level on nuclear power safety and it is based on the technical standards contained in the Safety Fundamentals of the IAEA.[4] Although in some countries such as the UK as discussed below, the requirements provided for in the CNS have been in effect for years before its adoption. This is in the form of Nuclear Installations Act (NIA) 1965 which provides a regime of control and liability in relation to the installation and operation of nuclear reactors and other installations designed or adapted for the production or use of nuclear energy, including the storage, processing, and disposal of nuclear fuel. The CNS nevertheless remains the start point on discussions relating to international nuclear safety.

The objectives of the CNS on nuclear power safety management are: to achieve and maintain a high level of nuclear safety worldwide through the enhancement of national measures and international co-operation including, where appropriate, safety related technical co-operation; to establish and maintain effective defences in nuclear installations against potential radiological hazards in order to protect individuals, society and the environment from the harmful effects of ionising radiation from such

[4] *The Safety of Nuclear Installations*, IAEA Safety Series No.110, 1993

installations; and also to prevent accidents with radiological consequences and to mitigate such consequences should they occur.[5]

A major part of the CNS requires contracting parties to take appropriate steps to ensure that safety at nuclear installations are given due priority; that the level of trained staff are adequate, that quality assurance programmes are established; that comprehensive and systematic safety assessments are carried out periodically; that radiation exposure is as low as reasonably achievable; and that emergency plans are prepared.[6] Also, the convention specifies appropriate steps with regard to the siting, design, construction, and the operation of civil nuclear power installations,[7] including an attempt to deal with the problem of unsafe reactors such as updating existing nuclear installations to modern safety standards.[8] Furthermore, the Convention provides for the parties to meet periodically to review reports on measures they have taken to implement these international safety obligations. It also makes provision for each party to discuss the reports submitted by other contracting parties with the aim of allowing experts to identify the problems, concerns, uncertainties, or omissions in national reports, focusing on the most significant problems or concerns.[9]

Looking at the provisions of the CNS, it is obvious that the Convention tries to promote its objectives of seeking a high level of nuclear power safety by strengthening national measures and international cooperation. As a party, the UK remains bound by its obligations in relation to how it acts with respect to the safety of its nuclear industry. Thus, this research now examines the implications of the obligations of the Convention in light of recent developments and events in the nuclear industry.

However before going into much detail, this section starts to examine the CNS by looking at its non-binding nature which appears to be the architect of some of the concerns over the safe use of nuclear power in contracting States. In this regard, it should be noted that there is nothing in the IAEA statute on health and safety standards that bind contracting Parties with the provisions of the CNS. Safety obligations are only based on fundamentals rather than specific safety requirements. It is only when the

[5] Art.1 of the CNS
[6] Art.10-16 of the CNS
[7] Art.17-19 of the CNS
[8] Art.6 of the CNS
[9] Art.20(3) of the CNS. See also: 1st Review Meeting of the Parties (1999) Annex II, para.4

IAEA supplies materials or services to contracting parties in terms of the safety of nuclear installations that the statute gives it the power to make sure that acceptable health, safety, and design standards are adopted,[10] or to examine the design of equipments and facilities to ensure compatibility with its standards.[11] For example as to the effects of the occurrence of natural disaster on nuclear installations, the arrangements in place are the IAEA established safety standards and requirements. These arrangements provide that hazards due to induced ground motion shall be assessed for the site with account taken of the seismic-tectonic characteristics of the region and specific site conditions, and that a thorough uncertainty analysis shall be performed as part of the evaluation of seismic hazards.[12] As to this, the IAEA has extended its objectives by establishing an initiative under the International Seismic Safety Centre (ISSC) within the IAEA's Department of Nuclear Safety and Security to serve as a focal point on seismic safety for nuclear installations worldwide. As such, the ISSC assists countries on the assessment of seismic hazards of nuclear facilities to mitigate the consequences of strong earthquakes. It also helps to promote knowledge sharing among the international community in order to avoid or mitigate the consequences of extreme seismic events on nuclear installations; to support countries through advisory services and training courses; and also to enhance seismic safety by utilizing experience gained from previous seismic events in contracting parties.[13]

It is to the non-binding nature of the CNS that this chapter argues that the implementation of its obligations sometimes become problematic at the national level. Take for instance, if the argument that modern nuclear reactors are safer than those of the early or middle twentieth century reactors is judged to be right, of which the answer would probably be "yes" by those promoting the nuclear option because of developments in the nuclear industry, it is then right to say that the reactors of the latter may need to be reviewed to modern safety standards. However as far as the CNS is concerned, such an update may prove difficult to enforce where the provisions of the Convention are not legally binding on contracting parties, or the IAEA having limited

[10] Art.III(6) XI of the IAEA Statute
[11] Art.XII of the IAEA Statute
[12] IAEA, Nuclear Safety Standards Series: Site Evaluation for Nuclear Installations. No. NS-R-3 (2003). Chapter 3
[13] IAEA, <http://www-ns.iaea.org> last accessed 20 March 2011

powers because it cannot ensure the full compliance with its safety standards. For example in ensuring the safety of installations, the IAEA acts as an International inspectorate and review body. In so doing, it provides a means for assessing the suitability of nuclear installations. Such was the case when the IAEA inspected Bulgaria's nuclear reactors in 1991 and found it in a very poor condition with various safety related deficiencies. It could only advise the Bulgarian government to take immediate measures but it could not compel any closure whatsoever.[14] Similarly, an IAEA inspection of the Chernobyl plant in 1994 disclosed continuing serious deficiencies and a failure to meet international safety standards.[15]

Thus, it is perhaps right to say that many of the provisions of the CNS are regarded as obligations to adopt a particular course of action rather than as obligations to achieve a specified result.[16] Article 6 which deals with the safety of existing installations also underline this argument. It provides that "each contracting party shall take the appropriate steps to ensure that the safety of nuclear installations existing at the time the Convention enters into force is reviewed as soon as possible. When necessary, the contracting Party are to ensure that all reasonably practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation. If such upgrading cannot be achieved, plans should be implemented to shut down the nuclear installation as soon as practically possible. The timing of the shut down may take into account the whole energy context and possible alternatives as well as the social, environment and economic impact". It is clear from the provision of article 6 that substandard nuclear installations must be shut down. However, it is also clear that the timing of the shutdown is left to the State concerned to make decisions. As such, it is obvious that States are not immediately obliged to comply with the obligations of the Convention. Thus, one may conclude that the early or middle twentieth century reactors such as the Chernobyl and

[14] P.W. Birnie, n 3 above 498. Also, note that concerns over safety standards led Bulgaria to reluctantly close four of its six reactors plant before joining the EU in 2007. Available at BBC, Nuclear Europe: Country and Guide, <http://news.bbc.co.uk/1/hi/world/europe/4713398.stm> last accessed 2 June 2011

[15] Ibid

[16] M.T. Kamminga, The IAEA Convention on Nuclear Safety, *The International and Comparative Law Quarterly*, (1995) Vol.44, No.4, pp.872-882, 877. Although, it should be noted that recent developments in international law have focused on how attention to procedure can be used to secure compliance. See for example: S. Bell and D. McGillivray, *Environmental law*, 7th Eds., (Oxford University Press, Oxford 2008) Chapter 6

Fukushima style reactors will remain in operation until economic alternatives are found.[17] As to this, Kamminga[18] argues that the thinking behind the provision of article 6 is that rather than having non-complying States outside the scope of the Convention, it is better to have them on board as parties, so that they can be subjected to the pressures of the peer review process. Accordingly, the impact of the CNS will therefore depend almost entirely on the interpretations given to its provisions in the context of the peer review process.

Even so, the peer review process raises concerns over the obligations of the Convention. This is worrying because the CNS does not provide for the enforcement or sanction in case of non-compliance by contracting parties. Instead it depends solely on peer review for effectiveness and to supervise the implementation of the provisions of the Convention as seen in articles 5, 20 and 21 which require contracting parties to hold meetings and discuss reports submitted by other parties to the Convention. The concern here is that review system as provided for appears to be basic for the purpose made for. For example, it does not provide for technical experts in the review process.[19] Although the Convention stresses the role of reporting and peer pressure in that it is designed to ensure fulfilment of obligations by Parties through control and sanction which is based on their common interest to achieve higher levels of safety with the aim of developing and promoting regular meetings of parties.[20] It however does nothing to enhance the commitment of contracting Parties to the review process or even to incorporate technical experts into the process. This concern is coupled with the fact that the IAEA has no general power of compulsory review of the nuclear installations in contracting States or even provide for independence verification of review compliance.[21] The reviews of nuclear installations only take place at request by contracting parties and the IAEA's

[17] P.W. Birnie, n 3 above 502. Also, note that the Ukrainian government announced that it supports the shutdown of the Chernobyl nuclear power plant as proposed the IAEA, but however it made mention that the closure schedule should respect the technological realities of reactor decommissioning as well as the financial capabilities of Ukraine. See: A. MacLachlin and A. Brall, *Ukraine Accepts Chernobyl Close but Doesn't Commit to Schedule*, NUCLEONICS WEEK, November 10, 1994 at page 14

[18] M.T. Kamminga, n 16 above 874

[19] For example, the peer reviews carried out under the auspices of the World Association of Nuclear Operators (WANO) were reported to have achieved good results. See: W.T. Subalusky, The Value of Peer Reviews to Nuclear Plant Safety (1994), *Trans. Of the American Nuclear Society*, Supp.70(1), 701-702

[20] Chapter 3 of the CNS

[21] M.T. Kamminga, n 16 above 879

procedures by themselves cannot ensure the assessment of the safety of installations. Even though when a review has been conducted, States parties decide which information they regard as confidential and therefore may not make available such information to be scrutinised by peers.[22] On the other hand, the peer review process itself may even raise issues such as transparency. For example, the issue of transparency may arise as in practice, where it is only governmental representatives, but not NGOs that may be invited to send observers to participate in review meetings of the parties as provided for by the Convention.[23] Thus, one thing for sure is that it appears that it will be difficult for the public to have confidence in the review processes. For example, there is likely to be issues such as increased public anxiety of the safety of nuclear installations. After all, the Fukushima nuclear power disaster is only a reminder to the public of the possibility of a nuclear disaster and its possible consequences.

It is also of increasing concern at the national level that the CNS just like the EURATOM as discussed below seeks to achieve its objectives by strengthening national safety measures, in that the responsibility of nuclear safety is a domestic affair. Article 7-9 does reaffirm this. It states that "the responsibility for nuclear safety rests with the State having jurisdiction over a nuclear installation and requires each party to establish and maintain a national legislative and regulatory framework for the safety of nuclear installations, including a system of licensing, independent inspection, and enforcement of applicable regulations". As an example, article 8 of the CNS requires the Health and Safety Executive (HSE) as a safety regulatory body in the UK to be resourced and separated from other bodies or organisations concerned with the utilisation of nuclear power. Surely, the fact that the HSE is sponsored by the Department of Work and Pensions which has no role in the utilisation of nuclear energy may help to ensure the independence of the HSE. However for an industry that has so such trans-boundary risks, it is arguable that the Convention lacks the procedure that provides for trans-boundary safety management. Such weakness appears more glaring because the

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[22] Art.27(1) of the CNS

[23] Art.24-5 & 27 of the CNS. See: IAEA <http://www-ns.iaea.org/conventions/nuclear-safety.asp> for details of previous review meetings. It should be remembered that the exclusion of environmental groups in the review process can partly be blamed with the exception of Greenpeace International, to take part in the drafting of the Convention. See: O. Jankowitsch and W. Tonhauser, "The Convention on Nuclear Safety" (1997) *Australian Review of International & European Law* 2: 319-340

Convention lacks specific provisions to promote commitment to opinions of other Parties other than the state in question. For example, the Convention provides for "the establishment and implementation of procedures for evaluating site-related factors that are likely to affect the safety of an installation; the likely safety impact of proposed installations; re-evaluating such factors as necessary; and for consulting other contracting parties in the vicinity which are likely to be affected by an installation",[24] but it does not provide that the state in question must take account of the views of another. My point of course is that in practice, the Convention treats the possible effects of trans-boundary risks minimal and this does not represent the spatial dimensions of risks of nuclear power.

In addition to the above, the concern over the obligations of contracting Parties is further compounded because the character of most of the obligations of the CNS appears to be general,[25] it contains no detailed technical annexes of in-depth standards of obligations,[26] and also does not provide for technological assistance. Although the generality of the provisions of the Convention and the lack of technical annexes of in-depth safety standards was however defended during the negotiation of the Convention by the authorities of countries with large nuclear power programmes as an incentive that would encourage all countries to strengthen their safety programmes and safety culture.[27] As a result, the Convention fails to envisage the possibility of adopting more specific safety standards when compared to other environmental treaties.[28] Examples are: the UN Convention on Climate Change adopted in 1992 which sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change, and the UN Convention for the Ozone Layer adopted in 1985 which is a framework agreement in which States are to cooperate in relevant research and scientific assessments of the ozone problem, to exchange information, and to adopt appropriate

[24] Art.17 of the CNS
[25] Ibid 876
[26] See also: O. Jankowitsch and W. Tonhauser, n 23 above
[27] Ibid 327. Note that although the countries with few or no nuclear power plants argued in favour of a more detailed, prescriptive form of Convention on all nuclear related activities and others expressing the wish for some form of mandatory international safety controls implemented by the IAEA. This was however defeated and the Convention as we can see only applies to land based nuclear power plants which excludes military installations, reprocessing plants, research reactors, and facilities designed specifically for treatment and storage of radioactive waste
[28] M.T. Kamminga, n 16 above 876

measures to prevent activities that harm the ozone layer. On the other hand, it is also arguably that a major concern for the UK is that the CNS does not provide for technological assistance in achieving the required safety standards among contracting parties. This I consider, a big failure on the part of those that drafted the Convention because the main environmental disadvantage of nuclear power is the technological risk involved. In this regard, Sand[29] argues that a clear trend in modern environmental treaties as seen in the Convention on Climate Change as an example, is the incorporation of technological assistance to encourage States to join a Convention and accept its obligations. Besides during the negotiation of the Convention, China also stressed the importance of safety related technical assistance by some other technologically advanced developing countries.[30] With this in mind, it is arguable that the purpose the CNS tries to address would appear well suited with the provision for technical assistance.[31] Such provision may be of considerable importance in the UK where nuclear reactor designs are based on foreign design policy. For example, it may provide further technical support during safety assessment of the design of nuclear installations where there may be differences in the detail of designs considered by foreign regulators.

4.2.1.2. The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

As mentioned above, the concern over nuclear power safety also led to the adoption of the IAEA Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the Joint Convention). The Joint Convention was opened for signature in 1997 and entered into force in 2001. The convention is "joint" simply because it applies to both radioactive waste disposal and spent fuel management. With little or no doubt, this is an effort to ensure that in safety terms spent fuel and radioactive waste must be subject to the same management requirements.

The main obligations under the Joint Convention are: to achieve and maintain a high level of safety worldwide in spent fuel and radioactive waste management through the enhancement of national measures and international co-operation including where

[29] P.H. Sand, Lessons Learned in Global Environmental Governance, 18 *B.C. Envtl. Aff. L. Rev.* 213 (1990-1991), 213-227
[30] O. Jankowitsch and W. Tonhauser, n 23 above 328
[31] M.T. Kamminga, n 16 above 878

appropriate, safety-related technical co-operation. Also, to ensure that during all stages of spent fuel and radioactive waste management there are effective defences against potential hazards so that individuals, society, and the environment are protected from harmful effects of ionising radiation now and in the future, in such a way that the needs and aspirations of the present generation are met without compromising the ability of future generations to meet their needs and aspirations.[32]

The Joint Convention as an incentive Convention[33] follows the model of the CNS above with similar objectives in ensuring high standards and prevention of accidents.[34] Under the Joint Convention, contracting parties are also to report on the implementation of its obligations at review meetings,[35] and as a result, the Convention contains no mechanism for the enforcement or sanction in case of non-compliance or a breach of its terms. Rather, it is also designed to obtain compliance through voluntary cooperation and "peer pressure" rather than by means of control and sanction.[36] However, it is in slight contrast to the CNS because it makes further reference to protection of the environment and the need for intergenerational protection in the context of radioactive waste disposal.[37]

Nonetheless, it is also of concern that some of the provisions of the Joint Convention appear ineffective for the purpose that it is meant to address. In particular is the provision of Article 3(1) which states that "the Convention shall apply to the safety

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[32] Art.1(i) and (ii) of the Joint Convention. In brief, there are a number of articles which elaborate on the safety provisions of the Joint Conventions. These are covered under seven Chapters. Chapter 2 deals with spent fuel management, Chapter 3 contains provisions on the safety of radioactive waste management, Chapter 4 provides for general safety measures such as the establishment of a legislative and regulatory framework, Chapter 5 deals with miscellaneous provisions, Chapter 6 deals with meetings of contracting parties, and Chapter 7 deals with other provisions

[33] Preamble V of the Joint Convention

[34] There is an overlap between the Joint Convention and the CNS. The CNS applies to radioactive waste or spent fuel held on the same site and directly related to the operation of a nuclear power plant. Once a nuclear plant ceases to be a nuclear installation it moves out of the CNS and into the Joint Convention

[35] Art.30 of the Joint Convention. Note: according to art.3, the Joint Convention does not apply to the safety of management of spent fuel or radioactive waste within military or defence programmes, unless declared as spent fuel or radioactive waste by the contracting party. however, the Convention shall apply to the safety of management of spent fuel and radioactive waste from military or defence programmes if and when such materials are transferred permanently to and managed within exclusively civilian programmes

[36] Commission Staff Working Document Accompanying the Report from the Commission to the European Parliament and the Council, Sixth Situation Report Radioactive Waste and Spent Fuel Management in the European Union, COM, (2008)542 Final, SEC, (2008) 2416 final/2, 16 July 2010, (the 'Commission Staff Working Document') page 43

[37] Chapter 1: Objectives of the Convention, Art.1(ii)

of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as part of a reprocessing activity is not covered in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management". Thus, the implication of the application of this provision is the exclusion of spent fuel from the scope of the Convention if in active reprocessing. Simply put, spent fuel held at reprocessing facilities as part of a reprocessing activity is not covered by the Convention. Once it is sheared to be dissolved and reprocessed, it is outside the scope of the Convention. It should also be understood that, although active reprocessing is excluded from the scope of the convention, storage on the site of a reprocessing facility pending reprocessing is covered by the Convention. This is because in such a case we are dealing with spent non-reprocessed fuel. This interpretation of Article 3(1) is not shared by all States which had participated in the negotiations. A minority of States considered that the words "as part of a reprocessing activity" mean "intended for reprocessing more or less in the near future". These countries consider storage of spent fuel on site of a reprocessing facility as intended for reprocessing outside the scope of the Convention.[38] At the same time, it is also the case that active reprocessing can be brought within the convention on a voluntary basis by a declaration of a contracting party.[39]

As such, the Joint Convention has some implications on contracting parties. For example, one may say that parties are given total discretion in carrying out their obligations. This is exemplified in the actions of France, Japan, and the UK who have pool storage of used fuel to support associated reprocessing plant operations and have made a common declaration stating that they shall on a voluntary basis, report on reprocessing as if it were part of spent fuel management within the meaning of the Convention and invite all other Countries which undertake reprocessing to do the same. However, report suggests that not all parties are likely to support such a move.[40] As such, where a minority of parties consider the active reprocessing as meaning

[38] A. de Kageneck and C. Pinel, The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, *The International and Comparative Law Quarterly*, Vol. 47, No. 2 (Apr., 1998), pp. 409-425, 413

[39] Art.3(1) of the Joint Convention.

[40] Ministry of Foreign Affairs, Ministry of Housing, Spatial Planning and the Environment, Ministry of Economic Affairs, National report of the Netherlands to the Joint Convention, first review conference April 2003, Page 6, The Hague, April 2003,

reprocessing more or less in the near future, it is surely going to be the case that used fuel sent to a reprocessing plant will also be stored for longer periods of time before reprocessing.[41] Thus, it is of concern that IAEA standards do not fully resolve this issue. As such, it remains a doubt whether there is really any comprehensive international law governing the reprocessing of nuclear waste on site other than the mere fact that the licence holder of a nuclear installation would be held liable for any environmental damage whatsoever that may occur.[42] Surely, this is a major issue in view of the impact of the earthquake and tsunami that struck Fukushima nuclear power stations where a number of radioactive activities including reprocessing of spent nuclear fuel were carried out on site. Although while focusing on the overall nuclear safety issues and emergency response of the Fukushima nuclear disaster the IAEA did recognise the importance of spent fuel management under severe facility degradation.[43] This however adds little to effective legal approaches for enhanced safety and security of spent fuel management. As a consequence, one can conveniently say that spent fuel management remains an important subject for both the security and safety of nuclear power.

It is also worth mentioning that spent fuel is not covered under the Joint Convention during transportation. According to the Convention, safety principles will apply if spent fuel is transported from one facility to another within a given site.[44] Nonetheless, it does contain rules applicable to trans-boundary movements. For example, article 27 provides that "each contracting party involved in trans-boundary movement shall take the appropriate steps to ensure that such movement is undertaken in a manner consistent with the provisions of this Convention and relevant binding international instruments". At the same time, article 27 does not contain any transport

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[41] Nuclear Engineering International, 'Used Nuclear Fuel - What Happens After Fukushima?', available at <http://www.neimagazine.com/story.asp?storyCode=2060462> accessed 1 December 2011

[42] See for example, art.21 of the Joint Convention and art.9 of the CNS

[43] IAEA, Mission Report: The Great East Japan Earthquake Expert mission, IAEA International Fact Finding Expert Mission of the Fukushima Dai-ichi NPP Accident Following the Great East Japan Earthquake and Tsunami, Tokyo, Fukushima Dai-ichi NPP, and Tokai Dai-ni NPP, Japan (24 May-2 June 2011) at Para. 1.3

[44] Art.2(0) of the Joint Convention. Although, as regards to off-site transportation of spent fuel, the Convention refers to "International Basic Safety Standards for Protection against Ionising Radiation and for the Safety of Radiation Sources" (1996), in the IAEA Safety Fundamentals entitled "The Principles of Radioactive Waste
Management" (1995), and in the existing international standards relating to the safety of the transport of radioactive materials (Para. Xiv of the Preamble)

safety rules. Rather, it only sets out the principles with which countries must comply when undertaking a trans-boundary movement.[45]

Having said this, there are also implications of the Joint Convention on particular legal authorities such as the Nuclear Defence Authority (NDA) in the UK. For example it is in the case of both spent fuel and radioactive waste management facilities, that the safety of existing facilities must be reviewed under article 12 to determine whether any intervention is needed for reasons of radiation protection. This may however have challenging liability implications for the NDA because of its control over past nuclear practices in the UK. The NDA will have to make provisions under article 13-16 of the Joint Convention for the siting of new facilities, their design and construction, including assessment of safety, operational facilities, and for geological disposal facility when the need arises. So also, financial provisions will have to be made available under article 22(iii) to enable appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of a disposal facility. Indeed, history suggests that one cannot overlook the liability implications on the NDA. For example, the issue of liability of existing nuclear installations came up in the late 1980s during the breakup of the Central Electric Generating Board (CEGB). The problem was lack of any real grasp on the magnitude of those liabilities which on the long run had an adverse impact on the UK privatisation process of the nuclear industry.[46] In this regard, it is arguable that the NDA needs to be well resourced in other to carry out its obligations as provided for under the Joint Convention.

4.2.2. European Dimension for Nuclear Safety: The European Atomic Energy Treaty

"Every institution is the product of a series of historical events and at the same time reflects the convictions, hopes and concerns of those who were instrumental in establishing it."[47]

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[45] A. de Kageneck and C. Pinel, n 38 above 412
[46] S. Taylor, Privatisation and Financial Collapse in the Nuclear Industry (Routledge, Oxford 2007) 43-4
[47] P.S.R.F. Mathijsen, *A Guide to European Community law* (5th ed., Sweet and Maxwell, London 1990) 5

In 1957, the EURATOM was created alongside the European Economic Community (EEC) Treaty and it was tipped to be a success in relation to the security of energy supply and to promote European market integration, in order to foster the means by which national differences in economic growth could be minimised. Unlike the European Coal and Steel Community Treaty (ECSC)[48] which expired in 2002 because of its validity period of fifty years, the EURATOM Treaty is still very much in existence and remains largely unchanged fifty three years after it was drawn up.[49]

The lack of validity period puts the EURATOM Treaty back into lime light as the starting point for present discussions on the safe use of nuclear power in the EU. For example, this relates to the Treaty provisions dealing with health and safety which are of uttermost importance in the development of EU laws on the safe use of nuclear power. These provisions have come under criticism within the EU mostly because the political and economic environment in which contemporary nuclear industry is operating is very different from the 1950s. Furthermore from the experience of the Fukushima nuclear disaster, it may as well be the case that some provisions of the Treaty have no teeth to ensure safety standards in the present day society. A few of these criticisms will now be examined.

A major criticism relates to the safety provisions of nuclear installations. The EURATOM Treaty provides that the safety of nuclear installations was to remain within the ambit of nuclear States. The Treaty only provides for basic safety measures for

[48] ECSC was signed in 1951 and it covered an energy policy for coal

[49] Art.2 of the EURATOM commits signatories to a plan of implementation. In order to perform its task, the community shall, as provided in this treaty:

(a) Develop research and ensure the dissemination of technical knowledge,
(b) Establish, and ensure the application of, uniform safety standards to protect the health of workers and of the general public,
(c) Facilitate investment and ensure, particularly by encouraging business enterprise, the construction of the basic facilities required for the development of nuclear energy within the community,
(d) Ensure a regular and equitable supply of ores and nuclear fuels to all users in the community,
(e) Guarantee, by appropriate measures of control, that nuclear materials are not diverted for purposes other than those for which they are intended,
(f) Exercise the property rights conferred upon it in respect of special fissionable materials,
(g) Ensure extensive markets and access to the best technical means by the creation of a common market for specialised materials and equipment, by the free movement of capital for nuclear investment, and by freedom of employment for specialists within the community,
(h) Establish with other countries and with international organisations any contacts likely to promote progress in the peaceful uses of nuclear energy.

workers and of the general public against radioactive substances. It provides that basic safety standards shall be laid down within the EU for the protection of the health of workers and the general public against the dangers of radiation.[50] Under article 33, Member States are required to lay down the appropriate provisions to ensure that they comply with the basic safety standards established under the Treaty. A general concern of the Treaty right from its establishment in terms of radiation protection from nuclear installations is that the Treaty makes no distinction between technological safety of nuclear installations and radiological protection.[51] However looking beyond this, it is now of increasing concern that the safety provisions of the Treaty do not appear to reflect an advanced nuclear industry in which it is no longer desirable to consider nuclear safety in a purely national perspective. Only a common approach is understood to guarantee the maintenance of a high level of nuclear safety in the EU.[52] Thus this raises concern about the safety organisational structure of Member States. For example, because nuclear power is a technology that hangs on support and skills of both the scientists and engineers, the concern for present discussion is how these skills are transferred and organised effectively for most under developed or developing Countries to provide adequate safety measures. This concern becomes more problematic in developing countries primarily due to scarcity of financial resources or perhaps the lack of management skills. For example, there are concerns about the safety and management of nuclear power installations in some of Eastern European countries such as Bulgaria as mentioned above.[53] Also, what became clear from the Fukushima nuclear power disaster inquiry was that Japan lacked some basic safety measures and had to rely on foreign

[50] Chapter III, art.30 of the EURATOM Treaty

[51] S. Tromans, Nuclear Law: *The Law Applying to Nuclear Installations and Radioactive Substances in its Historic Context*, 2nd Eds, (Hart Publishing, Oxford 2010) 56. Note: presently, there is by contrast a significant overlap between nuclear safety and radiation protection. Nuclear safety has not only a technological but also radiation protection component and radiation protection seeks to limit exposures according to the ALARA principle through increased control over sources of radiation such as nuclear installations. See: *Commission v Council*, Case C-29/99 at Para. 132

[52] Communication from the Commission to the Council and European Parliament: *Nuclear Safety in the EU*, COM (2002) 605, 6.11.2002. page 11

[53] However, a more practical example is a case study on Nigeria's move in adopting the nuclear option as an alternative source of low carbon energy supply. Although Nigeria is a country outside the EU, its earlier decision to exclude the nuclear option from energy mix because of the incompetent state of its nuclear watchdog (the Nigeria Nuclear Regulatory Authority(NNRA)) in ensuring the safety of the use of nuclear energy, is an example just to illustrate that there might still be some nuclear States with ill equipped safety procedures, but who may be adamant of taking on the nuclear option for energy production. See: NNRA < http://nnra.gov.ng>

countries for help.[54] It is therefore only reasonable to think that it is unacceptable to give much power to Member States who have inadequate organised safety structure for management of their nuclear industry.

Another criticism of the EURATOM although not necessarily related to nuclear safety, stems from the fact that the contemporary nuclear power industry operates in an energy industry where electricity generation should be competitive without state support.[55] In contrast to this, the rationale for the commitments made by the EURATOM signatory states was that, as new technology in the 1950s, nuclear technology would be very costly and would need a great deal of investment and support by the government.[56] Indeed, the drafters of the EURATOM recognised that the development of nuclear energy requires large investment to be made at construction stage. To do so in recent years may be problematic from the point of view of state aid rules. At the same time, this also may directly go against the essentials of a liberalized market,[57] which perhaps may make it is easy for Member States to be caught liable against the EU principles of liberalization. However, countries like the UK has been careful to limit support of nuclear power development to only the decommissioning of its existing Magnox reactors after the privatisation of its nuclear industry.[58]

In addition to the above, a further criticism of the EURATOM Treaty relates to the fact that it does not contain any explicit provisions for environmental protection.[59] Instead, the EURATOM only requires Member States to establish facilities to carry out the continuous monitoring of the level of radioactivity in air, water, and soil in order to ensure compliance with basic radioactive standards; including the transfer of information to the Commission so that an impact assessment of disposal of radioactive

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[54] The New York Times, N. Onishi, 'Safety Myth Left Japan Ripe for Nuclear Crisis', available at <http://www.nytimes.com/2011/06/25/world/asia/25myth.html?pagewanted=all> last accessed 26 June 2011

[55] Art.107 TFEU (ex article 87 TEC)

[56] Chapters IV and V of the EURATOM Treaty

[57] P. Barnes, "The Resurrection of the EURATOM Treaty - contributing to the legal and constitutional framework for secure, competitive and sustainable energy in the European Union" in T. Etty and H. Somsen, (eds)(2008) *The Yearbook of European Environmental Law*, Volume 8, p 182-218, Oxford University Press, 183

[58] DTI (1995), *The Prospect for Nuclear Power in the UK*, (Cm 2860) May, HMSO

[59] P. Barnes, n 57above 188

waste could be made.[60] It was not until the 1970's that the European Commission introduced the First Environmental Action Programme (EAP) in 1972[61] and in 1987 the first explicit statement of commitment to environmental protection appeared in the Single European Act.

As such, because the EURATOM Treaty is the first legal binding principle on nuclear power law in the EU, one may contend that the amendment of the Treaty to effectively address these issues would be a huge step in promoting safety measures and towards the development of nuclear power in the EU. Notable environmental groups such as Friends of the Earth (FoE) have called for the EURATOM to be reformed or even in extreme cases to be scrapped. They challenge that "the EURATOM Treaty is a political oddity. Although public opinion is largely opposed to the expansion of nuclear energy, and despite the fact that several Member States have phased out nuclear power or have begun to do so, the EU Member States continue to be members of a Community whose main objective is the speedy establishment and growth of nuclear industries. Having existed for nearly half a century, the treaty appears to have been largely forgotten about by politicians and citizens alike".[62] I believe that how soon such changes may occur will surely attract increasing significant interest than ever by the Commission considering the Fukushima event.

4.2.2.1. The Nuclear Safety Directive

For the first time in the EU since the establishment of the EURATOM Treaty, the EU has adopted a binding requirement on the use of nuclear energy in form of the Nuclear Safety Directive (NSD).[63] The adoption of this Directive marks a new chapter in the acceptance of acknowledged International nuclear energy safety principles in the EU, and it has been described by the European Commission as "a major step for achieving a

[60] Art.35 & 37 of the EURATOM Treaty
[61] OJ C 112, 20/12/1973. The First EAP established 11 principles including: prevention is better than cure, polluter pays principle, and that activities in a one Member State should not cause deterioration of the environment in another
[62] FoE Europe, 'Will the New EU Constitution Promote Nuclear Energy?', available at <http://www.foeeurope.org/publications/2005/euratom_and_constitution_may2005.pdf> p 4, accessed 12 February 2011
[63] Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community Framework for the Nuclear Safety of Nuclear Installations OJ L 172, 02/07/2009

common legal framework and a strong safety culture in Europe".[64] Although it is arguable that the adoption of this Directive is a response to some of the lapses of the EURATOM Treaty as we have seen above, however, the controversy that surrounded the adoption of the provisions of the Directive makes one to think otherwise.

The NSD is based on the IAEA Safety Fundamentals and the CNS above. The goal is to maintain and to promote the continuous improvement of nuclear safety and its regulations; and to ensure that Member States provide appropriate national arrangements for high level nuclear safety.[65] It applies to any civilian nuclear installation operating under a licence granted under the jurisdictions of a Member State at all stages covered by the licence, and does not prevent Member States from taking more stringent safety measures.[66]

The NSD provides that Member States shall ensure that the prime responsibility for nuclear safety of a nuclear installation rests with the licence holder and that this responsibility cannot be delegated.[67] In terms of regulatory standards, the Directive goes beyond the EURATOM Treaty. The EURATOM only requires each Member State to lay down the appropriate provisions, by legislation, regulation, or administrative action, to ensure compliance with basic standards established under the Treaty.[68] Whereas, the Directive provides that Member States must establish and maintain a competent regulatory authority in the field of nuclear safety, and must ensure that it is functionally separated from any other body or organisation concerned with the promotion or utilisation of nuclear energy, in order to ensure independence from undue influence in its decision-making.[69] Although the UK national legislation and arrangements under the

[64] European Commission (2009), ' The EU establishes a common binding framework on nuclear safety', Press Release IP/09/1039, 25 June 2009
[65] Art.1 of the NSD
[66] Art.2 of the NSD. The Directive expands the definition of "Nuclear Installation" to mean: an enrichment plant, nuclear fuel fabrication plant, nuclear power plant, processing plant, research reactor facility, spent fuel storage facility and storage facilities for radioactive waste that are on the same site and are directly related to the above mentioned facilities
[67] Art.6 (1) of the NSD
[68] Art.33 of the EURATOM Treaty
[69] Art.4-5 of the Nuclear Safety Directive

umbrella of the Nuclear Directorate[70] had been in existence before the adoption of the Directive, it however represents an example of a competent regulatory authority set by the Directive.

Another positive development is that the NSD makes it legally binding for Member States to at least every ten years arrange for periodic self-assessments of their national framework and competent regulatory authorities, and to invite an international peer review.[71] Though this is a reference to requirements under the International arrangement of the IAEA, it nevertheless, still shows some form of commitment at the EU level to address the safety issues of nuclear installations. Definitely, the adoption of a ten year periodic self-assessment is a very precise obligation which facilitates the safety of nuclear installations in Member States. It is also an essential provision to assess national safety regulatory framework considering that Member States retain technological control over nuclear installations on their territories. It thus becomes a significant step forward in terms of nuclear safety, bearing in mind that it can easily lead to a breach of Community law in the event of non-compliance by Member States.[72]

Having said this, it is surprising that none of the final provisions of the NSD addresses the issues of nuclear waste disposal and spent fuel. Clearly speaking, one expects an improvement in the provisions of the Directive in that it should be more informed than the CNS which it is based upon. However with the issue of national control of the management of nuclear installations that has developed since the establishment of the EURATOM Treaty, there was no doubt that history would repeat itself. For example, in the build up to the adoption of the Directive, there was a separate proposal dealing with the management of nuclear waste and spent fuel and decommissioning.[73] The European Council however, managed to exclude such provisions and other substantive provisions of the CNS from the final draft of the NSD.

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[70] From the 1st of July 2011, the Nuclear Directorate changed to the Office for Nuclear Regulation and it has absorbed all the elements of what was ND - the Nuclear Installations Inspectorate (NII), the Office for Civil Nuclear Security (OCNS) and the UK Safeguards Office (UKSO)

[71] Art.9 of the Nuclear Safety Directive

[72] M. Ferro, 'Directive 2009/71/EURATOM: the losing battle against discrimination and protection of sovereignty', *Int. J. Nuclear Law*, Vol. 2, No. 4. 2009

[73] COM (2003) 32 final of 30.1.2003 – Proposal setting out basic obligations and general principles on the safety of nuclear installations. See also: COM (2004) 526 final of 08.09.2004 - laying down basic obligations and general principles on the safety of nuclear installations

The major reason for this is because countries like Spain, Italy, and the UK in particular were concerned about certain provisions of the initial proposal. The UK Government argued that there was no real benefit in introducing a regional layer of regulation below the framework of the IAEA Convention on Nuclear Safety and IAEA Safety Standards.[74] As to this, it is arguable that the failure of the Directive to recognise the issues of nuclear waste may also have an effect in the context of the acceptability of nuclear power. The latest EU survey on public opinion underlines this. Where nuclear waste is concerned, the survey reveals that an overwhelming majority of Europeans would find it useful to have European legislation on nuclear waste management.[75] It adds that knowledge and information are crucial in determining public attitudes to the use of nuclear power and that citizens would like to know more about nuclear waste management and environmental monitoring procedures. It is against these issues that attention is now drawn to the provisions of the Directive on the Management of Spent Fuel and Radioactive Waste (SFRWD).

4.2.2.2. Directive on the Management of Spent Fuel and Radioactive Waste

Arguably, in what turns out to be a response to the concern of the public on nuclear waste and spent fuel on one hand, and on the other an indirect response to the Fukushima disaster in terms of the effects of nuclear waste and spent fuel that were stored on site, is the introduction of Council Directive 2011/70/EURATOM[76] which has binding effects on Member States. The timing of the adoption of the Directive could not have been more appropriate following the events during the Fukushima disaster. Besides because discussions where ongoing before the disaster occurred, the introduction of the Directive also stands to dispute the assertion that "societies find it easy to respond to disaster than to forestall it".[77] However to what extent the Directive disputes this assertion is considered by examining its provisions.

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[74] See: DTI, *Nuclear Safety Directive, Consultation Document* (2003)
[75] European Commission, EUROBAROMETER 234: A Report on Europeans and Nuclear Safety, March 2010
[76] OJ L199/48 [2.8.2011] establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (SFRWD)
[77] Review by A. Boyle, 'Nuclear Energy Law after Chernobyl', (1989) *I.C.L.Q.* 38(4) 979-981

Just like the NSD, the SFRWD also builds on International standards contained in the Joint Convention. The objectives of the SFRWD is to ensure the long-term management of radioactive waste and spent fuel; to ensure a high level of safety in spent fuel management and radioactive waste management, protecting workers and the general public against the dangers arising from ionising radiations at all stages of management of radioactive waste and spent fuel; and also to maintain and promote public participation and information with regard to radioactive waste and spent fuel management policies.[78]

As the title suggest, the SFRWD deals with the issues of the management of spent fuel and radioactive waste at the EU level. In so doing, there are many attributes one may attach to it; at least beyond the standards contained in the Joint Convention which it models. For example article 2(1) of the SFRWD provides that the Convention applies to "all stages of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors or is managed within civilian activities; and all stages of radioactive waste management from generation up to disposal, when the radioactive waste results from civilian activities or is managed within civilian activities". In contrast, the Joint Convention only lay down the similar measures regarding the management of spent fuel as it does for radioactive waste.

In addition to the above and under general principles imposed on Member States by the SPRWD, there appears to be new provisions on spent fuel and radioactive waste management. An example is the provision of article 4(4) which provides that "radioactive waste shall be disposed of in the Member State in which it was generated, unless agreements are concluded between Member States to use disposal facilities in one of them". This provision is without doubt a novel provision of which the Joint Convention falls short. Article 4(4) prohibits the disposal of radioactive waste outside

[78] Art.1(1-3) of Directive 2011/70/EURATOM. The obligations of the Directive are: art.5 which deals with the provision of the establishment of national framework for spent fuel and radioactive waste management; art.6 which deals with the establishment of a competent regulatory authority in the field of safety of spent fuel and radioactive waste management; and art.7 which deals with the responsibilities of licence holders. Others are: the provisions for the arrangement of expertise and skills to cover the need of the national programme for spent fuel and radioactive waste management; ensuring transparency; provision for financial resources for the implementation of national programmes; and the provisions for the contentment of national programmes, to include, reporting and notification of national programmes (art.8-14)

the EU. It also impedes the reprocessing of spent fuel and storage of radioactive waste outside the EU. However, it is not clear whether the reference to the provisions of article 4 as "general principles" instead of "general requirements" is intended to imply a non-binding nature in terms of shipment of spent fuel and storage of radioactive waste outside the EU, or whether it was simply an attempt to adopt the same terminology as adopted in the IAEA Principles.[79] However, it should be noted that exports to countries outside the EU is only permitted under strict and binding conditions. For example, the country outside the EU needs to have radioactive waste management and disposal programmes with objectives representing a high level of safety equivalent to the EU standard.[80] Besides, shipment of spent fuel and radioactive waste is prohibited to a State which is party to the Partnership Agreement between the members of the African, Caribbean and Pacific Group of States of one part, and the European Community and its Member States, of the other part (Cotonou ACP-EC Agreement) which is not a Member State.[81]

It is also worth mentioning that the peer review processes as provided for under the SPRWD is more precise than the requirements of the Joint Convention. For example, Member States are required periodically and at least every ten years, to arrange self assessment and invite international peer review of their national framework and nuclear programmes. The outcome of which is to be reported to the Commission and other Member States.[82] Arguably, the provision that Member States are to invite international peer review of their national framework may as well be that the peer review process of the SFRWD could serve as a means of building public confidence and trust in the management of spent fuel and radioactive waste in the EU. However, considering the challenges of nuclear waste in the UK for example, the concern is whether the ten year interval provided for is suitable in assessing compliance with issues of spent fuel and radioactive waste.

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[79] A. Stanic, A Step Closer to EU Law on the Management of Radioactive Waste and Spent Fuel, *Journal of Energy & Natural Resources law*, 29 No. 1, 117, 145-146

[80] Art.4(4)(b) of Directive 2011/70/EURATOM

[81] Art.16(1)(b) of Council Directive 2006/117/EURATOM of November 2006 on the Supervision and control of shipments of radioactive waste and spent fuel

[82] Art.14(3) of the SFRWD

Looking at the above, it is clear that the requirements of SFRWD exceed that of the Joint Convention which it builds upon. Although at the same time, it should be noted that the provisions fall short of the initial 2003 proposal on spent fuel and radioactive waste management in prescribing the content of national programmes, including waste disposal.[83] However more important is that it provides the Commission the power to review national programmes on spent fuel and radioactive waste. This, alongside the provisions of articles 141 and 143 of the EURATOM Treaty to commence infringement proceedings, means that under the SFRWD the Commission is granted enforcement powers to enable it to ensure that Member States comply with the provisions of the SFRWD.

Above all and in what is being considered as a significant step in improving nuclear safety standards in the EU is that the introduction of the SFRWD shows that the general opposition by some Member States to prevent the Commission from adopting binding existing international nuclear safety measures at the EU level so far has been dropped. This is of course in contrast to the position of Member States during the negotiation process of the NSD where they were reluctant to accept further binding international principles at the Community level. For example, the adoption of further measures beyond international safety principles only featured in the omitted provisions of the NSD. Although these developments suggest some sort of credit to the SFRWD, it is however yet to be seen whether the provisions are adequate in addressing the issues of nuclear waste and spent fuel in Member States. For example, it is provided for under the Directive that Member States will have to draw up national programmes and notify the Commission by 2015 at the latest and that the Commission is to examine such programmes and can require changes[84] on plans with a concrete timetable for the construction of nuclear waste disposal facilities, as well as a description of the activities needed for the implementation of disposal solutions. Yet drawing up such programmes within the time scale provided may also be challenging. This is because as discussed in Chapter 3 above, the identification of geological repository site in the UK as an example may not be as easy as one might think. My point of course is that any difficulty

[83] See also: A. Stanic, 79 above 145
[84] Art,14 of the SFRWD

encountered in the process may lead to an unfavourable outcome in meeting obligations under the SFRWD. Thus depending on how one looks at this, any difficulty in meeting the obligations of the Directive may be seen as a failure by the drafters of the Directive to fully understand the challenges and concerns of spent fuel and nuclear waste. Only time would tell how true this is.

4.2.3. UK Regulatory Regime

In addition to the above, the concern over the fear of the release of radiation from nuclear installations into the environment in the UK as with other EU countries also distinguishes nuclear power safety measures from other low carbon energy sources. The first UK legislation to incorporate radiation protection into law is the Nuclear Installations Act (NIA) 1965. It is the primary source of legislation covering the operation of installations including nuclear power stations and waste processing plants. It consolidates and replaces the requirements of the Nuclear Installations (Licensing and Insurance) Act 1959, which focused on three aspects of nuclear power sites namely: licensing of nuclear sites, compensation for any damage to person or property from ionising radiation, and a scheme of compulsory insurance;[85] the Nuclear Installations (Amendment) Act 1965, which amends the definition of nuclear reactor in section 1(6) of the Electricity (Amendment) Act 1962; and also the United Nation Convention on Third Party Liability in the Field of Nuclear Energy 1960 (the Paris Convention), which provides that operators of nuclear power plants are liable for any damage caused by them, regardless of fault.[86]

The NIA 1965 provides that no person shall use any site for the purpose of installing or operating any nuclear reactor (other than one comprised in means of transport, whether by land, water or air) unless a licence to do so has been granted in respect of that site. Under the Act, a nuclear site licence is required for installations designed or adapted for: the production or use of atomic energy; the carrying out of any process whether preparatory or ancillary for the production or use of atomic energy which involves or is capable of causing the emission of ionising radiations; or the

[85] S.1-8 of the Nuclear Installations (Licensing and Insurance) Act 1959
[86] Art.3 of the Paris Convention

storage, processing, or disposal of nuclear fuel or of bulk quantities of other radioactive matter, being matter which has been produced or irradiated in the course of production or use of nuclear fuel; and anyone who contravenes shall be guilty of any offence.[87] In this function, the Office for Nuclear Regulation (ONR) is the responsible body which legislates and grants licences for all nuclear activities from the time an application is first received to when the plant finally closes. The NIA 1965 also deals with certain liability and insurance issues as to the release of radiation into the environment from nuclear installations. For example, it imposes a duty on the licensee of a nuclear site to secure that specified matters do not cause injury to any person, or damage to any property of any person other than the licensee. This could be occurrence either on the licensed site; or occurrence involving matters which has been on the licensed site or in the course of carriage; or occurrences involving nuclear matter being carried in the course of carriage involving nuclear matters on behalf of the licensee as licensee of the site or perhaps in the course of carriage to the site with the arrangement of the licensee from relevant territories.[88] In any case, the nuclear matter must not at the time of the incident be on any other relevant site in the UK (for example, sites occupied for nuclear purposes by Government departments).[89]

Furthermore, the control of radioactive substances is also subject to the Radioactive Substance Act 1993 (RSA 1993). The RSA 1993 defines radioactive waste as "waste which consists wholly or partly of: (a) a substance or article which if it were not waste, would be radioactive material; or (b) a substance or article which has been contaminated in the course of the production, keeping or use of radioactive material, or by contact with or proximity to other waste falling within (a)".[90] There have however been some recent developments in UK legislation to regulate radioactive waste activities

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[87] S.1(1) (a)-(b) and S.1(3) NIA 1965
[88] S. 7-21 NIA 1965
[89] S. Tromans and J. Fitzgerald, *The Law of Nuclear Installations and Radioactive Substances*, (Sweet & Maxwell, London 1997) 113. Section 12 of the Act also provides a right for strict liability. It states that where any injury or damage has been caused in breach of any duty by the licensee, taking into account of any relevant exclusion or reduction, there must be compensation in respect to the injury or damage caused in accordance with the act. Such claim must however, be brought within 30 years of the date of the occurrence that gave rise to the claim or, where the occurrence was a continuing one, 30 years from the date of the last event in the course of occurrence (S.15 NIA 1965). Note that S.16 caps the amount of compensation payable
[90] Art.2 RSA 1993

in a number of areas through the Environmental Agency (EA) under the Environmental Permitting (England and Wales) Regulations (EPR) 2010.[91]. This is part of a wider plan to standardise the legislation on environmental permitting, with the object of creating a simpler and less bureaucratic system.[92] What this means is that applications and grant for permits, conditions, appeals, enforcement and other matters would become subject to common requirements and provisions.[93] However, the definition, authorisation and accumulation of radioactive waste regulation within the RSA 1993 remain unchanged. Under section 13 of the RSA 1993, the disposal of radioactive waste from licensed nuclear plants including reprocessing sites without authorisation to do so is prohibited. An operator is not allowed to dispose on or from the site of radioactive waste without a permit to do so, knowing or having reasonable grounds for believing the material or waste to be radioactive material or radioactive waste. Also under section 14, the accumulation of radioactive waste with the view for subsequent disposal on any premises is also prohibited. Additionally under the EPR 2010, the EA must also ensure that limits on radioactive discharges are to be kept as low as reasonably achievable (ALARA), taking into account economic and social factors.[94] These radiation limits and conditions are however binding on operators and the regulator must take reasonable care to allow safe disposal of radioactive wastes.[95]

The UK law is also designed to ensure the health and safety of workers at nuclear sites. Here, HSE is concerned with the control of exposure to radiation arising from the use of radioactive materials and radiation generators in work place activities in the nuclear industry and other related industry. Under the Health and Safety at Work Act (HSWA) 1974, an employer is required to ensure so far as is reasonably practicable that he does not cause harm either to his employees or to other people either on or off the

[91] The EA is the principal regulator under the RSA 1993 for England and Wales. In Scotland, a separate agency, the Scottish Environment Protection Agency (SEPA) has this role. EPR 2010 replaces most of the RSA 1993. The does not change legal requirements, Government Policy or the technical requirements in relation to the regulation of radioactive substances on nuclear sites

[92] S. Tromans, n 51 above 413

[93] For example, section 16 of RSA 1993 has been amended to change the procedure in relation to authorisations for the accumulation or disposal of radioactive waste on or from nuclear sites

[94] Part 3(1) EPR 2010

[95] The Environmental Agency, near-Surface Disposal Facilities on Land for Solid Radioactive Wastes: Guidance on Requirements for Authorisation, (Feb. 2009) Para. 2.1.4

site.[96] These are however consistent with article 9 and 10 of the CNS respectively. The CNS obliges the UK as a contracting party to ensure that the prime responsibility for the safety of the nuclear installation rests with the licence holder.

Also following the experience of the Sizewell B inquiry as discussed in Chapter 5 below, the government acted to bring forward the role of the Health and Safety Executive (HSE) to require it to pre-licence nuclear power station designs. The reason for this is to enable companies to submit information on reactor designs in advance before committing significant sums of capital to planning and construction.[97] This is done via the GDA which is in line with the nuclear site licensing regime as seen under the IAEA CNS. For example, the Convention provides that parties are to take necessary steps in ensuring that the safety of an installation rests with the licence applicant to ensure that it meets the specified safety criteria.[98] Thus, it is surely the case that licence applicant must show that it fully understands the hazards associated with its operations and knows how to control them. As such, the GDA should therefore be seen as a process that provides for safety, security, and environmental aspects of the reactor design which should be of one or two submitted designs (foreign modern design).

On completion of the GDA process, a Design Acceptance Confirmation is issued by the HSE. This is a Statement of Generic Design Acceptability by the EA and a Generic Conceptual Security Plan Approval. As to this, any Design Acceptance Confirmation issued for generic design applies for a period of ten years, subject to no significant new information arising during that the time frame which might call into question the original basis of assessment.[99] Indeed in light of the Fukushima nuclear power disaster, one is forced to raise questions about the process of GDA because not only was the disaster greater than the design basis at Fukushima power station, but also the need to examine why the design failed to reflect the accident and its impact. For example, because radioactive waste activities were been carried out on site during the disaster, the key question is whether planning for long-term managed spent fuel should

[96] S.2 and 3 of the HSWA 1974
[97] HSE at <www.hse.gov.uk/newreactors> accessed last 4 October 2011
[98] Art.7(2) and 9 of the Convention of Nuclear Safety
[99] HSE <http://www.hse.gov.uk/newreactors/ngn03.pdf> last accessed 16 October 2011. Para. 63

be an integral part of reactor design? There are two reasons for these questions. The first is because the nuclear industry as seen so far has become internationalised in relation to its safety regulatory framework; and the second is because the future of nuclear power installations in the UK in particular is based on adopted overseas designs. Thus for present purposes, the latter carries more weight and the ONR was quick to allay fears. It points out that the Fukushima nuclear reactors are of Boiling Water Reactors (BWR) which is different from those envisaged in the UK with the exception of the Sizewell B which is of a Pressurised Water Reactor (PWR). In its interim report, the ONR concluded that the current regulatory safety framework in the UK is satisfactory and that there are not any significant defects in the approach of the GDA, nuclear site licensing and construction consents.[100]

[100] Office for Nuclear Regulation, *Japanese Earthquake and Tsunami: Implications for the UK Nuclear Industry: Final Report*, September 2011. Available at <http://www.hse.gov.uk/nuclear/fukushima/final-report.pdf> lasted accessed on 4 November 2011. See: Para. 386-401, 549, and Annex F respectively

4.3. DISASTER PREPAREDENESS

The Chernobyl nuclear disaster in 1986 provided the platform for nuclear States to provide assistance and cooperate in cases where they are at risk from nuclear accidents and to take action on nuclear disaster management. The key scrutiny faced were regulations on health and safety, and as a result, further regulations were been introduced to facilitate such assistance and cooperation. However, since the occurrence of the Fukushima nuclear power disaster which reaffirms that nuclear accident cannot be completely ruled out even by countries that are far more proficient in disaster management, it is only logical to think whether the responses in place can cope with highly dangerous situations that might arise; which thus becomes the focus of this part. In addressing this concern, the approach used is quite similar to the preceding part. That is, an examination of both the international and EU regulations as applicable to the UK.

4.3.1. Post Chernobyl Disaster: International Perspective

"It is an obvious truism that societies find it easier to learn from their mistakes than to forestall them".[101]

This quote fits the description of the impact of the Chernobyl nuclear disaster as early notification of nuclear accidents made its mark in the international scene as no previous international Convention requires the prompt notification of a nuclear accident.[102] The genesis of which is attributed to the late notification by the Soviet Union Government about the disaster, extent of the damage to reactor, including the areas that were contaminated by radioactive materials. For example, the Chernobyl accident began with a chemical explosion as the nuclear plant entered into a planned shutdown in 1986 and the world first heard of the accident only after Sweden and Finland detected windblown debris and gases on their radiation monitors.[103] Also, the maps indicating the towns and areas that were contaminated with radioactive material from the nuclear power plant

[101] A. Boyle, n 77 above. Note: this quote however stand to be challenged by the introduction of the SFRWD

[102] Although several agreements between individual states require the parties to advise each other promptly of any serious operating incidents at nuclear facilities. An example is the Agreement Relating to Information in the Nuclear Field between the USA and Canada of 1976

[103] J. Davis, Disaster Raises New Questions About Fate of Nuclear Energy, *Cong. Q. Weekly Report*, May 3, 1986, 964

accident were not officially published until the early 1989, making it almost three years after what has been declared as the worst nuclear accident ever.[104] The Soviet government however later admitted that the accident had occurred but were slow in reporting it.[105]

As a result of the delayed tactics on the part of the Soviet government, numerous international Conventions and bilateral Treaties were created. However, it should also be remembered that there had been various Conventions at the international level. Examples are the Paris Convention on the Prevention of Marine Pollution from Land Based Sources 1974 and the Exchange of Notes between the UK and France on Radiological Consequences[106] which deals with the prevention of pollution from land based sources. Nonetheless, the Convention on Early Notification of Nuclear Accidents (Early Notification Convention) and the Convention on Assistance in the case of a Nuclear Accident or Radiological Emergency (Assistance Convention) in 1986 and 1987 respectively were still adopted to address disaster response concerns; both of which will now be examined.

4.3.1.1. The Convention on Early Notification of a Nuclear Accident

The Early Notification Convention entered into force in 1986. It is designed to strengthen cooperation between states concerning the safe development and use of nuclear energy by providing relevant information about nuclear accidents as early as possible in order to have trans-boundary radiological consequences minimized.[107]

The adoption of the Early Notification Convention shows how sceptical nuclear States are about any future accident. This is because the Convention applies to nuclear accidents resulting from a wide range of activities, including any nuclear reactor wherever located; any nuclear fuel cycle facility; any radioactive waste management facility; the transport and storage of nuclear fuels or radioactive wastes; the manufacture,

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[104] H. Ginzburg, '*The Psychological Consequences of the Chernobyl Accident*: Findings from the International Atomic Energy Agency Study' (1974) 108(2), 184-192
[105] J. Davis, n 103 above 964
[106] Cmnd. 9041
[107] Preamble to the Early Notification Convention

use, storage, disposal and transport of radioisotopes for agricultural, industrial, medical and related scientific and research purposes; and the use of radioisotopes for power generation in space objects, which result or may result in international trans-boundary release of radiological material of safety significance to another state),[108] and by making provisions that States may notify other accidents as well.[109] Under this Convention, a party experiencing a nuclear accident should immediately notify the IAEA and potentially affected States of the location, time, and type of accident, and must provide any available information to minimize radiological consequences to affected States.[110] Afterwards, the IAEA will pass on the information to other States by providing: the time, exact location where appropriate, and the nature of the nuclear accident; the facility involved; the cause and the foreseeable development relevant to the trans-boundary release; the general characteristics of the radioactive release; information on meteorological and hydrological conditions, necessary for forecasting the trans-boundary release; the results of any relevant environmental monitoring; the off-site protective measures taken or planned; and also the predicted behaviour over time of the radioactive release.[111] These requirements are important given the nature of nuclear accidents and the rapid changes which may occur in radiation levels.[112]

As to the above, reports suggest that the Early Notification Convention procedures were followed in response to the Fukushima nuclear power disaster. It was reported that in the early hours of the event, the IAEA received the first request for information about the state of the safety of the power reactors in Japan. Since that time, the Agency has responded to requests for information from official contact points from State Parties to the Convention. Requests were received from organizations that are not officially nominated contact points and from members of the public who also followed up by the relevant Agency technical division or the Division of Public Information.

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[108] Art.1 of the Early Notification Convention

[109] Article 3 of the Early Notification Convention. Note that notification of nuclear weapons is not mandatory. However, China, France, Russia, UK, and the USA as nuclear weapons states have also declared their intent to report accidents involving nuclear weapons

[110] Art.2 and 5 of the Early Notification Convention

[111] Art.4, 7, and 5 of the Early Notification Convention

[112] S. McBrayer, Chernobyl's Legal Fallout-The Convention on Early Notification of a Nuclear Accident, 17 *Ga. J. Int'l & Comp. L.* (1987) 303-319, 315

Also, the International Emergency Centre (IEC) published on the Early Notification and Assistance Convention (ENAC) web site its first IEC Status Summary Report to inform relevant authorities of the activities carried out by the Agency in response to the situation at Fukushima Daiichi nuclear power plant. The document covers activities undertaken by the Agency from the time of the activation of the IAEA Incident and Emergency Centre immediately after news was received of the earthquake.[113]

Having said this, there are yet concerns that the IAEA must deal with nuclear emergencies more quickly than it did during the Fukushima nuclear disaster. For example reports suggest that the IAEA was in touch with the Japanese nuclear regulators within hours of the earthquake and tsunami; however, it officials did not hold a press conference to give an indication of the situation in Japan until three days after the disaster, and its technical experts did not begin assessment for a full week.[114] Commentators were also quick to point out that the content of briefing about the disaster by the IAEA led to mixed feelings at the international level because it was not outspoken enough to dispel the confusion around the impact of the disaster.[115] However, others[116] are of the opinion that care must be taken in the way in which information on nuclear accidents are been divulged. They argue that such events are often made worse by the way the nuclear industry and governments handle the early stages of disasters, as they reassure the public that all is fine. They also add that some statements are well intentioned but as things get worse, people wonder why early reassurances were issued when it is apparent that there was no basis for them.[117]

The above criticism is after all not surprising because some provisions of the Early Notification Convention are less clear as it leaves interpretation of certain terms to the discretion of each contracting party. This stems from the fact that the Convention

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[113] IAEA, IAEA Activities in Response to the Fukushima Accident. Available at <http://www.iaea.org/Publications/Documents/Board/2011/govinf2011-8.pdf> Para. 19 and 20. Last accessed 29 November 2011

[114] Nature (The International Weekly Journal of Science), Nuclear Agency Faces Reform Calls', available at <http://www.nature.com/news/2011/110426/full/472397a.html> lasted accessed 2 December 2011

[115] Ibid

[116] A. Scott and J. Watson, "Quiet Voices Must be Heeded to Avert a Future Fukushima", available at <http://www.guardian.co.uk/commentisfree/2011/mar/17/fukushima-japan-nuclear-disaster> last accessed 28 December 2011

[117] Ibid

does not give specific definitions of how quickly States must provide information on nuclear accidents within its territory and the decision as to what is prompt. Moreover besides notifying the IAEA of the accident, other States to be notified about the accident is entirely at the discretion of the Accident State. As to this, the drafters of the Convention should have at least stipulated that States are required to give notice of any nuclear accident no later than a specified period of time after the accident may have occurred. Thus it is easy to argue that such a provision would have assured a reasonable application of the Convention.

A closer look at the provision of article 5(3) of the Early Notification Convention which includes the phrase "except when such information is provided in confidence by the notifying State Party", also suggests that the application of the Convention may not be relied upon. This is because it allows a notifying State to restrict the use of confidential radiological information.[118] Although, it may again be argued that this provision allows for secrecy based on national interest or for defence purposes. However, such provision may undermine the Convention's purpose by allowing a notifying party to restrict information that is to be made available. It may be that by allowing a State to restrict the use of information concerning a nuclear disaster within its borders, the Convention undermines its effectiveness as a means of minimizing trans-boundary radiological consequences which may be of detriment to the other party. In relation to this concern, the only justification for the accident State in this context is that the Convention reflects the realities of the 1980s when it was created, and not that of the twenty-first century[119] where nuclear secrecy is a major concern for both the government themselves and the public.

Also, it should be noted that the definition and scope of article 1 appears yet to be another major concern. It states that the Convention shall apply in the event of any accident involving facilities or activities of a State party or persons or legal entities

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[118] M. Oxhorn, The Norms of Nuclear Accidents After Chernobyl, 8 *J. Nat. Resources & Envtl. L.* 375 1992-1993, 375-395, 390

[119] Y. Amano, 'Introductory Statement to the Board of Governors', available at <http://www.iaea.org/newscenter/statements/2011/amsp2011n007.html> last accessed 2 December 2011. Further concern relates to the fact that the scope of the convention is limited to accidents arising out of non-military facilities

under its jurisdiction or control, from which a release of radioactive material occur or is likely to occur and which has resulted, or may result in an international trans-boundary release that could be of radiological safety significance for another state. The wording of this provision suggests that it is for the Accident State to decide whether or not the release of radioactive materials have a trans-boundary effect on another State. Besides, the provision of article 1 may also be interpreted as only when the release of radiation has a trans-boundary effect that the Accident State is required to notify other states of the accident. Thus, at what point does a release acquire safety significance? Or how do States determine if the accident could be of radiological safety significance to another State? These questions may sound irrelevant, but it is indeed vital in the understanding of the application of the Convention, as it is arguable that the effectiveness of the Convention is dependent on States possessing a basic radiological monitoring and assessment capability.[120] Thus because the Convention does not stipulate the method in which the accident State may define the parameter of the significance of an accident to another State, it is perhaps also right to say that the Convention appears unclear in its applicability. For example, after the Chernobyl disaster, the attitude of the Soviet government indicated that there was no radioactive release with detrimental effects to other States. Therefore where the Chernobyl disaster and the delayed tactics of the Soviet government is concerned, it may well be that if the Convention had been in operation in the event that followed the disaster, the Soviet government may have justified its actions of not notifying other states of the accident in that it had no significance to other states.[121] Although, one should also remember that the late notification of the disaster did have significance in terms of response to environmental release of radiation in other EU states.[122]

Furthermore, it is of concern that the Convention may be limited in scope of the accidents it applies. For example, the Convention does not apply to nuclear accidents resulting from nuclear weapons. Article 3 of the Convention does not provide that states

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[120] P.W. Birnie, n 3 above 515

[121] N. Pelzer, Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law?, available at <http://www.oecd-nea.org/law/chernobyl/PELZER.pdf> at p.80. last accessed 4 December 2011

[122] N. Hawkes and Others, *The worst Accident in the World* (Pan Books Ltd, London 1986) 155

must notify surrounding states if accidents occur from nuclear accidents. As the Convention now reads, if a state sustains a major accident in testing nuclear weapons which has serious trans-boundary effects, that state is morally but not legally obliged to notify. As such, the consequences of such inaction could severely harm the lives of many.[123] However, one thing for sure is that the Convention appears to expand customary law on the notification of accidents.[124]

4.3.1.2. Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency

The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency is similar to the Early Notification Convention. This is because they have identical implementation and technical structures, but the former however strives to fill the gaps left by the latter.

The Assistance Convention provides for the facilitation of prompt assistance by parties in the event of a nuclear accident or radiological emergency to minimize its consequences and to protect life, property and the environment from the effects of radioactive release.[125] Article 2 of Assistance Convention provides for assistance in the event of a nuclear accident or radiological emergency, whether or not such accident or emergency originates within its territory, jurisdiction or control to call for assistance from any other state party, directly or through the IAEA, and from the IAEA, or where appropriate other international intergovernmental organisations. It adds that a State party requesting assistance shall specify the scope and type of assistance and to provide the assisting party with information to determine the extent to which the request will be met. However in the event that this is not practicable, it provides that the requesting State party and the assisting party shall, in consultation, decide upon the scope and type of assistance required, and the Agency also has with the duty of spreading information across party states. It also provides that Parties shall make known to each other the

[123] S. McBrayer, n 112 above 318
[124] Ibid, 314
[125] Art.1 of the Assistance Convention

competent authorities and points of contact;[126] that assistance may be agreed upon without or with reimbursement of costs;[127] that the Parties shall seek to facilitate the transit of personnel assistance through its territory of duly notified personnel, equipment and property involved in the assistance to and from the requesting Party.[128]

Unlike the Early Notification Convention, only the Assistance Convention required changes in the UK law; at least in respect of certain essential privileges and immunities as provided for under article 8 of the Assistance Convention. For example, section 5 of the Atomic Energy Act 1989 gives the force of law in the UK to the provisions of article 8 which requires the UK to grant immunities to the personnel of the assisting party.[129] As to this, section 5(2) of the Act provides that the provisions of article 8 shall be construed as granting any privileges or immunity which they require to be afforded. Section 5(6) further adds that if in any proceedings any question arises whether a person is or is not entitled to any privilege or immunity by virtue of this section, a certificate issued by or under the authority of the Secretary of State stating any fact relevant to that question shall be conclusive evidence of that fact.[130]

However just like the Early Notification Convention, it is possible to argue that the provisions of the Assistance Convention are also imprecise for the purpose which it was established for. This is because there are concerns with the vague provision of article 2 of the Convention. For example, it states that parties "may" call for assistance and the requested party will decide whether or not it may render the assistance requested and the scope and terms of the assistance that might be rendered. Clearly speaking, the use of "may" provides the discretion for the assisting state in rendering assistance to the

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[126] Art.4 of the Assistance Convention
[127] Art.7 of the Assistance Convention
[128] Art.9 of the Assistance Convention
[129] These are: immunity from arrest, detention and legal process, including criminal, civil and administrative jurisdiction, of the requesting State, in respect of acts or omissions in the performance of their duties; exemption from taxation, duties or other charges, except those which are normally incorporated in the price of goods or paid for services rendered, in respect of the performance of their assistance functions; afford the assisting party exemption from taxation, duties or other charges on the equipment and property brought into the territory of the requesting State by the assisting party for the purpose of the assistance; and provide immunity from seizure, attachment or requisition of such equipment and property (art.8(2-3) of the Assistance Convention)
[130] See also: J. Woodliffe, Chernobyl: Four Years on, *Int'l Comp. L. Q.*, Vol.39, No.2 (1990) 461-471, 462, for discussions on withdrawal of declaration of the Assistance Convention in the UK

accident State as the Convention does not oblige a response to nuclear emergency. This is however not surprising because the Convention also aims to give assisting States immunity from legal proceedings brought by the requesting State, and an indemnity for proceedings brought by others.[131]

Also similar to the Early Notification Convention is the discretion given to contracting parties. The discretion here relates to the direction and control of assistance afforded. For example under article 3, the overall direction, control, co-ordination and supervision shall lie with the State that needs help. As such, the Convention creates no duty either to seek compulsory assistance, or to control the emergency sort for.[132] Failure to do so may however incur responsibility on the Accident State if it results in harm to others.

4.3.2. Bilateral Agreements

Although before the adoption of the Early Notification and Assistance Conventions, there exist numerous bilateral and unilateral agreements between states in the field of environment safety such as the Paris Convention of Marine Pollution[133] and the agreement on radiological protection between the UK and France in 1983, which provides for the exchange of information in the event of emergencies occurring in one of the two states which could have radiological consequences for the other state.[134] So also is the European Commission which has been in the capacity of recommending negotiations between states on arrangements which will apply in the event of an accident from nuclear installations.[135] In spite of this, an important provision of the Assistance Convention and the Early Notification Convention is that they provide impetus for the creation of further bilateral agreements. This is of great significance in terms of nuclear

[131] Art.8 and 10 of the Assistance Convention
[132] P.W. Birnie, n 3 above 515
[133] The Paris Convention of Marine Pollution from Land-based Sources 1974
[134] 1983/84 Cmnd. 9041 Treaty Series No. 60 (1983)
[135] An example is 87/170/EURATOM: Opinion of the Commission of 26 February 1987 Concerning Heysham 2 Nuclear Power Station (UK). OJ L 068, 12.03.1987. See also Para. 3.3.2. below

safety because it allows for more cooperation between two States since the Conventions appear to be weak in some relevant areas of application.[136]

Since the Chernobyl disaster, the UK had concluded three bilateral arrangements on early notification of a nuclear accident and exchange of information concerning the operation and management of nuclear facilities with Denmark and Norway for example.[137] These agreements focus on the exchange of information concerning nuclear accidents. In several aspects, these bilateral agreements are wider in scope. For example, there is an obligation to notify if there is an accident involving a trans-boundary effect of radioactive safety. Article 2 of the UK arrangement with Denmark as an example provides that "if there is an accident involving a nuclear facility or activity in the territory of one party from which a release of radioactive material results and if such a release could have an effect, outside the first party's territory, of radiological safety significance for the other party, the party in whose territory the accident has occurred is to immediately notify the other party directly. The party is also obliged to provide for such available as it is relevant to minimising the radiological consequences as identified in the Early Notification Convention". Furthermore, the competent authorities of each party as designated for the purposes of the agreement are to exchange, on or before its entry of the agreement into force, safety related information on nuclear facilities and activities, which is relevant to the risk of abnormal release of radioactive materials, and consequently the Parties shall periodically exchange any further information.[138] It is in the context of these bilateral agreements that one begins to appreciate the Early Notification Convention and the Assistance Convention. It is also towards these bilateral agreements that the UK government hopes will help reassure the public of its commitment to nuclear safety.[139]

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[136] Art.12 of the Assistance Convention and art.9 and 10 of the Early Notification Convention

[137] Cm.685, U.K.T.S. No.11 (1989) and Cm.371, U.K.T.S. No.30 (1988) respectively

[138] Art.8(1) of the UK and Denmark Agreement. Also, art.6 is the obligation to notify the other party where abnormal levels of radiation are registered that are not caused by release form facilities or activities in the notifying state's territory. Also under art.8(2), authorities undertake to notify each other promptly of commissioning, decommissioning and other significant changes in nuclear facilities in their respective territories

[139] Foreign and Commonwealth Office (FCO) Press Release No.150 (19 November 1987)

4.3.3. Post-Chernobyl and the EU

Before the Chernobyl disaster, the EU had earlier issued Directives dealing specifically with early notification of a nuclear accident. An example is Directive 80/836/EURATOM[140] laying down the basic safety standards for the health and protection of workers and the general public against the dangers of ionising radiation. The Directive provides that Member States must notify as a matter of urgency neighbouring states of any accident which could expose the public to radioactivity.[141] The Directive does not however, state what information must be given other than the occurrence of the accident. Considering on one hand that the Directive does not give specification as to the information that must be given other than the occurrence of an accident, and on the other that the IAEA Convention on Early Notification does not fully cover the exchange of information,[142] it is not surprising that the EU adopted further notification measures.

This led to the adoption of Decision 87/600/EURATOM on early exchange of information between Member States in the event of a radiological emergency.[143] The decision provides for the notification and provision of information whenever a Member State decides to take measures of a wide-spread nature in order to protect the general public in case of a radiological emergency following: an accident in its territory involving facilities or activities of radiation from which a significant release of radioactive material occurs or is likely to occur; or the detection, within or outside its own territory, of abnormal levels of radioactivity which are likely to be detrimental to public health in that Member State; or any other accidents in which radioactive material occurs or is likely to occur; or which involves significant release of radioactive materials occurs or is likely to occur.[144]

In addition to the above, the EU also adopted Directive 89/618/EURATOM on informing the general public about health protection measures to be applied and steps to

[140] No. L 246 of 15.07.1980
[141] Art. 45 of Directive 80/836/EURATOM
[142] Commission of the European Communities, Report on Activities Undertaken by the Community Following the Chernobyl Accident, COM (89) 203 final, Brussels 25 April 1989 at p.15
[143] [1980] OJ L246
[144] Art.1 of Decision 87/600/EURATOM

be taken in the event of a radiological emergency.[145] According to the Directive, "a radiological emergency" means any situation: an accident in the territory of a Member State involving facilities or activities referred to in article 2(2) of the Directive in which a significant release of radioactive material occurs or is likely to occur, or detection, of abnormal levels of radioactivity which are likely to be detrimental to public health, or other accidents other than those specified from which a significant amount of radioactive material occurs within or outside its own territory,[146] without delay.[147] As such, it should be noted that the exposure of the public to radiation doses is to be determined by the Basic Safety Standards discussed earlier, and that in normal circumstances the information provided should be primarily instructive and aimed at reassuring the general public that emergency plans exist, both at national level for hazards associated also with non-fixed installations or originating outside national borders, and at regional or local level for fixed installations.[148] The Directive which closely follows the requirements of the Early Notification Convention also does not hinder the obligations of member States under other bilateral or multilateral agreements.[149] Above all, one thing for sure is that this Directive demonstrates that the provision of information to the general public forms an integral part of emergency planning management.

4.3.4. UK Applicability

The above EU measures are transposed in the UK by the radiation (emergency preparedness and public information) Regulations 2001.[150] It applies to any work with ionising radiation which involves having on premises radioactive substances containing more than specified quantities of radioactive fissile materials, transporting material by rail, or transporting or conveying material other than by standard means such as road, rail, sea or air.[151] It requires that before an activity is undertaken for the first time, a RA must be carried out by the operator or carrier to demonstrate that all hazards arising from

[145] Official Journal L 357, 07/12/1989
[146] Art.2 of Directive 89/618/EURATOM
[147] Art.6 of Directive 89/618/EURATOM
[148] Commission Communication on the Implementation of Council Directive 86/618 [COM(1991) 103/03]
[149] Preamble to the Directive
[150] SI 2001 No 2975. Note that this implements also the Basic Safety Directive
[151] Reg.3 of the Radiation (Emergency Preparedness and Public Information) Regulations 2001

that work with the potential to cause a radiation accident have been identified; and the nature and magnitude of the risks to employees and other persons arising from those hazards have been evaluated; and that where the assessment shows that a radiation risk to employees or other persons exists from an identifiable radiation accident, the operator shall take all reasonably practicable steps to prevent any such accident, and to limit the consequences of any such accident which does occur.[152] Regulation 7 provides for the operator to prepare an adequate emergency plan designed to secure, so far as is it reasonably practicable, the restriction of exposure to ionising radiation and the health and safety of persons who may be affected by such reasonably foreseeable emergencies as are identified by the said assessment. Regulation 13 also adds that the operator shall take reasonable steps to put such emergency plan, or parts of it as necessary, into effect without delay when a radiation emergency occurs, or in any event in which could reasonably be expected to lead to a radiation emergency, and shall notify such occurrence to the relevant regulatory authority without delay. Operators are however responsible to ensure that members of the public who are in the area where they are likely to be affected by an emergency are supplied in an appropriate manner with the relevant information.[153]

In addition, the government also deals with nuclear emergencies through the Nuclear Emergency Planning Liaison Group (NEPLG). The NEPLG brings together the organisations with interests in off-site civil nuclear emergency planning, and it is a forum for discussing common problems, exchanging information and experience and agreeing improvements in planning, procedures and organisation.[154] As to this, the Department of Energy and Climate Change (DECC) has issued NELPG consolidated

[152] Reg.4(1) and (2) of the Radiation (Emergency Preparedness and Public Information) Regulations 2001
[153] Reg.16 of the Radiation (Emergency Preparedness and Public Information) Regulations 2001. Further, Reg.9 deals with off-site emergency plan; reg.10 deals with the review and testing of emergency plans; and reg.11 deals with consultation and co-operation in performing the duties imposed by regulators
[154] Department for Business, Innovations & Skills (BIS), Nuclear Emergency Planning and Liaison Group, available at <http://webarchive.nationalarchives.gov.uk/+/http://www.berr.gov.uk/whatwedo/energy/sources/nuclear/key-issues/emergency/neplg/page31040.html> last accessed 2 January 2012

guidance[155] to all those involved in the development of site-specific emergency plans at local level and reviews the results of off-site exercises to ensure lessons are learned.[156]

[155] DECC, Emergency Planning Liaison Group: Consolidated Version, (January 2009) Chapter 1 at Para. 1.3. The purpose of the Consolidated Guidance is however to bring together guidance into one document for general reference by planners and practitioners concerned with emergency response at nuclear sites.
[156] Ibid

4.4. LEARNING FROM DISASTER

As seen above, the Chernobyl disaster had a huge effect on the environment in general and also the safety regulatory framework of nuclear power. On one hand, the environmental effects of the release of radioactive materials were felt at different countries. For example, the effect of the disaster spread to Sweden, Finland in particular. The public in Denmark, South Germany and Switzerland also felt the impact. Also in the UK, the release of radioactive substances into the environment where thought to have caused rain falling on high ground carried by radioactivity to farmland.[157] On the other hand, managing these effects revealed the gaps in both international and regional levels for dealing with catastrophic disaster of that magnitude, and lessons were learnt to improve nuclear safety standards. At this time, the disaster served as a constraint to the continuous use and further development of nuclear power. This was however in contrast to the position in the early 1950s and early 1970s when the law was seen as promoting the use of nuclear power.[158]

Coincidentally twenty-five years after the anniversary of the Chernobyl disaster, the Fukushima nuclear power disaster further widens the concern on nuclear power safety. As such, it affords us the opportunity to revisit the provisions and effectiveness of nuclear safety regulations, and to examine whether there is need to review further these measures.

After examining the different safety regulations above, it is strongly suggested that there is the need to review these regulations. Such review should be at the international level and it should have a legal binding effect on nuclear power States. This may however be controversial as some commentators may find it easy to contend that the continuing improvements being made in the safety of nuclear installations should strengthen its safety measures.[159] I argue otherwise and my reasons are set below.

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[157] European Communities, *Consequences of the Chernobyl Nuclear Accident: Opinion and Report* (Economics and Social Committee, Brussels 1987)

[158] P. Cameron, 'The Revival of Nuclear Power: An Analysis of the Legal Implication', *J. Environmental Law* (2007) 19 (1): 71-87, 74

[159] G.N. Kelly, *Emergency Preparedness and Response Achievements, Future Needs and Opportunities*, (European Commission, Brussels 1049 Belgium). Available at < http://www.irpa.net/irpa10/cdrom/01242.pdf>

Indeed, a major challenge for the nuclear industry remains how to close the gap between safety challenges. Such challenges as seen above vary across issues such as dealing with natural disasters, spent fuel and radioactive waste management, increasing international nuclear cooperation, and also dealings in terms of disaster emergency preparedness and response management. Surely, there are many ways in which these can be addressed.

One suggestion would be to unify the nuclear industry through the establishment of a new International Nuclear Agency to ensure that there is a ground for a global nuclear regime such as a universally accepted standard of nuclear safety and security, and adequate supervision that will allow nuclear States to meet their obligations. The Agency should focus on addressing the gaps in existing international environmental regimes such as the CNS, the Joint Convention, Early Notification and Assistance Convention, and also other IAEA safety principles (with focus on those relating to the disposal of nuclear waste). Within the capacity of the Agency, it should be able to create legally binding safety obligations on contracting parties, and also compulsory incentives of self-report of safety obligations to the Agency by all States within a shorter period of time. These measures are considered vital in situations where nuclear States have control of installations in their territory. For example in the context of nuclear waste, it may be of importance to create binding obligations on disposal methods, to include how and where waste is to be buried as an example, so as to ease the concern of the public on risk related issues. Also of particular importance is for the Agency to be able to facilitate proper and efficient safety implementations by placing sanctions on nuclear States for non-compliance. As to this, the Agency must introduce regulatory instruments of environmental standards which must be complied with, and non-compliance with these standards should attract penalties or sanctions. For example, the use of penalties and sanctions may include licence suspension or perhaps revocation of licence[160] in extreme cases of violation of safety standards. Indeed this is considered essential in the nuclear

[160] C. Abbot, *Enforcing Pollution Control Regulation: Strengthening Sanctions and Improving Deterrence* (Hart Publishing, Oxford 2009) 10

industry in the absence of voluntary compliance[161] if the intended purpose of the Agency is to be achieved.

Having said this, it should be remembered that the proposal for the management of nuclear power by an international body is not new. It is recalled in 1953, that the President of the USA proposed at the General Assembly of the United Nations the creation of an organization to promote the peaceful use of nuclear energy and to seek to ensure that nuclear energy would not serve any military purpose.[162] However, it is this proposal and compromise that led to the creation of the IAEA which is now the body charged with the main tasks of encouraging and facilitating the development and dissemination of information on nuclear power, and ensuring that nuclear power is used for peaceful purposes only.[163] Although events such as the Chernobyl disaster have led to the transformation of the focus of the IAEA's priority, for example in terms of measures to be adopted in preventing a nuclear accident and considerations after an accident. However, these IAEA measures are not legally binding on contracting parties; rather they are international standards and requirements that may be adopted by them at their own discretion and for use in national regulations in respect of their own activities.

However as to the establishment of a new International Nuclear Agency, the attitude of nuclear power States to establish non-binding nuclear safety measures may be a major concern that is likely to hinder such development. From its beginnings, there has been sign of States being reluctant to relinquish control of nuclear installations, and this is now very often common in nuclear law. This is reflected in early treaties such as the EURATOM, which provides that the safety of nuclear installations was to remain within the ambit of Member States. For example, it provides that basic standards shall be laid down within the EU for the protection of the health of workers and the general public against the dangers of radiation.[164] Even at times when the EU needed to take uttermost action at times of major criticisms of its safety measures, the events that led to the adoption of the NSD for example, again reveals the determination of States not to give

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[161] Ibid
[162] D. Fisher, *History of the IAEA: The First Forty Years*, (IAEA, Vienna 1997) Chapter 1
[163] Art.III (1-5) of the IAEA Statute
[164] Chapter III, art.30 of the EURATOM Treaty

up control of nuclear matters within their jurisdiction. In the build up of the Directive for example, there was a separate provision to include all necessary measures to ensure that international safety principles were binding upon EU Member States, some countries were however defiant about such provision.[165] Perhaps, one reason for this is because the defiant States may be the ones that will be caught liable for breach of obligation under a stringent regime. The UK for example, argued that there was no real benefit in introducing a regional layer of regulation below framework of the IAEA Convention on Nuclear Safety and IAEA Safety Standards.[166] It is from this view that it is been argued that the lack of an International Nuclear Agency with legally binding safety provisions may be a detriment in ensuring adequate and effective global nuclear safety standards. This should not come as a surprise to many of us. After all, since the risk nuclear power respects no border, while should safety measures be limited in application?

The unwillingness to establish legally binding nuclear power safety measures at International level is all but more worrying in the context of nuclear renaissance, with countries such as the UK planning to extend the life of its nuclear plants and also build new ones, or even other countries with porous security systems who are weighing the nuclear option. However, a recent event in form of the SPRWD suggests that the strength to hold on to national measures may be well over, at least at the EU level. This is also a greater step which arguably indicates that the EU is willing to reduce the power given to Member States under the EURATOM Treaty to have control over nuclear installations in their territory. But still, we should not forget that the ability to enforce such measures at the international level depends entirely on states agreeing on such development. How far the development in the EU will help lead the way forward at the international level is yet to be seen.

CONCLUSION

As discussed so far, it is obvious that much has been achieved in the past decade to improve the safe use of nuclear power. However in light of the Fukushima nuclear

[165] COM (2004) 526 final
[166] See: DTI, *Nuclear Safety Directive, Consultation Document* (2003)

power disaster, it appears that there is still need to maintain and improve nuclear power disaster emergency preparedness and response.

It is towards this that this chapter proposes the creation of an International Nuclear Authority Agency to create binding legal nuclear safety requirements and to oversee the global nuclear industry, with institutions such as the EU being a legally binding party. Although, this may as well be a major challenge for nuclear States who are used to having control over nuclear installations within their territories, however, progress at the EU level may help facilitate such international negotiation.

CHAPTER 5: CASE STUDY

NUCLEAR POWER: THE UK PLANNING REGIME AND THE ISSUE OF PUBLIC PARTICIPATION IN THE DECISION-MAKING PROCESS

5.1. INTRODUCTION

As regards the pivotal case for the development of nuclear power as discussed in Chapter 1, it is very important to have in place the right planning regulatory framework to promote its development. At the same time, this planning regulatory framework, alongside the regulatory regimes discussed in Chapter 4, may also help to ensure that adequate safety steps are taken in the development of nuclear power.

Generally speaking, the land use planning regime for the construction of Major Infrastructure Projects (MIPs) to include nuclear installations in the UK has been subjected to reforms by the government over the years. The rationale behind this is well understood. It dates back to 1999 when the government in its consultation on streamlining the processes of MIPs through the planning system concluded that the former system "takes far too long to process major projects through a decision. It adds that the process is lengthy, unwieldy and expensive for all concerned. Delay is costly, leads to uncertainty and brings the planning system into disrepute; and the fact that these projects are relatively infrequent does not detract from the need to improve the procedures for dealing with them".[1] In 2007,[2] the immediate past Labour government proposed to address these issues and to create a planning system that is "fit for the purpose of the twenty-first century".[3]

The Proposals set out in 2007 culminated in the Planning Act 2008 (hereinafter referred to as the "2008 Act") which provided for a new regime for the authorisation procedure for MIPs are authorised. For present purposes, it provides for the authorisation of MIPs by a Development Consent Order (DCO) which is made by the

[1] DETR, '*A Consultation Paper on Streamlining the Process of Major Infrastructure Through the Planning System*', 1999b

[2] Department of Community and Local Government (DCLG), Department of Trade and Industry, and Department of Environment, Food and Rural Planning (DEFRA), *Planning for a Sustainable Future: White Paper*, (Cm 7120) HSMO, 2007

[3] Moving Towards the Planning White Paper: Speech by Ruth Kelly, the then Secretary of State for Communities and Local Government, 29 January 2007

independent Infrastructure Planning Commission (IPC) with reference to National Policy Statements (NPSs).[4] Nonetheless, the Coalition government is presently legislating for the abolition of the IPC through the 2010 Localism Bill to become a Major Infrastructure Planning Unit attached to the Planning Inspectorate.[5] At this point one cannot state specifically what the new system will look like until the Localism Bill becomes law, however reports suggest that the functions of the IPC are to remain largely unchanged, with the government expecting a smooth transition.[6] It is through these measures that the government expects will expedite the land use authorisation process and deliver a more efficient system for dealing with applications for MIPs. Although as a general planning law, such measures are to have environmental safety at heart, the event in Japan however re-emphasises safety concerns.

Having said that, the issue now is whether the changes made to the planning system through the 2008 Act will fulfil expectations. This is because there is an inherent tension between a radically streamlined system and a process which provides acceptable levels of participation by national or local groups.[7] More fundamental also in the context of climate change goals[8] is whether the system provides for a speedy delivery of low carbon sources of energy such as nuclear power, and whether the system provides for a thorough safety assessment procedure.

Against this background, this chapter examines the land planning regime for nuclear new build in the UK. It analyses how the regime deals with the concerns of public participation in the decision-making process. In so doing, this chapter starts with

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[4] Art.33, 1 & 5 of the 2008 Act respectively

[5] The Coalition: Our Programme for Government (p.11) <http://www.cabinetoffice.gov.uk/news/coalition-documents> accessed 15th February 2011. Other key provisions of the Bill are: to abolish Regional Spatial Strategies, amend the Community Infrastructure Levy, which allows councils to charge developers to pay for infrastructure. Some of the revenue will be available for the local community, provide for neighbourhood plans, which would be approved if they received 50% of the votes cast in a referendum, provide for neighbourhood development orders to allow communities to approve development without requiring normal planning consent, and give new housing and regeneration powers to the Greater London Authority, while abolishing the London Development Agency

[6] Communities and Local Government, 'Major infrastructure stays on fast-track as planning quango closes' available at <http://www.communities.gov.uk/news/corporate/1626220> accessed 29 October 2011

[7] . Tromans, Nuclear Law: *The Law Applying to Nuclear Installations and Radioactive Substances in its Historic Context*, 2nd Eds, (Hart Publishing, Oxford 2010) 128

[8] Department of Energy and Climate Change (DECC), *UK Low Carbon Transition Plan: National Strategy for Climate and Energy* (TSO, July 2009) Page 52

an overview of the Sizewell B public inquiry, it been the most recently built nuclear power station in the UK, to put into context these concerns. It also examines the planning regime for MIPs, to include primarily an examination of the fundamental objectives of the NPSs and the IPC[9] and the requirements for securing DCO in dealing with these concerns; and also the implications of the regime in operation. It however concludes by looking at the continuing concerns and the future of land use planning regime in the UK.

[9] Note: considering the fact that the Localism Bill has just passed the Committee stage at the House of Lords, this chapter discusses the IPC as part of the existing regime; it will however, strive to make reference to the Localism Bill as appropriate

5.2. THE LAND USE PLANNING REGIME FOR THE LAST GENERATION OF NUCLEAR POWER STATIONS: AN OVERVIEW OF THE SIZEWELL B PUBLIC INQUIRY

Where the development of nuclear power is concerned, an excellent starting point for examining the concerns of the UK planning regime is the Sizewell B public inquiry (hereinafter referred to as "SB inquiry"). Although before the SB inquiry, there had been little public scrutiny of the development of nuclear power in the UK. For example, safety questions where been considered at the Windscale Inquiry into the application to build a nuclear fuel reprocessing plant.[10] However, at no previous public inquiry into an application to build a nuclear power station had further relevant issues including nuclear safety and design been considered in depth.[11]

The SB inquiry remains the longest and most expensive nuclear power inquiry in the UK. It was based on the proposal for a Pressurised Water Reactor (PWR) by the Central Electric Generating Board (CEGB). It was held under the Electricity and Generating Stations and Overhead Lines (Inquiries Procedure) Rules 1981 and ran from January 1983 to March 1985. Until 2009, inquiries in the UK were authorized under many different Acts of Parliament and could take a considerable period of time to reach a decision by either the local planning authority or as called in by the Secretary of State (SoS), usually based on the recommendation of a planning inspector.[12] The SB inquiry is no exception to this as it was held to advise the SoS for energy on whether to approve or reject the CEGB's proposal.

The SB inquiry was a wide ranging one. It featured a detailed examination of the economic, environmental and safety aspects of the proposal for PWR through the planning process. The issues that were discussed included: the need for nuclear power, safety, waste management and the local implications of the proposal; and the government was prepared to allow its evidence to be challenged. Safety issues in particular were discussed in depth. On one hand, it is because the government was aware of public sensitivity as to safety of PWR design following the Three Mile Island incident

[10] G. Greenhalgh, After Parker: A Review of the Windscale Inquiry and Subsequent Developments (International Atomic Energy Authority (IAEA) Bulletin) Vol. 20, No. 6
[11] F.H.B. Layfield, *Sizewell B Public Inquiry: Report*, (HMSO, London 1986), Para. 9.2
[12] S. 76A 4(b) of the Town and Country Planning Act (TCPA) 1990

in the United States of America (USA), which also involved a PWR although of a different design to that proposed for the SB. On the other hand, because of the lack of previous public scrutiny of nuclear safety, the many suspicions, and fears surrounding nuclear power in the public's mind.[13] Besides, safety issues were also discussed because the government had also repeatedly stressed that the safety of nuclear power installations is of the greatest importance as it features relevant issues in the design, construction, operation of the station, and in particular to get the views of the Nuclear Inspectorate as the licensing authority as to such development.[14]

Given the enormous range of issues examined at the SB inquiry, special arrangements were made to ensure a fair and thorough inquiry as it was desirable to ensure as far as possible that objectors had a proper opportunity to make critical examination of the proposal.[15] As such, parties were able to submit written evidence, with other supporting documents which were presented by expert witnesses. A number of independent witnesses were also invited to give evidence to the inquiry to assist in areas where there was not sufficient evidence.[16] Further, the inquiry process allowed for effective cross-examination of evidence through pre-inquiry meetings to deal with the division of matters, and the scope of evidence that was allowed to be challenged by objectors. There were also a number of so-called "side room meetings" where parties were able to exchange information in order to identify and reduce matters to be canvassed in the formal inquiry sessions. Overall, it is believed that the objectors which the inquiry was designed to accommodate welcomed these arrangements because it afforded them the opportunity to participate on issues of nuclear power safety and environmental risk decision-making process.[17]

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[13] F.H.B. Layfield, n 11 above at Para. 9.3. See also: S. Tromans and J. Fitzgerald, n 203 above 74
[14] Ibid, 9.1
[15] O'Riordan et al, *Sizewell B-An Anatomy of the Inquiry* (MacMillan Press, 1988) Para. 9.41
[16] Ibid
[17] R. Davies, The Effectiveness of the Sizewell B Public Inquiry in Facilitating Communication about the Risks of Nuclear Power, *Science, Technology, & Human Values*, Vol. 12, No. 3/4, (1987) 102-110, 104

5.2.1. The Issues of the Sizewell B Public Inquiry

Generally speaking, nuclear power projects are usually contentious in nature. As a result, there is usually the balance between public or economic need and environmental harm which must be struck. Besides, they often extend to the boundaries of geographic areas and statutory control regimes, and sometimes much of the evidence both for and against the proposal will be highly technical. Even also in the process of securing permission there is tension between public participation, due process and accountability which must be struck.[18] Indeed as one commentator puts it, "the overall arrangement of the SB inquiry could best be described as quasi-judicial and the procedures adopted were similar to those of a High Court proceeding".[19] Clearly, this is not hard to imagine because of the contentious nature of the SB project. Parties were allowed to submit written evidence, with supporting documents, which were presented by experts in order to ensure as far as possible that they had the opportunity to scrutinise the CEGB's proposal. This sort of approach however also suggests that there is a clear chain of cause and effect in the SB inquiry process which give rise to a number of important issues, such as environmental and local issues which have to be resolved before securing planning consent.[20] As such, it is arguable that examining these issues may lead to further consequences in an inquiry process. However, whether an inquiry of this nature is suitable for securing land use consent where nuclear power is concerned remains a discussion within this chapter. But first, it is important to identify and examine the obvious immediate issues of the SB inquiry.

There is, quite noticeably, the provision for public participation. Both the government and the promoter (CEGB) hoped that this could help guarantee the public to support nuclear power by providing a transparent process to command their confidence. As a matter of fact, the government once admitted that "the Sizewell B project would only be approved if it received the endorsement of an inquiry at which a full public

[18] K. Lindblom and R. Honey, Planning for a New Generation of Power Stations, *J.P.L.* (2007), 843-862, 843-4
[19] R. Davies, 17above 103
[20] K. Lindblom and R. Honey, n 18 above 847

discussion of every aspect of the proposal would be held".[21] Undoubtedly, the SB inquiry provided the opportunity for the public to participate in the decision-making process but the outcome was a lengthy and expensive process (for both the promoters and objectors).

5.2.1.1. The Duration of the Inquiry

The reason behind the length of the SB inquiry and the time taken to reach a decision is clearer when looked at through the consideration of safety factors with no precise policy statement to indicate what exactly and how exactly it should be examined. Rather, considerations were given to all national policy issues thought to be relevant to the construction of a nuclear power station. For example, the inquiry engaged in issues such as, energy conservation, fossil fuel prices and availability, and the ability to build the PWR on time and to budget.[22]

Also, the rules of natural justice require decision-makers to hear "both sides" of considerations.[23] As to this, case law suggests that the Inspector was required to ensure that the evidence produced by the public and the promoter were examined and challenged. For example, in the case of *Errington v Minister of Health*[24] where the local authority made a draft clearance order under housing legislation, it was argued that after receiving the inspector's report, the Minister had entered into further correspondence with other government officials who had visited and conferred on the site. The objectors then successfully claimed that in hearing further evidence of one party behind the back of the others, the Minister had been guilty of a breach of natural justice. Although the decision in this case is quite old, it nonetheless illustrates that decision-makers are expected to comply with the rules of natural justice in processes which in turn result in decisions. The issue of natural justice was also considered in *Bushell v Secretary of State for the Environment.*[25] This case concerns a local public inquiry which was held

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[21] W. Patterson et al, *Critical Decision: Should Britain Buy the Pressurised Water Reactor?* (Friends of the Earth Trust, London 1986) 16
[22] S. Tromans, n 7 above 128
[23] V. Moore, *A Practical Approach to Planning Law* (11th edition, Oxford University Press, Oxford 2010) 345
[24] [1935] 1 KB 249 (CA)
[25] [1980] AC 75

following the objection to two proposed motorway schemes. In this case, the Inspector disallowed cross-examination of Department of the Environment witnesses designed to test the reliability and accuracy of a Department publication for assessing future traffic growth and the need for new motorways. The SoS however recommended the schemes after the inquiry. Despite the later innovation of new methods of traffic growth prediction, revealing slower growth, the SoS denied the objectors' requests for a re-opening of the inquiry. He agreed to allow the objectors' an opportunity to comment on his disagreement with the Inspector's recommendations if the new methods led him to do so. The objectors' appealed against the dismissal of their application to quash the schemes,[26] contending *inter alia* that disallowing cross-examination had been wrong in law and that the SoS had considered previously undisclosed information which might reasonably have caused the Inspector to reach other conclusions. On appeal, the Court considered the grounds for refusing cross-examination were unacceptable stating that "there is a massive body of accepted decisions establishing that natural justice requires that a party be given an opportunity of challenging by cross-examination witnesses called by another party on relevant issues".[27] Also more recently in *R. (on the application of Hillingdon LBC) v Secretary of State for Transport*,[28] where the claimants, a group of local authorities and organisations applied for judicial review of the SoS decision to confirm policy support for a third runway and new passenger facilities at Heathrow airport, it was held that until a NPS was concluded, the SoS could not limit the scope of permissible debate about airport expansion.[29] Thus in the present context where safety factors relied on complex engineering approaches to demonstrate environmental concerns as seen in the SB inquiry, this may take time due to the need to take into consideration all parties' submissions.

An example of a similar project which also led to a long public inquiry, although not energy related, is the Heathrow Terminal 5 inquiry which was even much longer than the Sizewell B inquiry. The Terminal 5 proposal attracted a great deal of opposition

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[26] *Bushell v Secretary of State for the Environment*, 76 L.G.R. 460; 91978) 36 P. & C.R. 363; [1978] J.P.L. 310; (1978) 122 S.J. 110
[27] [1980] AC 75 at 116
[28] [2010] EWHC 626
[29] Ibid, at Para. 64

and as a result the inquiry lasted for 524 days over a period of 46 months. There was also a period of twenty-one months from the close of the inquiry to the production of the final report from the inspector and a further eleven months from the report to reach a decision. In sum, the whole process from the submission of the proposal to when the decision was made lasted for nearly seven years.[30]

5.2.1.2. High Cost

High cost also proved to be a key issue of the inquiry process from the outset. It is evident that the overriding problem for some objectors (Non-Governmental Organisations (NGOs) and private individuals) during the inquiry was finances.[31] With regard to the presentation of safety features, the wider public were represented by experts who had considerable expertise and experience as applicable to give evidence; of course, the same cannot be said of a layman. Nearly all the objectors had to raise funds through appeals to the wider public and other different ways they considered appropriate to mount a respectable case against what they classified to be a massive threat to the environment.[32] Moreover, because the inquiry lasted for a long period of time there was failure to deliver more timely outcomes. As a result, most objectors where faced with the difficulty of the cost involved in seeking and retaining the services of experts and professional advocates to help present their evidence over a long period of time. For example, Friends of the Earth (FoE) in particular took no further effective part after their initial evidence and cross-examination of CEGB witnesses, due to lack of funds.[33]

Considering this, high cost of participation raises an important point about the nature of the inquiry process. This is because of the mere reason that the inquiry was dominated by those who could employ professional advocates for a longer period of time is a concern. In this case, it was the CEGB; the promoter and a state-owned

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[30] Kate Barker, *Review of Land Use Planning: Final Report and Recommendations* (HMSO, December 2006) 183

[31] F.H.B. Layfield, n 11 above at Para. 9.42

[32] Lord Justice Brooke, David Hall Memorial Lecture: Environmental Justice: The Cost Barrier, (2006) 18 (3): 341-356 *J. Env. Law* 2006. It was considered from its beginnings to fund objectors to help prepare their cases, but such consideration was rejected by the SoS. See: F.H.B. Layfield, n 11 above at Para. 1.28

[33] Walt Patterson, 'A Report on Sizewell' available at (1984) Available at <http://www.waltpatterson.org/sizewellrpt.pdf> accessed 5 October 2010

company whose costs were born out of public tax. Although it is fair to mention that attempts were made by the Inspector to remedy the difficulties of high cost by introducing measures such as the innovation of "counsel to the inquiry" to cross-examine witnesses independently and "invitation of independent witnesses" to educate the inquiry on specific technical topics, indications were that such measures only helped the proponents more than the opponents.[34] This was also the case in the Windscale public inquiry into the British plan for a thermal-oxide reprocessing plant (THORP) where hundreds of individual organizations testified at the inquiry to assess conflicting arguments. With no source of funding, objectors had great difficulties in developing a coherent and coordinated position to counter the arguments.[35] Thus, because objectors were handicapped in presenting their views, one is forced to ask questions about the credibility, fairness, thoroughness and legitimacy of the process. Did the inquiry fulfil the participatory objective of the government? Or did it sufficiently reflect the values of the public? Certainly, I believe the answers to these questions should be the basis for any reform whatsoever to the planning system in the UK because planning outcomes affect everyone in the society and care must be taken to involve the public in the process.

Also important for consideration is the length of time taken by the Inspector to publish the report of the inquiry. This raises concern about the outcome and legitimacy of the process. Commentators[36] argued that the inquiry was not sufficient as a basis for the approval of the CEGB proposal. This argument is based on the fact that the inquiry ended before the accident at Chernobyl and it is believed that the changes in the oil and gas industry may have altered the economics of the proposed PWR, and that the SoS would have put into account new evidence relating to the Chernobyl disaster; none of which would have been discussed at the inquiry. Going back to the decision in the cases above, there are clear grounds to contend that the decision of the inquiry may have been reached in an unfair manner.

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[34] R. Davies, n 17 above 104
[35] B. Wynne, "Nuclear Debate at the Crossroads" *New Scientist*, 349-360, August 3, 1978
[36] M. Purdue, The Layfield Report on the Sizewell B Inquiry, *Public Law* (1987) 162-75, 172

5.3. THE LAND USE PLANNING REGIME FOR THE DEVELOPMENT OF NUCLEAR POWER IN THE UK

As seen above, the construction of a nuclear power station in the UK requires land use development consent. It also constitutes a practice which requires a licence,[37] in particular the issue of Generic Design Assessment (GDA), intended to provide a structured assessment of the safety of nuclear installations;[38] justification in radiological protection terms;[39] and the arrangements which will have to be in place for decommissioning and waste management programmes.[40] As the title suggests, this part examines the land use planning regime for the construction of a new nuclear power station in the UK, with particular focus on processes and requirements in the decision-making process.

5.3.1. Background to Policy Formation

Following the SB inquiry, the government reconsidered the land use planning regime for NSIPs in three separate policy reviews in 2006.

The first is the 2006 "Energy Challenge"[41] report of the UK energy review. This report considered in details the land use planning regime and applications for infrastructure projects under the Electricity Act 1989. The review revealed that the planning system resulted in delay in the decision-making process, high cost for the promoters and also uncertainty of the decision process. Issues highlighted included individual energy projects being part of large national systems that provide benefits enjoyed by all communities; lack of clear government policy highlighting the strategic national need of a particular development; and the overlap between the various consent

[37] These requirements are provided for under the Nuclear Installations Act (NIA) 1965. S. 1 of the Act states that "no person shall use any site for the purpose of installing or operating any nuclear reactor (excluding those comprised in a means of transport) for the production of use of atomic energy; or the carrying out of any process which is preparatory to the production or use of atomic energy and which involves or is capable of causing the emission of radiated matters; or the storage, processing or disposal on nuclear fuel ....unless a licence to do has been granted in respect of the site in question"[....]

[38] Office of Nuclear Regulator (ONF), *Guidance-Assessment of New Nuclear Power Stations*. Available at <http://www.hse.gov.uk/newreactors/guidance.htm> last accessed 15 August 2011.

[39] DEFRA, *'The Justification of Practices Involving Ionising Radiation Regulations 2004: Guidance on their Application and Administration'* (May 2008). See also: Chapter 2(B) above

[40] See: Part 3 of the Energy Act 2008 & Part 4 of the Energy Act 2010

[41] Department of Trade and Industry (DTI), *Energy Review. The Energy Challenge*, (Cm 6887) July, (HSMO, 2006)

regimes and other processes governing health and safety and environmental matters. It however proposed that the government was to introduce fundamental change into the planning system for infrastructure projects with the recognition of local government involvement, the importance of environmental impact assessment of proposed developments, and public participation and public inquiries.[42] The report considered these provisions as necessary elements to maintain a decision-making process that is fair, transparent, and encourages public support. It also added that the consideration of safety, and the need and benefits issues should be excluded from the inquiry system by establishing a new system to consider and decide issues in the national context in advance of any particular application. This sort of approach was considered vital to ensure that safety issues are not raised at inquiries, and that inquiries will only give considerations to local implications of projects at specified locations, including environmental impacts. The aim is that this will avoid national issues arising as part of the consideration of every proposal, and therefore it should appropriately allow public inquiries to focus on local and other relevant issues.[43]

Arguably, this approach should enable all local impacts to stand up against national considerations that are already established. However, when one begins to consider the safety of nuclear power and further down the line in terms of environmental effects of the risk of nuclear waste, it actually becomes worrying that the issue of safety is excluded from the inquiry process. The reason for this is because, as seen from the SB inquiry, an inquiry that includes safety considerations may give the public the opportunity to scrutinise competent bodies involved in nuclear safety and detailed engineering problems.[44] If not, members of the public may well feel they have been denied the opportunity in environmental decision-making, leaving them with less confidence in decisions that result from such process. In this regard, the consideration of safety issues may on one hand help to restore public's confidence given that the UK nuclear new build is to be of a foreign design, of which the Fukushima nuclear power disaster (although the Fukushima reactors are of different design) has done little to help

[42] Ibid, Para. 5.136
[43] Ibid, Para. 7.1, 7.2, and 7.36 consecutively
[44] F.H.B. Layfield, n 11 above at Para. 4.17

raise confidence. On the other, if safety issues are considered at inquiries, it may also help the decision makers to further scrutinise safety principles most especially and as expected, the licence applicant will need to fulfil the terms of transfer of the necessary knowledge and expertise of the engineering and safety case of reactor design from the vendor to the licensee during the Generic Design Assessment.[45]

The second policy review is the Kate Barker report on land use planning.[46] Kate Baker, in her report recognised that it is a necessary part of the planning system that decisions should be informed by the relevant economic, social and environmental and resource factors through proper consultation; but that this is likely to be costly and time-consuming, particularly for major projects. She added that because planning often involves making complex judgements, there will inevitably be some complexity in the decision-making process and that it is important that such complexity is avoided.[47] She recommended the introduction of a new system for dealing with NSIPs based around National Statement of strategic objectives and an Independent Planning Commission to determine applications.[48] Similarly, Rod Eddington's Transport Study[49] also analysed a range of transport projects and found that many projects took over two years from the start of inquiry to make a decision. He recommended the reform of the planning process for MIPs to provide greater clarity and certainty without compromising fairness and thoroughness. He also proposed that this should be carried out in particular by providing greater clarity about government policy through Strategic Statements of transport objectives, and introducing an Independent Planning Commission to take the final decision on specific applications.[50]

Subsequently, as mentioned in the introductory part of this chapter, the government proposed in the 2007 Planning White Paper a radical overhaul of the system based on the above recommendations. The White Paper laid the foundation for the

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[45] HSE, Applying for a Nuclear Site License for New Nuclear Power Stations: A Step by Step Guide, Paras. 22-24. Available at <www.hse.gov.uk/newreactors/ngn02.pdf> accessed last 15 October 2011

[46] Kate Barker, n 30 above

[47] Kate Barker, Barker Review of Land Use and Planning: Interim Report and Analysis, (July 2006) Executive summary at Para. 1.15

[48] Ibid, Para. 1.11 & Final Report and Recommendations at Para. 3.13

[49] The Eddington Transport Study: *Transport's role in sustaining the UK's productivity and competitiveness* (TSO, December 2006).

[50] Ibid, p 59

current planning regime under the 2008 Act by introducing a new system for securing consent for NSIPs. In an effort to addresses the issues of the planning regime as discussed at 5.2.2 above, the government introduced a new streamline process in the 2008 Act. The main features of the 2008 Act include: the introduction of a single DCO for the construction of NSIPs, which override the need for any other planning consent or permission that is required;[51] and a new Community Infrastructure Levy and new emphasis on pre-application engagement with local authorities and community groups to ensure applicants on NSIPs fully develop their proposals before submission.[52] It also establishes a new body called the IPC, which deals with applications of these projects; and the NPS which is issued by the SoS and which sets out the government's policy on specified developments to which an application is determined.[53] Thus, the question now is whether this regime will effectively address the issues it is created for? In answering this question, both the roles and functions of the IPC and NPS that are relevant for present discussions are examined below.

5.3.2. National Policy Statement

The NPSs set out the national policy framework of particular national infrastructure. It integrates the government's objectives for infrastructure capacity and development with its wider economic, environmental and social policy objectives, including climate change goals and targets, in order to deliver sustainable development.[54] Against a backdrop of the issues of the inquiry process at the SB inquiry, it is clear that the purpose of the NPSs is to set out the government's policy for specific development of NSIPs before an application is being considered by the IPC, to help reduce the time taken for authorisation.

By the introduction of the NPSs, the SoS will for the first time set out and be accountable for Overarching Policy. Under section 5 of the 2008 Act, a statement is

[51] S.14-30 of the 2008 Act. The DCO removes the need for certain consents to be obtained, such as those under S.36 and S.37 of the Electricity Act 1989. Note: NSIPs are projects of capacity of more than 50 megawatts if onshore and 100 megawatts if offshore
[52] Part 11 of the 2008 Act
[53] Schedule 1 and Part 2 of the 2008 Act
[54] Cm 7120 Para. 3.4

designated as NPS if the statement is, issued by the SoS and sets out national policy in relation to one or more specified descriptions of development.[55] Section 5(5) allows for the NPS to set out, in relation to a specified description of development, the amount, type or size of development which is appropriate for a specified area; to set out criteria to be applied in deciding whether a location is suitable for a specified description of development; the relative weight to be given to a specified criteria; identify one or more locations as suitable (or potentially suitable) or unsuitable for a specified description of development; identify one or more statutory undertakers as appropriate persons to carry out a specified description of development; and to set out circumstances in which it is appropriate for a specified type of action to be taken to mitigate the impact of a specified description of development.

The revised draft Overarching Policy Statement for energy (EN-1) explains the need for new energy infrastructure. It sets out policies which are relevant to more than one type of energy infrastructure and it instructs the IPC on how to assess the impacts which are common to more than one type of energy infrastructure, including the impacts of infrastructure that should be addressed by the promoters when making applications for consent for the projects concerned.[56] However in the context of nuclear power, the revised draft National Policy Statement for Nuclear Power Generation (EN-6)[57] establishes the need for new nuclear power stations in the UK that need to be developed significantly earlier than the end of 2025.

The EN-6 can be described as the first stage in the development of nuclear power. This is because besides establishing the need for nuclear power development, it also lists the sites that the government has judged to be potentially suitable for the construction of new nuclear power stations. These lists are judged through the process of a Strategic Site Assessment (SSA) which sets out criteria for deciding on potential sites and indicates how potential sites meet specific criteria. The issues considered by SSA include: proximity to military activities, civil aircraft movements and hazardous

[55] Note: Clause130 of the 2010 Localism Bill as amended by the House of Lords if it becomes law will introduce further Parliamentary procedures for the designation of NPSs

[56] DECC, *Planning for New Energy Infrastructure: Consultation on the Revised Draft National Policy for Energy Infrastructure* (HSMO, 2010)

[57] DECC, *Revised Draft NPS for Nuclear Power Generation (EN-6)*, Volume I of II (October 2010)

industrial facilities and operations; coastal processes and flooding, storm surge and tsunami; designated sites of ecological importance; areas of amenity, cultural heritage and landscape; size of site to accommodate operation, and also access to suitability sources of cooling.[58] As the SSA would have been engaged through a consultation process,[59] the government's expectation is that planning inquiries should not be made to re-assess the question of whether there are alternative sites for a nuclear new build or whether the proposed site is viable.[60] It is clear that this process of site selection is in contrast with the approach taken during the SB inquiry where all issues relating to the development of nuclear power were discussed. The aim of the government is however to reduce the duration of the inquiry system by not allowing the IPC to consider the question of alternative sites, since the suitability of a site will already have been considered through the SSA consultation process. However, in as much as the government feels it is inappropriate to embark on the issue of site suitability during inquiries at least in the context of expediting the inquiry process, concerns remain on whether a specific location that is judged appropriate will be the best available option, or perhaps whether alternative sites should be considered during inquiries, or solely by the decision-maker.[61] Thus, it is arguable that the SSA may not have credibility unless it involves hearings at which high-level environmental impacts of potential sites are challenged and examined during the inquiry process. In any event, it is however unlikely that the SSA will rule out arguments on whether a proposed site is the best available option. The reason for this is because case law suggests that the availability of alternative sites should be a material consideration in planning applications.[62]

Although the features of the NPSs as discussed so far, particularly the suitability of a site which makes the NPS an important and influential statement in the development of nuclear power in the UK, it is also arguable that NPSs may be politically influenced when describing the need for a particular type of national infrastructure. While this

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[58] Ibid, Para. 2.3. Note that the SSA criteria contribute to the achievement of SEA objectives discussed below at FN 529

[59] DECC, n 56 above at Para. 41

[60] BERR, *Towards a Nuclear National Policy Statement: Consultation on the Strategic Siting Assessment Process and Siting Criteria for New Nuclear Power Stations in the UK* (2008), Para. 1.13

[61] S. Tromans, n 7 above 140

[62] *Secretary of State for Environment v Edwards (P.G.)* (1995) 69 P. & C.R. 607, at 613

remains a possibility, section 5 of the 2008 Act provides for a number of safeguards and procedural requirements before the NPSs are being designated. These are: before designating a statement as an NPS, policy makers are faced with the task of ensuring that there is adequate environmental investigation of the policy they intend to put forward. They are to carry out an 'Appraisal of Sustainability' (AoS) that also discharges all the requirements of the Strategic Environmental Assessment (SEA), a compulsory environmental requirement in regards to plans and programmes adopted by the SoS, at least when identifying specific sites.[63] The key requirements of the SEA which is also similar to the requirements of the Environmental Impact Assessment (EIA) are the preparation of an environmental report, with consultation of relevant authorities and the public on the draft plan or programme.[64] Certainly, this sort of arrangement must allow the authorities and the public an early and effective opportunity within appropriate clear timeframes[65] to express their opinion on the draft plan or programme, and the accompanying environmental report before the adoption of the plan or programme or its submission to the legislative procedure.[66] Such opinion must however be taken into account during the preparation of the plan or programme and before its adoption or submission to the legislative procedure.[67] Likewise, the proposals for a NPS may only be

[63] Directive 2001/42/EC – implemented into UK through the Environmental Assessment of Plans and Programmes Regulations 2004 (SI 2004/1663). Nuclear NPS meets the test of the SEA. These are: is there a specific legislative, regulatory or administrative requirement for the plan or programme?; does the plan or programme set a framework for future development consents?; does it relate to a subject matter contemplated by the Directive?; and is it likely to have significant environmental effects? See: Directive 2001/42 Art.2(a), 3(4), 3(2)(a), and 3(1) and also Environmental Assessment of Plans and Programmes Regulations 2004 (SI 2004/1633) reg. 2(1), 5(1-2), and 9(1). See also: *Bard Campaign v Secretary of State for the Communities and Local Government* [2009] EWHC 308 (Admin) which establishes that SEA is required when alternative sites for a particular development is being considered; S.5(3) of the Planning Act 2008

[64] Art.6(4) of Directive 2001/42/EC

[65] *Seaport Investment Ltd v Department of the Environment (No 1)* Court of Appeal in the Northern Ireland and the High Court [2007] NIQB 62

[66] Art.6(2) of Directive 2001/42/EC

[67] Art.8 of Directive 2001/42/EC. Further, the NPS in setting out policy in relation to a particular description of development must set out the criteria to be taken into account in the design of that description of development; it must give reasons for the policy set out and such reasons must in particular include an explanation of how the policy set out in the NPS takes account of government policy relating to the mitigation of, and adaptation to climate change. There are also further provisions under section 6 of the 2008 Act, and procedures for reviewing an NPS and for suspending the operation of an NPS pending review under section 11. However, these are only likely to occur when there is a significant change in circumstances

designated as one if the consultation, public requirement, and parliamentary requirements set out in the 2008 Act have been complied with.[68]

Considering the above requirements, especially the requirement for consultation, public and Parliamentary, there is no denying that they are essential procedures for a transparent and accountable decision-making process. However, as examined below, the issue is whether it addresses particular issues of public participation in the decision-making process. For example, whether there is the opportunity for the public to engage thoroughly in discretions covered by the NPS, particularly on issues that are location specific.

5.3.3. The Infrastructure Planning Commission

Section 1 of the 2008 Act establishes a new body called the IPC. The IPC, which comprises of a Chair person, Deputies, and Commissioners as appointed by the SoS, is an independent body charged with the examination of applications on energy projects, transport, waste, water, and applications for harbour development. It makes the final decision on MIPs where there is a relevant NPS in force and it is not directly accountable to the Parliament for its decisions; but there will be circumstances where the SoS will be responsible for the final decision. This is when there is no NPS in force, or when it is decided that there is a significant and unanticipated change of circumstances which means that the NPS is no longer up to date and there is an urgent need to decide an application before national policy can be reviewed; or in cases of defence, or national security, where the SoS is satisfied that intervention would be in the interests of defence or national security".[69]

In order to ensure accountability on the part of the IPC, its members are subjected to pre-appointment scrutiny by the Parliament Select Committee which requires the IPC to provide the Committee with information relating to particular

[68] S.5(4)-(9) of the 2008 Act. Note that the Coalition Government is legislating to introduce a requirement through the Localism Bill for there to be Parliamentary approval of an NPS. As such, an NPS can only be designated after it has been considered in the House of Commons and either approved within the consideration period of 21 days or if no resolution is passed that it should be proceeded with within those 21 days. See: Clause 109 of the Localism Bill as amended in Committee

[69] S.108-112 of the 2008 Act

developments.[70] In addition to this, the IPC must also issue a code of conduct expected of the Commissioners in connection with the performance of the Commission's function. The code includes the provision requiring each Commissioner to disclose financial and other interests in accordance with the procedure established under the Act and any such provision as the SoS may direct.[71]

In an effort to expedite the planning process, the immediate past Labour government believed that the IPC will help to avoid the need for many of the range of separate consents which previously had to be obtained under separate legislation and from different government agencies, departments and local authorities. The reason for this is to have a single consent regime which will simplify and speed up the planning process for NSIPs. Examples are planning permissions, authorisations for compulsory acquisition of land, approvals under the relevant acts and so on.[72] However, a cumulative result of the power of the IPC has led to criticisms of its role in determining applications and the changes brought by the 2008 Act.

Commentators[73] argue that the introduction of the IPC represents a fundamental departure from a democratic planning system and that the advantages associated with the streamlined process and single consent regime are outweighed by a lack of democratic accountability. The start point for assessing this argument is the decision of the court in *R. (on the application of Holding & Barnes Plc) v Secretary of State for the Environment, Transport and the Regions.*[74] This case elaborates more on the democratic standards of independent bodies who make decisions on matters that affect the public. It assesses whether such decisions are compatible with the Human Rights Act of 1998. It was held in this case that "to substitute for the SoS an independent and impartial body with no central electoral accountability would not only be a recipe for chaos: it would also be profoundly undemocratic".[75] Thus in light of the decision in this case, and a closer look at the IPC's power to grant consents across a wide range of regimes

[70] Hansard HC col 349 (25 June 2008)
[71] S.2 of the 2008 Act
[72] IPC, Introducing the Infrastructure Planning Commission: A Guide to its Role (IPC, 2009)
[73] B. Kelly, The Planning Bill: Implications of the Proposals for a New Regime for Major Infrastructure for Democracy and Delivery, [2008] *J.P.L.* Iss. 13,
[74] [2001] UKHL 23
[75] Ibid, Para. 60

including the compulsory acquisition of land, there is an overwhelming concern that such function or power may undermine the accountability of the decisions that are made by the IPC. It is not so hard to make a case that giving such power to the IPC, which is an unelected body, is wholly unprecedented and may likely lead to an erosion of human rights and democracy.[76] On the other hand, Kelly argues that these arguments would have weight if Ministers are not involved in deciding infrastructure development.[77] By using the NPS as an example, he added that Ministers set out a clear policy framework; they make the case for their policy through public consultation; and they are subjected to Parliamentary scrutiny.[78]

Having said this, it is arguable that developments in areas of land use planning consent in the UK in form of the Localism Bill is a response to the concerns surrounding the democratic accountability of the IPC.[79] One key provision of the Bill is to abolish the IPC and replace it with the MIPU within the planning inspectorate, so as to strengthen the roles of the Parliament and SoS in the planning regime. If the Localism Bill becomes law as expected, the IPC is set to transfer its functions of decision-making to the Ministers because the government believes that the existing planning procedure for NSIPs under the IPC needs to be more democratic, transparent and accountable for it to effectively facilitate development.[80] As such, it is also arguable that the issue of democratic accountability of the IPC will no longer surface in the creation of the MIPU as it is the Ministers that will make decisions on MIPs within the clear constraints of a detailed statutory framework agreed by Parliament and with reasons for decisions, including to the Parliament which should be subjected to judicial review.[81]

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[76] B. Kelly, n 73 above 1
[77] Ibid 10
[78] Ibid
[79] The Conservative Manifesto 2010 titled "Invitation to join the Government of Britain", p.20. Available at <http://media.conservatives.s3.amazonaws.com/manifesto/cpmanifesto2010_hires.pdf> last accessed 2 November 2011
[80] Department for Communities and Local Government, Localism Bill: Major Infrastructure Projects: Impact Assessment (2011) page 1. Available at <http://www.communities.gov.uk/documents/localgovernment/pdf/1829675.pdf> last accessed 7 June 2011
[81] Clause130 of the 2010 Localism Bill

However, the issue remains whether these Parliamentary constraints will protect certain conflicting views such as, the issue of national considerations outweighing local issues in policy formation. In any event, it is more likely that the former will outweigh the latter. This therefore suggests that the views of the public may still be overlooked in the decision-making process even after the creation of the MIPU.

5.3.4. The Regime in Operation

I have established above that the provisions of the NPSs and the IPC are of particular importance in examining individual applications for MIPs, and that the government is set to abolish the IPC when the Localism Bill becomes law. Attention is now drawn to the planning regime and how the proposed changes may affect the system. This section will assess the requirements faced by each applicant before making an application and after the initial application is made. This is discussed under two main sub-headings namely: the pre-application process and the examination process.

5.3.4.1. Pre-application Process

The pre-application stage being the second stage of the planning process is a front-loaded process.[82] It introduces a new legal requirement that imposes a number of requirements on applicants and seeks to reduce substantially the usage of public inquiries. For example, it provides for extensive safety considerations, pre-application consultation, notification, and publication to statutory bodies and stakeholders, local authorities, persons with direct land interests, and local communities before an application for development consent is made so as to expedite the process. For recent purposes, these requirements are sub-divided under three main headings for an easy understanding of how the system actually works. These are: the Environmental Impact Assessment (EIA), and other relevant bodies or persons as required.

[82] R. Owen and S. Anwar, The Major Infrastructure Regime Under the Planning Act 2008-Yet Fit for Purpose? *J.P & Env. Law* (2011) 849-859, 854

5.3.4.1.1. Environmental Impact Assessment

The promotion of a high level of environmental concern is identified by Directive 85/337/EEC[83] on the assessment of the environmental effects of certain public and private projects as amended by Directive 97/11/EC[84] which requires an environmental assessment of development that is likely to have significant effects on the environment. The development process for any nuclear new build falls under the types of specified schedule 1 projects under the Directive and as a result, an application for the construction of a nuclear power station will have to be accompanied by an EIA statement.

According to Wood,[85] the EIA process includes the following: "the EIA refers to the evaluation of the effects likely to arise from a major project (or other action) significantly affecting the natural and man-made environment. Consultation and participation are integral to this evaluation". Indeed as stated in the Directive, the EIA shall identify, describe and assess the direct and indirect effects of a project on prescribed factors, with trans-boundary consultation with other Member States that may be affected by the project in terms of the risk of accident or disposal of waste produced, and also making such information available and consulting the public within a reasonable time, so as to give those concerned the opportunity to express an opinion before any development consent is granted.[86] He adds that EIA is the "process that supplies decision-makers with an indication of the likely consequences of their actions, and if properly used it should lead to informed decisions about potentially significant actions and to positive benefits to both proponents and the population at large".[87]

However where the EIA provides that the public must be consulted, case law suggests that consultation is not always carried out. An example is the case of *Berkeley v*

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[83] O. J. No L 175/40, 5/7/85 – On the assessment of the effects of certain public and private projects on the environment

[84] O. J. L073, 14/03/1997 – amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment

[85] C. Wood, *Environmental Impact Assessment: A Comparative Review* (Longman, Harlow UK1995) 1-3

[86] Art.3-6 of Directive 97/11/EC

[87] C. Wood, n 84 above. See also: *In R. (on the application of Burkett) v Hammersmith and Fulham LBC* (No.1) [2002] UKHL 23, it was held that the EIA process is designed to redress to some extent the imbalance in resources between promoters of major developments and those concerned, on behalf of individual or community interests, about the environmental effects; see: Para. 15

Secretary of State for the Environment.[88] In this case, B who had objected to a development containing 30 flats, appealed against a decision that the development did not require an environmental impact assessment to be carried out.[89] B argued that if properly construed, the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 Reg.9(2) imposed a duty on an inspector to refer to the SoS for him to determine whether to direct that an EIA was required before an application could be determined; and that since the situation could arise in which it could plausibly be argued that a certain development would have serious environmental consequences without an environmental impact assessment being required under the Regulations, the Regulations had not properly been transposed under Directive 85/337/EEC as amended by Directive 97/11/EC. In dismissing the appeal, it was held that the SoS was not obliged to make a direction under Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 Reg.4(8), and that a planning authority or an inspector could grant planning permission without an EIA having been carried out even if a plausible submission had been made that the development was one in respect of which the SoS could make a direction under Reg.4(8).[90] Also, that Annex III to the Directive set out the selection criteria to be applied by Member States in specifying the relevant parameters, and if Member States failed to apply those criteria, the relevant legislation would not comply with Community law.[91]

Where nuclear power is concerned, any proposed site is to undergo an EIA. This is regardless of whether the site has been identified as suitable in the NPS. This is because the outcome of the SSA and SEA cannot remove or avoid the need to identify, describe and assess in an appropriate manner the effects of nuclear power projects. However, the SEA may as well be the appropriate starting point of the process. For present purposes, Tromans[92] points out that the issue at hand is how far such an examination needs to go, and how far the IPC will be able to rely on such matters being

[88] [2002] Env. L.R. 14
[89] [2001] Env. L.R. 32
[90] [2002] Env. L.R. 14 at Para. 45
[91] Ibid, Para. 47
[92] S. Tromans, n 7 above 157

adequately controlled by other bodies. Arguably, disputes may arise on how issues should be handled in the environmental report, but it is expected that the report should include a description of the likely significant effects resulting from the existence of the project. For example, a likely issue is how to deal with nuclear waste. As such, before development consents for new nuclear power stations are granted, the IPC will need to be satisfied that effective arrangements exist or will exist to manage and dispose of the waste they will produce. In this regard, the government has identified that geological disposal is technically achievable as long as a suitable site can be identified for the disposal of higher activity radioactive waste. The government is however satisfied that safe, secure and environmentally acceptable interim storage arrangement will be available until a geological disposal facility can accept the waste;[93] and as a result, the examining body need not consider this question.[94] It therefore becomes a matter of concern whether there will be adequate information available in order to identify and allow proper assessment of the effects of dealing with nuclear wastes; and above all to allow the requirements for the EIA to be satisfied. To mention again, such requirements may prove difficult to complete because of the uncertainty that surrounds the effects of nuclear waste on the environment. For example, the production of poor environmental statement may be as a result of uncertainty. However, the law plays down this concern as it gives room for incomplete environmental statements. For example, it was held in *R (Blewett) v Derbyshire County Council*[95] that in an imperfect world it is an unrealistic counsel of perfection to expect that an applicant's environmental statement will always contain the full information about the environmental impact of a project. Nonetheless, it is still expected that the applicant should identify at local and regional levels any socio-economic impacts associated with the construction, operation and decommissioning of new nuclear power stations.[96] This is also to include the impacts associated with interim

[93] DECC, n 55 above at Para. 2.11
[94] DECC, Draft NPS for Nuclear Power Generation (EN-6), (November 2009) Part 4
[95] [2003] EWHC 2775, Para. 41
[96] DECC, National Policy Statement for Nuclear Power Generation (EN-6), Volume I of II (July 2011) at Para. 3.11.3

storage facilities for Intermediate Level Waste (ILW) and spent fuel as part of the EIA process as stated in the EIA Directive.[97]

Considering the above, it is also arguable that the Fukushima nuclear power disaster may on one hand intensifies the concern of having a thorough environmental statement of proposed nuclear new build, and on the other hand, questions the government's policy on nuclear waste and its relationship with the examining authority. As a result, questions over the location of interim facilities for new nuclear wastes to be produced are probably going to be a primary concern for nuclear power objectors, and this may ensue during inquiries. If care is not taken, the public may also challenge any exclusion of the long term effect of radioactive waste from a nuclear power project in the environmental statement. Although, such an issue may well be a matter for the examining authority to decide whether the information provided in the environmental statement is sufficient or not,[98] care must nevertheless be taken by the government and the applicant in producing an environmental statement to avoid legal challenges.

5.3.4.1.2. Consulting Other Relevant Bodies or Persons

In addition to the EIA requirements above, an applicant must prepare a statement setting out how it proposes to consult the people leaving in the vicinity of the land. This is known as the Statement of Community Consultation (SOCC).[99] It involves the applicant promoting a judgement of what vicinity means and in any which way will need to satisfy the examining authority that they have acted reasonably.[100]

Surprisingly, it is the responsibility of the promoter to design the consultation exercise without need to seek formal approval from the local authority or the examining authority before it begins consultation.[101] Of course how such consultation will be carried out will probably be a concern for the public in terms of quality and acceptable

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[97] Annex I of Directive 97/11/EC. See also: DECC, Appraisal of Sustainability of the Revised Draft Nuclear National Policy Statement: Main Report (October 2010) at Para. 3.8.15

[98] *Atkinson v Secretary of State for Transport* [2006] EWHC 995 (Admin), it was held that it is a matter for the SoS to decide whether the information is sufficient. Para. 38

[99] Department for Communities and Local Government (DCLG), Guidance "Planning Act 2008: Guidance on pre-application consultation", Para. 26

[100] Ibid, Para. 53

[101] DCLG, Planning Act 2008: Guidance for Local Authorities, (March 2010) Para. 42

decisions. In any event, it will be expected that the promoter should follow the principle set out in *R v North and East Devon Health Authority ex p. Coughlan.*[102] These are first, that consultation process must be at a time when proposals are still at a formative stage; second, the proposer must give sufficient reasons for any proposal to allow for intelligent consideration and response; and third, adequate time must be given for consideration and response; and lastly, the product of consultation must be conscientiously taken into account in finalising and proposals.

5.3.4.2. Examining an Application under the Planning Act 2008

This is the third stage of the application process. Under the 2008 Act where the examining authority receives an application, it must by the end of the period of 28 days, decides whether or not to accept the application.[103] Section 56 provides for the notification of an accepted application. It requires the examining authority to give notice of the application to persons, authorities, owners and occupiers of relevant land; and where the application includes a request for the compulsory acquisition of land, section 59 requires the applicant to notify persons who are affected by the application. In addition to this, the applicant must give notice to each relevant local authority inviting them to submit a local impact report within a specified period of time.[104]

Accordingly, a decision is to be made by the authority who decides on how the application should be decided. The 2008 Act provides that the Chairperson of the IPC may decide whether the application should be examined by a Panel of Commissioners or by a single Commissioner.[105] Where nuclear power is concerned, the application is more likely to be handled by a Panel of three or more Commissioners because of the level of detail that is usually involved. The constituted Panel thus has the discretion to decide

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[102] [2001] QB 213

[103] S.55 of the 2008 Act

[104] S.102 (5)-(9) of the Planning Act 2008. A local impact report is defined in S.60 (3) as a report in writing giving details of the likely impact of the proposed development on the authority's area (or any part of the area). Note: Clause 138 of the Localism Bill as amended by the House of Lords makes further provisions for local authorities to be notified

[105] S.61, 64 & 78 of the Planning Act 2008 respectively. Note: it is the duty of the Panel to decide or make recommendation in respect of application. Under S.75, such decision by the Panel requires the agreement of a majority of its members. The Chair of the Panel has a second (or casting) vote in the event of a tie.

how the process is to be conducted with regard to any guidance given by the SoS or by the Chairperson of the IPC, as long as it is relevant to how the application should be examined. The Panel may in examining the application may however disregard representations if they are vexatious or frivolous or relate to the merits of the NPS or are even in relation to compensation for compulsory acquisition of land. Also after having made an initial assessment of the principal issues arising on the application as required, the Panel is required to hold a meeting with the applicant and interested party such as the public, on how the application should be examined before making any procedural decision[106] so as to encourage interested parties to gain an understanding of the proposed application and to reach consensus between them.[107]

5.3.4.2.1. The Inquiry

Everything about the IPC is about discretion and to speed up the authorisation process. For example by focusing on the relationship between the proposal and the local plans, and local environmental impacts in the context of NPSs during inquiries,[108] section 89 of the 2008 Act provides that wherever possible, the examination of applications by the IPC is to take the form of consideration of written representations. This is quite different from the role of the Inspector under the Town and Country Planning Act 1990 (TCPA 1990) where the SoS appoints an Inspector to consider an application.[109] The reason for this is to speed up the process of considering an application as it may help reduce the need for repetitious oral evidence giving.[110] Furthermore, the IPC also decides hearings on specific issues, open floor hearings, or perhaps to include consideration of oral representations about a particular issue to ensure adequate examination of issues or that an interested party has a fair chance to put a case forward.[111] However, there are also exceptions to this process. For example, if the application includes a request for an order granting consent to authorise compulsory acquisition, then the affected person is given

[106] S.87-89 of the Planning Act 2008
[107] DTI, "Updating the Electricity Generating Stations and Overhead Lines Inquiry Procedure Rules in England and Wales: An Energy Review Consultation", (November 2006) Para. 2.10
[108] S.60 of the Planning Act 2008
[109] S.76 of the TCPA 1990
[110] Kelly, n 73 above 5
[111] S.90-93 of the Planning Act 2008

the opportunity to say that he wishes hearing to be held and to make oral representations. However at any hearing, the examining authority is to apply the principle that any oral questioning of a person making representations at a hearing should be undertaken by the examining authority except where the examining authority thinks that oral questioning by another person is necessary to ensure the adequate testing of any representations or that a person has a fair chance to put the person's case.[112] In certain circumstances, the examining authority may also allow cross-examination where it feels it is necessary to do so in order to ensure the adequate testing of any representations.[113]

In line with the streamlined process, the IPC is however under a duty to complete the examination of the application in six months beginning with the day after the start day of the application.[114]

5.3.4.2.2. Challenges

Under the 2008 Act, section 118 provides for decisions to be challengeable by a claim for judicial review only if the claim is filed within six weeks of the day on which the order is published, or if later, the date on which the statement of reasons is published. An objector may challenge: first, a decision under section 55 not to accept an application for an order granting development consent; secondly, a decision in relation to an error or omission in a decision document; third, a decision to make a change to an order granting development consent; and fourthly, a decision to make a change to, or revoke, an order granting development consent. In addition to this, it is also clear that the Court may entertain proceedings for questioning anything else done, or omitted to be done, by the SoS or the commission in relation to an application for an order granting development consent only if the proceedings are brought by a claim for judicial review and the claim form is filed during the period of six weeks beginning with the relevant day.

However as seen in the next part, there are concerns that both the pre-application process and the application process are not compatible with the provisions of the

[112] S.94(7) of the Planning Act 2008
[113] DCLG "planning act 2008: guidance for the examination of applications for development consent for nationally significant infrastructure projects". Para. 106
[114] S.98 of the Planning Act 2008

European Convention of Human Rights and the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matter (Aarhus convention).

5.4. THE EFFICACY OF THE LAND USE PLANNING REGIME

"The outcome of planning affects everyone, and everyone must therefore have the opportunity to play a role in delivering effective and inclusive planning".[115]

I have explained above that the introduction of the NPSs and the examination process of the IPC will prevent the consideration of certain issues such as safety and site selection at the inquiry stage. The question remains as to the extent at which the system provides for adequate public involvement in the decision-making process. Thus there is the need to give answers to the following questions - Does the system operate in a fair manner? Does it respect the rights of the public?

In view of the above questions, there have been extensive and tense debates on how the planning regime operates. In this regards, commentators tend to be divided into two camps. Some argue that the consultation requirements, combined with the opportunities given to people to participate and challenge decisions, make it impossible for development to be delivered in an efficient way; while others argue that the changes made to the system do not afford the public the opportunity to participate fully in the decision-making process.[116] This part argues in light of the European Convention of Human Rights (ECHR) and the Aarhus convention that there are limited opportunities for the public to participate in the decision-making process. My reasons are discussed below.

5.4.1. The European Convention of Human Rights

The rights of the public as regards to implications of the planning regime arise in a number of contexts. The main Convention rights that are likely to be relevant to the planning regime are set out in articles 1, 6, and 8 of the Conventions; with article 6 raising the most serious concerns.

Article 6(1) of the ECHR which provides that "in the determination of his civil rights and obligations or of any criminal charge against him, everyone is entitled to a fair

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[115] Office of the Deputy Prime Minister, *Planning Policy Statement:1 Delivering Sustainable Development*, (2005), Para.40

[116] B. Kelly, n 72 above 1

and public hearing within a reasonable time by an independent and impartial tribunal established by law", might allow objectors to the site selection criteria by the SoS after only consultation and not any form of hearing. For example, the issue of the right to a fair trial was considered in the *Alconbury* decisions. This consists of four applications been made to the High Court for declarations that the planning process in each case was not compatible with article 6(1) of the ECHR. The *Alconbury* case itself involved an appeal against a refusal of planning permission recovered by the SoS under sections 78 and 79 of the Town and Country Planning Act 1990 (1990 Act). Two of the other cases involved decisions by the SoS to call in applications for planning permission under section 77 of the 1990 Act for determination by himself. The Fourth case involved the proposed use by the SoS of highway orders and related compulsory purchase orders in connection with a scheme to improve the A34/M4 road junction. In all four cases the Divisional Court of Queen's Bench Division was prepared to grant the declarations of incompatibility sought. Appeals were pursued in three of the cases: *R (on the application of Alconbury) v Secretary of State for the Environment, Transport and the Regions*; *R (on the application of Holdings & Barnes) v Secretary of State for the Environment, Transport and the Regions*; and *Secretary of State for the Environment, Transport and the Regions v Legal and General Society Ltd.*[117]

In *Alconbury*, the House of Lords agreed that the determination of administrative matters such as planning decisions involved the determination of civil rights and obligations under the meaning of article 6 of ECHR, and that the SoS had not claimed that in dealing with a called-in application or a recovered decision, he was acting as an independent tribunal and could not be seen as impartial.[118] This is based on European jurisprudence of reference to combined process of inquiry and judicial review as described in *Bryan v UK*[119] for example. This case concerns the subject of an enforcement notice requiring B to demolish two buildings on his property which had been erected in breach of planning control. It was said that "whether the power of judicial review is sufficiently wide to satisfy the requirements of Article 6 must depend

[117] [2001] 2 W.L.R. 1389
[118] Ibid, Para. 43
[119] (1995) 21 E.H.R.R. 342, Para. 187

on a number of considerations, including the subject matter of the dispute, the nature of the decision of the administrative authorities which is in question, the procedure, if any, which exists for review of the decision by a person or body acting independently of the authority concerned and the scope of that power of review".[120] Thus for present purposes, there may the infringement of article 6 because it is also the case that the determination of site selection on one hand lacks the process of inquiry, and on the other hand, the SoS is not an independent and impartial tribunal for the purpose of the ECHR in the same way that it was accepted in *Alconbury*.

In addition to the above, the provision of article 6 might also allow those that are not satisfied by the IPC decisions on grounds of fair hearing a ground for challenge. However, as seen in *Balmer-Schafroth v Switzerland*[121] which involves the request for the refusal of an extension of the operating licence and the order of immediate and permanent closure of a nuclear power station, it was held that the risk from a nuclear power station was too remote for the article 6 right to a fair hearing to be engaged.[122] It should however be noted that neither the Strasbourg nor the English courts specify any procedure to which the hearing must be conducted. For example in *R (Vetrelein) v Hampshire County Council,*[123] it was held that a "fair" hearing does not necessarily require an oral hearing; much less does it require that there should be an opportunity to cross-examine. Whether a particular procedure is "fair" will also depend upon all circumstances, including the nature of the claimant's interest, the seriousness of the matter for him and the nature of any matters in dispute.[124] Also in *Brugger v Austria,*[125] it was held that each case must be determined on its merits. Such determination may however depend on whether the matter on which an oral hearing is said to be required is one involving the application of discretion and judgement, or whether there are disputed facts that can only be tested fairly by oral evidence.

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[120] Ibid, Para. 47
[121] (1998) 25 E.H.R.R. 598
[122] Ibid, Para. 39
[123] [2002] Env. LR 198
[124] Ibid, Para. 68
[125] No. 76293/01 2006

Thus, the question now is whether an oral hearing fulfils a requirement of a fair hearing where nuclear power is concerned? Either way, there is no denying that an occupied home or accumulation of another's property will surely engage article 6 of the ECHR as property rights are protected by the First protocol which states that "every natural or legal person is entitled to the peaceful enjoyment of his possessions". In this regard, the decision in *Lopez Ostra v Spain*,[126] in regards to pollution from a chemical factory shows that human rights must be considered in the planning process. That is, the right to respect one's home and family, and article 1, the right to the peaceful enjoyment of possessions.

As it stands, a person making claims under article 6 in any way as it relates to nuclear power must show that their civil rights are beyond doubt engaged. Even though, it is still a matter for the UK Court to decide. For example, in the case of *Athanassoglou and others v Switzerland*,[127] where A along with others living close to a nuclear power plant, complained that they had been denied an effective judicial means of challenging a decision to renew the plant's operating licence, the Court considers that "how best to regulate the use of nuclear power is a policy decision for each State to take according to its democratic processes, that article 6 cannot be read as dictating any one scheme rather than another. What article 6 requires is that individuals be granted access to a Court whenever they have an arguable claim that there has been an unlawful interference with the exercise of one of their rights recognised under domestic laws."[128] However in considering the effects of the planning regime on human rights in the UK, it should be remembered that the government had once assessed the implications that decided that no changes were required in order to avoid legal challenges.[129]

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[126] (1994) 20 E.H.R.R. 40 ECHR. However, in Buckley v UK [1996] JPL 1018 (ECHR), where the applicant had been refused planning permission for the siting of a caravan on her own land. she alleged, inter alia, a breach of art.8. It was held that art.8 did not go so far as to allow an individual's preference as to his place of residence to override the general interest; and that since the regulatory framework within which the decision was made contained adequate procedural safeguards protecting the applicant's interest, there had been no breach of art.8

[127] (2001) 31 E.H.R.R. 13

[128] Ibid, Para. 54. See also: Alconbury decisions, FN 118 above

[129] Parliamentary Question in the House of Commons, 15 October 2001

5.4.2. Aarhus Convention

Having said this, the Courts are more likely to entertain claims under the Aarhus Convention which commits the government to guaranteeing public participation in decision-making processes. As it applies to the ongoing discussion, article 6 applies to the procedure for decision-making by the IPC. Arguably, this is not protected under the UK planning regime. Under article 6, "the public must be informed early in environmental decision-making procedure and in an adequate and timely manner; the public participation procedures must include reasonable time frames allowing sufficient time for informing the public; parties must provide for public participation when all options are open and effective public participation can take place; each party must encourage prospective applicants to identify the public concerned and engage into discussions with them; the authority must provide access for the public examination upon request and also submit in writing whatever comments, opinion or information it regards as relevant".

In this regard, one area where there is likely to be a legal challenge is how the question of alternatives has been dealt with by the SoS in cases of NSIPs that are bound to have some significant effects. For example as stated under the SEA Directive where an environmental assessment is required, an environmental report shall be prepared in a way in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives are taken into account.[130] In *Bard Campaign v SoS for the Communities and Local Government*,[131] a challenge to the government's Eco Town policy was pursued on the basis that it failed to take into proper account alternatives. It was argued that various documents including a Housing Green Paper, an Eco Towns prospectus and a consultation document "Eco Towns-Living a Greener Future" together with the process by which bids for eco-town status were solicited and in some cases rejected, all combined to be a plan or programme in which alternatives had been inadequately considered due to the absence of formal SEA having been undertaken. The High Court dismissed the case on grounds that on a fair reading of the documents in question they had not progressed to a sufficiently advanced state that could

[130] Art.4 of Directive 2001/42/EC
[131] [2009] EWHC 308 (Admin)

be treated as a plan or programme that required SEA. As one commentator [132] puts it, this case was dismissed only because there was still a stage at which a policy document would be drafted in which the government would shortlist sites for eco-town status in favour of sites that would be discarded from the process. Thus, it is possible that the preparation of an NPS which identifies specific locations as suitable by ruling out other options could engage article 6. Such a challenge may however be upheld depending on the measures and thoroughness of the SSA stage.

It also seems clear that the process of SSA which provides for the consultation of the public may be caught under article 7 of the Convention. Under article 7, "each Party must make appropriate practical and/or other provisions for the public to participate during the preparation of plans and programmes relating to the environment, within a transparent and fair framework, having provided the necessary information to the public, and to the extent appropriate, each party shall endeavour to provide opportunities for public participation in the preparation of policies relating to the environment". As seen here, the obligation for participation is somewhat stronger under Article 7 and it seems there might be possible violation of this provision especially when consultation is seen as mere tokenism. In this regard, Lindblom and Honey[133] point out that the process of the SSA which requires public consultation at an early stage of sites selection is not the same as public participation. They argue that public participation involves involvement in the decision-making process through dialogue, consideration and response. Although one may argue that their definition of public participation gives preference to a deliberative form of participation as it encompasses its features, but the fact remains that the purpose of consultation is not much a challenge to decision-makers about what should be done but rather to legitimize those actions by the involvement of all affected parties in the policy process.[134] As such, one area where the government will be cautious, and all parties will be looking very closely, is how the question of alternatives would be dealt with.

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[132] P. Robinson, Energy Planning in 2009 – All Systems Go?, *J.P.E.L.* 2009, 53-77, 60

[133] K. Lindblom and R. Honey n 18 above

[134] J. Pierre, Public Consultation and Citizen Participation: Dilemmas of Public Advice in '*Taking Stock: Assessing Public Sector Reforms*', edited by B. Guy Peters et all, (McGill-Queen's University Press, 1998). See also: Chapter 2 of this thesis

Besides, such challenges may also arise when the matter comes to be examined by the IPC, new or further information was considered and such where not consulted in the NPS or perhaps in the preparation of NPSs which identifies specific locations. In this regard, case law however shows that one cannot rule out the possibility of further considerations by the government even after the consultation process had been completed. As such, it is possible for objectors to apply for judicial review as seen in the *Hillingdon LBC* case.[135] For example in *R. (Greenpeace Ltd) v Secretary of State for Trade and Industry*[136] concerning the Energy Challenge Review Report, Greenpeace brought a claim that the document was "seriously misleading" in that it did not inform consultees about the report of the Committee on Radioactive Waste Management (CoRWM) on nuclear waste programme which was a significant determinant of nuclear new build.[137]

Also, since nuclear power station is under the list of activities in Annex I of the Aarhus Convention; it is not hard to imagine that if a person is denied access to written representation, cross-examination, or hearing in specified environmental activities, the affected person may challenge such procedural arrangement under article 6. For example in *Nicholson v Secretary of State for Energy*[138] where the applicant objector was prevented by the inspector from cross-examining witnesses called by various local authorities at a public inquiry into a proposal for open-cast mining, it was held that persons or bodies opposed to a project are expected to take an active, intelligent and informed part in the decision-making process. Also in *Bushell v SSE*,[139] it was held that there is a massive body of accepted decisions establishing that procedural fairness requires that party be given an opportunity of challenging by cross-examination witness called by other parties on relevant issues.

In addition to the above, it is also likely that the judicial review process of the IPC decisions may be challenged under article 9(4) of the convention which requires procedures for access to justice to be fair. The assumption here is that sufficient time

[135] FN 28 above
[136] [2007] EWHC 311. See also:
[137] [2007] EWHC 311, Para.109
[138] (1977) 76 LGR 693
[139] [1981] AC 76

will be required by objectors to bring a meaningful challenge. The six week period is indeed a demanding timescale even for well experienced NGOs given the contentious nature of nuclear power installations; although, it may not be much of a problem to well-organised NGOs. Arguably, this may create an indirect division between those that are well organized to challenge decisions within a stringent time frame and those that cannot. As such, one begins to wonder whether the system actually benefits the public or it directly aims to include favourable conditions for specified groups. If it benefits the latter, then it will be more difficult for the public to effectively enforce their rights.[140]

5.4.3. Possible Implications of Legal Challenges

Considering the above discussions, it is arguable that the amount of time that could actually be saved through the introduction of the NPSs and IPC may be limited. This is because there could be legal proceeding to secure a mandatory order, a prohibiting order, or judicial review, particularly in relation to the process of SSA and the examination procedure of the IPC. The decision in the *Greenpeace case (2007)* shows that Courts are prepared to consider challenges to the procedures adopted in the formation of policy and that the government cannot by-pass its obligations under the Aarhus convention no matter how much it would like to fast-track the planning process.

A substantial point however arises in relation to legal challenges. Where the development of nuclear power is concerned, challenging cases in Court may result to delay in the authorisation process of new build. This is because cases may take time to be dealt with, and in fact may lead to an uncertain outcome. Thus, it is arguable that this in turn is likely to have an impact on the UK low carbon goals. An example is the case of *R v Secretary of State for Business and Enterprise, ex p North Devon Council*[141] which shows the risk involved in legal challenges. This case relates to claims for judicial review of the Secretary of State's decision to grant planning permission for a wind farm at Devon. The developer was granted planning permission by the Secretary of State on 9th of October 2007 to build wind turbines but was set back by the Council's application

[140] R. Mccracken QC, Infrastructure Planning Commission: Challenge or Opportunity, *J.P.L.* [2009] Iss. 13, 7-23, 21.
[141] Case Reference CO/11543/2007

for a judicial review. It was however not until nine months after that proceedings started in the Administrative Court. In this instance, it is also arguable that the reason for the six weeks cap for challenges is to lessen the likelihood of any delays whatsoever during proceedings.[142] Having said this, the reality however is that the overall amount of time the government hopes to save during the planning process of nuclear power development may be lost depending on the challenges levied against the NPSs, and the IPC examination procedures.

CONCLUSION AND CONTINUING CONCERNS

As discussed so far in this chapter, the introduction of the NPSs and the IPC through the 2008 Act is a step further by the government in tackling the procedural issues of the planning system and to expedite the land use authorisation process. As such, some commentators are keen to contend that we have entered a new era of energy consenting in which it is not enough to say that one would like to install some form of power generation because one is confident that one can sell electricity, or at least one is willing to take the risk. Rather one is to explain by reference to whatever objective standards one has and why there is a need for this type of development.[143]

Having said this, there are concerns in that the regime aims to speed up the development of nuclear power by removing consideration of matters such as safety and site selection away from the inquiry process; and as discussed so far, this may have implications on public participation in the decision-making process. Thus, it is perhaps right to say that the law appears to serve as a promoter of nuclear power. This however, should not come as a surprise because the government made it clear in its 2006 Energy Review that energy projects will continue to enjoy special treatment and that the planning system is aimed at ensuring a greater likelihood that consent is granted for such projects.[144]

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[142] As a matter of fact although not subjected to legal proceedings, there has been considerable delay in the designation of NPSs, mainly because of the change in government and the recent events in Japan. See: The "Plan for Growth" document published alongside the Budget 2011 at p.47

[143] P. Robinson, n 132 above 55

[144] Cm 6887

To this point, I believe that all policies need thorough reviews at all times; however, introducing new reforms within a short period of time does not always address certain issues. Instead these issues may recur in some cases. Also, the government incurs cost on itself,[145] and may even expose the planning system to uncertainty when policies are changed frequently. Although in the case that policy is changing in the present context, the big question remains whether the proposed MIPU will actually address the issues of public participation when the Localism Bill becomes law.

[145] B. Van der zee, 'Labour's fast-track planning body: £9.3m to run a year and no punters' available at <http://www.guardian.co.uk/environment/blog/2010/apr/21/infrastructure-planning-committee> assessed 28 October 2010

CHAPTER 6

CONCLUSION

From its beginnings, nuclear power has been tipped to address energy security concerns in terms of the distribution of energy supply. However over the past decades, human influence on the climate through increased use of fossil fuels, and the fear that carbon source energy is being depleted have led to other environmental attractions of nuclear power. In spite of these attractions, the nuclear benefits have been over shadowed by the impacts of the Chernobyl disaster in the former Soviet Union. The disaster showed the lapses of the international community in nuclear power disaster prevention, preparedness, and management. As a result, it necessitated changes and improvements in international nuclear safety regulations[1] by focusing on the prevention of possible future nuclear accidents and mitigation of the consequences should a nuclear accident occur again in the future. The EU and other nuclear States also joined to address their obligations under these regulations, and most importantly to fill the gaps left at the international level.

Having said this, the Fukushima nuclear power disaster in Japan put the post-Chernobyl safety regulations back in the spot light. As such, it affords us the opportunity to assess existing international, EU, and national nuclear power safety regulations. In so doing, it is clear from discussions in Chapter 4 that there are still concerns over these regulations at the international, EU, and national level. For example, there are still concerns in areas of nuclear waste management and the reprocessing of spent fuel, disaster prevention through the design of existing nuclear reactors, and also disaster preparedness and management measures. Also, more fundamental is that the disaster has shown a new way in which a nuclear disaster may occur. It shows that the combination of natural disaster and human behaviour can lead to a catastrophic disaster with which the safety regulations in place may find it difficult to cope.

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[1] N. Pelzer, Learning the Hard Way: Did the Lessons Taught by the Chernobyl Nuclear Accident Contribute to Improving Nuclear Law?; available at <http://www.oecd-nea.org/law/chernobyl/PELZER.pdf> last accessed 4 December 2011

As discussed in Chapter 2, there have been clear signs of rethinking about the use of nuclear energy by governments in a number of countries as a result of the Fukushima disaster. Surely, this is an effort to reduce the risks that are associated with the use of nuclear power. For example, countries such as Germany that has agreed to stick to the planned moratorium on nuclear power and on the road to shut down all its nuclear plants by the year 2022.[2] However, the role played by nuclear countries such as Germany in other countries raises particular concerns in terms of the possible consequences of a moratorium on the use of nuclear energy. As such, it remains to be seen whether a moratorium on nuclear power would have implications in addressing the carbon concerns, and the risks posed by nuclear power.

With regard to the above, it is only reasonable to think that a moratorium on nuclear power will lead to reliance on other sources of energy. Thus, it is worrying in terms of climate change that this may lead to crisis of confidence between developed and developing countries. In this regard, it has been argued that because under-developed and developing countries indirectly look up and benefit from the assistance rendered by developed countries in combating the carbon concerns, developed countries may be sending out wrong signals to under-developed or developing countries to expand the use of fossil fuels or substituting nuclear power for other low carbon sources.[3] This is indeed a possibility as revealed under the Kyoto Protocol where developing country parties rely on developed country parties in meeting climate change objectives.[4] For example, Nigeria is a developing country that is already seeking aid to help it cope with the effects of the changing environment.[5] More certain is the situation in Australia which reaffirms this argument. In response to the Fukushima disaster, Australia's Labour party has recently argued that because countries such as Germany, Switzerland and Italy were reducing their commitment to nuclear energy, it will be absurd under these

[2] Guardian Newspaper, Germany Votes to End Nuclear Power by 2022, available at <http://www.guardian.co.uk/world/2011/jun/30/germany-end-nuclear-power-2022> assessed 19 July 2011
[3] N. Netzer and J. Steinhilber, Nuclear Waste a Crisis...Green Light for a Sustainable Energy Supply, in N. Netzer and J. Steinhilber, *The End of Nuclear Energy? International Perspectives After Fukushima*, p.11-12. Available at <http://library.fes.de/pdf-files/iez/08289.pdf> accessed 15 September 2011
[4] Art.11(3) of the Kyoto protocol to the United Nations Framework Convention on Climate Change 2008
[5] BBC, 'Nigeria Seeks Climate Change Aid' available at <http://www.bbc.co.uk/news/world-africa-16084988> last accessed 9 December 2011

circumstances to expand their nuclear capabilities.[6] Although Australia is a developed country, its decision against the nuclear option based on the policy of other developed nations shows how keen nations maybe in adopting foreign policy measures in matters of environmental risk. However, contrary to this assertion, some commentators also argue that it is not necessary to have nuclear energy to meet climate change objectives as there are a variety of ways of getting to a particular emissions target.[7] As to this, various analyses of future energy use have also shown that excluding nuclear option would put significantly more pressure on energy supply and the use of other technologies, such as Carbon Capture Storage (CCS) which are unproven.[8] Besides, what this also means is that for the UK, there must be provision of other alternative source of low-carbon energy supply to replace the existing 18% of electricity that is being generated from nuclear energy.[9] This may even prove difficult to attain as there appears to be barriers to the growth of other low-carbon sources of energy.[10] Clearly, this is also a hint that other law-carbon sources of energy may not be developed in time to meet the climate change targets in the UK, while the continuous use of fossil fuels adds to the concerns over carbon sources of energy. Also as it relates to the risks of nuclear power, it is worth mentioning that the use of nuclear power has created a large amount of nuclear wastes that have been stored temporarily on sites over the years in the UK and other nuclear States around the world. My point of course is that even when a moratorium is placed on the use of nuclear power, it may not necessarily be a solution to the manifestation of its risks.

Thus where new nuclear build is concerned in the UK, it is important to address its inherent issues for nuclear power to have a place in the society. Indeed, such acceptance relies on public acceptability of the risks of nuclear power. This is not

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[6] BBC, Australia's Labour Party Backs Uranium Sales to India', available at <http://www.bbc.co.uk/news/world-asia-16021428> last accessed 5 December 2011

[7] D. Helm, Nuclear Power, Climate Change, and Energy Policy, in D. Helm and C. Hepburn, The *Economics and Politics of Climate Change*, (Oxford University Press, Oxford 2009) 262

[8] House of Lords Select Committee on Science and Technology: *Nuclear Research and Development Capabilities: 3rd Report of Session 2010-2012* (TSO, London, November 2011) Para. 40

[9] World Nuclear Association, 'Nuclear Power in the United Kingdom', available at <http://www.world-nuclear.org/info/inf84.html> accessed 20 August 2011

[10] G. Crowhurst and S. Davidson, Planning: A Roadblock to Renewable Energy in the UK, *Env. Law Rev.*, Vol. 10, Iss. 3, 181-199

surprising because the risks that are associated with the use of nuclear power have the potential to affect every member of the society including future generations. As such if the public are to consent to the use of nuclear power, solutions will have to be found to the obstacles that are currently presented in the decision-making process; particularly in policy formation and planning. As such it is of outer most concern that the decision-making processes would have to be compatible with the considerable body of international and EU law in relation to public participation.

To this point, there is the ultimate need for a legal response to the law and policy issues of nuclear power. At the same time, because nuclear power appears to be the most legally controlled energy source in the world due to the fact that it is subject to a very high degree of regulations at the international, EU, and national level, care must be taken in addressing its law and policy issues because any proposed measures must also be compatible with regulations across jurisdictions. For present purposes, such measures may define the level of acceptability of nuclear power.

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