# NUCLEAR LAW

*The Law Applying to Nuclear Installations and Radioactive Substances in its Historic Context*

*Second Edition*

STEPHEN TROMANS QC

# Nuclear Law

## The Law Applying to Nuclear Installations and Radioactive Substances in its Historic Context

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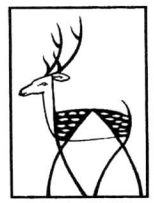


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# NUCLEAR LAW

This book is a practical guide to the international, EC and UK law applying to the various uses of nuclear energy and radioactive substances. The first edition was produced in 1997, and given the renaissance of interest in nuclear power in the UK and worldwide, this new, updated and much expanded edition is timely. It covers the law relating to the permitting and operation of nuclear power stations, the decommissioning and clean-up of former nuclear facilities, radiological protection, the management of radioactive waste and spent fuel, liability and insurance, and the security and transport of radioactive materials. Readers will find a clear framework explaining the development and application of nuclear law, and how domestic law is based on and influenced by international and European requirements and by its historical context. In the commercial context, the chapters dealing specifically with new build and with decommissioning will be vital reading.

# PREFACE

This book is a very much expanded version of *The Law of Nuclear Installations and Radioactive Substances* which was published in 1997, and which set out to provide practical commentary on the two key pieces of legislation: the Nuclear Installations Act 1965 and the Radioactive Substances Act 1993. During the intervening period these two acts have remained the cornerstones of regulation in the UK, but the context within which they operate has changed markedly. Perhaps the main change has been the renewed interest by some countries, among them England and Wales, in the construction of new nuclear power stations. In his prescient Foreword to the 1997 work, Lord Lewis of Newnham pointed to the need for the hazards associated with carbon dioxide production from fossil fuels to be set against the longer-term problems of nuclear waste disposal in the debate on the future of nuclear energy. This has proved to be the case—along with domestic energy security, the reduction in emission of greenhouse gases has provided the impetus for policies favouring new nuclear build. Hence the inclusion in this book of chapter 5, dealing specifically with this topic. The stark reality for the UK as at Christmas 2009 was one of sharply declining North Sea gas output, and heavy reliance on imported gas as an energy source, much of it imported by ship in liquid form. Yet at the same time, the economic conditions must be right for the massive commercial investment necessary to develop nuclear power stations: in the order of £2.7 billion to build a new 1,000 MW station. The inconclusive outcome of the December 2009 UN Copenhagen summit on climate change and the consequent lack of certainty as to the future price for carbon emissions will have been very unhelpful in this regard. A coherent national energy policy, underpinned by a simple carbon tax to create long term certainty for investors in low—carbon technologies, is becoming ever more acutely necessary, if secure energy supplies at stable prices are to be achieved, and carbon emissions are to be cut in compliance with existing targets.

Another major area of legal and policy development has been the decommissioning of former nuclear facilities, with the initiation of a multi-billion programme and the creation of a new body of central importance, the Nuclear Decommissioning Authority. This aspect, together with the inception of an entirely new regime for the clean-up of radioactively contaminated land, is covered in new chapter 11. The ever-growing importance of international and European Community law as the driving forces behind domestic law on nuclear safety and radiological protection are reflected in chapters 2 and 3, again almost entirely new material. Sadly, events since 1997 have also necessitated a much more intense focus on the issues of nuclear safeguards and security, a topic barely touched on in the original work, but now the subject of extended analysis in chapter 8. Other areas have not stood still by any means, and the chapters dealing with nuclear site licensing, liability and insurance, the use of radioactive substances and the disposal of radioactive waste have all been heavily revised and expanded. An emphasis which I have sought to retain is the provision of sufficient historical and technical material to put the current law into a more clearly understandable context.

One problem is of course that with such a multi-faceted and fast-moving subject there is no ideal time for publication and any text can only form a snapshot of the landscape at a particular point in time. In this case, the text was delivered to the publishers on 19 August 2009, and hence cannot include a number of developments after that date. To assist the reader, a brief overview of such developments follows this Preface. Particularly problematic has been the continued uncertainty as to the timing of changes to the regime for regulating radioactive substances and waste so as to bring these matters within the general environmental permitting regime, and the UK's approach to implementing revisions to the Paris Convention on Third Party Liability. It appears that such developments may occur during 2010, but to await them before finalising the text would have meant that the book would not have been available to those needing it during 2010 for areas such as new build and decommissioning. The author's decision on timing has therefore been a compromise, but heavily influenced by the large number of readers of the 1997 work who have made clear their views that an updated version is overdue and should not be delayed.

I am most grateful to a number of people who have assisted in the work on the text. First, I must acknowledge with thanks the work of Andrew Jones, who acted as my research assistant from January–April 2009 and who assembled a substantial amount of the materials used in updating and re-writing. Secondly, I would like to thank Peter Dickinson of the Nuclear Directorate of the HSE, Ian Salter of Burges Salmon LLP, and Mark Tetley of Nuclear Risk Insurers Limited, all of whom were kind enough to read specific draft chapters. Responsibility for any errors and omissions of course rests with me. Thirdly, I have been greatly assisted, stimulated and encouraged by my membership of the International Nuclear Law Association (INLA) and involvement with a number of its working groups. Fourthly, staff at Hart Publishing have been extremely professional, supportive and diligent, and have greatly eased for the author the process of publication. I have been privileged in my professional work at the Bar to have been involved regularly on a number of significant pieces of work in the fields of nuclear law, both before and during my work on this text. This inevitably provides new practical insights and focus, but also means that writing tends to be confined to weekends and (in this case) to two summer stints in 2008 and 2009. Last but not least, my wife, Caroline, therefore is due my thanks for her patience in this regard.

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*New Year's Eve 2009*

# ADDENDUM

## Current Developments August–December 2009

The purpose of this Addendum is not to provide a detailed account of all developments since the text was finalised, but rather simply to highlight for the reader's benefit the most important ongoing issues.

### *Chapter 4: Licensing*

The process of Generic Design Assessment (GDA) described in chapter 4 is continuing, with the issue of a number of reports following Step 3 of the assessment process for new power station designs. Step 3 provides an overall safety and security review and analysis of the proposed reactor designs. The next stage of the process is Step 4, in which the regulators will examine the evidence put forward by the design companies in support of their safety cases and will examine their security plans. This Step will provide a high-level indication of whether the proposed nuclear power station design is likely to meet the UK's regulatory requirements. If the design is considered acceptable, the regulators will issue a Design Acceptance Confirmation at the end of Step 4. Where specific issues have not been fully resolved, these will be identified as exclusions which will have to be resolved before the plant can operate. In November 2009, a joint regulatory position statement was issued on the EPR pressurised water reactor designed by AREVA and the chosen type for EDF. Assessments undertaken independently by HSE, by the French nuclear regulator ASN and by the Finnish regulator STUK, have all raised issues regarding the plant's control and instrumentation systems which require to be addressed: see Joint Regulatory Position Statement of 2 November 2009. There are also issues relating to the Westinghouse AP1000 design, favoured by RWE and E.ON, in particular on design codes and standards and human factors. In the case of both reactor designs, more information has been requested on the resilience to external hazards, such as aircraft impact. In particular, the HSE has indicated that there are some difficulties in respect of establishing a final 'design reference point' after which designs and safety cases will not be subject to significant change. Neither design is at present complete and this makes it problematic to obtain sufficient firm information on some aspects, for example the squib pressure release valves on the AP1000, which is a novel design: see HSE/EA GDA progress report 1 July 2009–30 September 2009. The regulators however remain confident that a 'meaningful' GDA will be completed in June 2011.

The other key issue in respect of safety regulation is the proposed restructuring of the HSE's Nuclear Directorate. Creation of a new Nuclear Statutory Corporation (NSC) under the auspices of HSE is being considered, as is noted in chapter 4. It now appears that the NSC will be governed by its own predominantly non-executive board, with individual regulatory decisions delegated to the Chief Inspector—which for the first time will become a position formally provided for in legislation. HSE is now working with the Department for Work and Pensions and with DECC on the legislation necessary to create the NSC. It is intended that the changes will be made through a Legislative Reform Order (LRO) under the Legislative and Regulatory Reform Act 2006: a consultation exercise on the issue closed in September 2009. The currently proposed timescale is that a LRO would be made in Spring 2010, with shadow operations within the ND from April 2010 and the creation of the NSC in Autumn 2010. None of this will, of course, change the substance and the standards of regulation in this area; it does, however, mean that the NSC will have greater autonomy and, importantly, will be able to be more flexible on how it pays and manages its staff.

## *Chapter 5: New Build*

A further piece of the commercial jigsaw for the construction of new nuclear power stations fell into place on 28 October 2009, with the announcement of the sale for £70 million of 190 ha of land at Sellafield by the NDA to a consortium of companies including Scottish & Southern Energy (SSE), Iberdrola of Spain and GdF Suez, of France. The group has announced its intention to build a new station with 3.6 GW capacity, aiming for a start to construction in 2015.

The Infrastructure Planning Commission opened for business on 1 October 2009 and is now actively advising promoters of projects and other interested parties on the application process. At a launch event on 22 October 2009 the IPC provided a list of the projects which it anticipates receiving applications for: among the first of these are proposals for new nuclear power stations at Hinkley Point, Sizewell, Oldbury-on-Severn and Wylfa, as well as connection projects by national Grid for Hinkley and Sizewell. The IPC has also started publication of its own Guidance Notes, providing guidance on pre-application stages and on preparation of application documents. The Government's intention is to 'switch on' the new procedures for energy and transport projects from 1 March 2010: progress to this end is set out in the Implementation Route Map published by DCLG in December 2009. A second package of secondary legislation and guidance (dealing with applications forms and procedures, environmental impact assessment, habitats assessment and model clauses for orders) came into force on 1 October 2009; consultation on a third package, dealing with examination procedures, has now closed and these regulations are intended to come into force on 1 March 2010.

Draft National Policy Statements covering the energy sector, and including overarching energy policy (EN-1) and nuclear power (EN-6), were published for consultation on 9 November 2009. The Nuclear NPS and its supporting documents are voluminous. It addresses the need for new nuclear capacity, the policy and regulatory framework, the Government's assessment of the arrangements for the management and disposal of waste from new nuclear power stations, the impacts of such stations and potential ways to mitigate them, and names specific sites that the Government considers to be potentially suitable. The key supporting materials include Appraisals of Sustainability and Habitats Regulations Assessments of the policy statement overall and of the nominated sites individually, a Strategic Siting Assessment, specialist advice on sites from relevant regulators, and a study undertaken of possible alternative sites. According to *Planning* Magazine (18 December 2009) a number of former members of CoRWM have protested that their recommendations on waste management have been seriously misrepresented in the draft NPS: whether this is in fact the case and whether there will be a legal challenge to the NPS once formally published will remain to be seen in 2010.

## *Chapter 6: Liability and Insurance*

It is understood that consultation on implementing the revised Paris Convention in the UK will begin in Spring 2010. A key issue remains the current non-insurability of some of the new heads of nuclear damage. The likely solution appears to be that the UK Government will act as reinsurer to Nuclear Risk Insurers Limited as a temporary expedient until such time as market capacity becomes available. The Government would charge a premium for this, which would be passed on by NRI to the insured parties.

## *Chapter 8: Safeguards and Security*

This issue has been dominated by increasing fears over the intentions of Iran, following the announcement by Iran in September 2009 of construction of a further enrichment plant at Fordo near Qom, and missile testing undertaken by Iran. Talks aimed at reaching agreement between Iran and the world's main nuclear powers (involving Iran shipping its stocks of enriched uranium to France and Russia for further processing) broke down in October. Iran remains in breach of five UN resolutions calling for it to cease enrichment of uranium until issues as to potential military applications are resolved. It is believed that Iran has the know-how to make a nuclear weapon and lacks only the necessary quantities of fissile material. In November 2009 the IAEA Board of Governors passed resolution GOV/2009/82 in which it noted with serious concern that Iran had constructed an enrichment facility at Qom in breach of its obligation to suspend all enrichment-related activities and that Iran's failure to notify the Agency of the new facility until September 2009 was inconsistent with its obligations under the Subsidiary Arrangements to its Safeguards Agreement and urged Iran to cooperate and to comply with its international obligations in this regard. The aggressively unrepentant response of the Permanent Mission of Iran to the resolution, made on 3 December 2009, has been published as INFCIRC/779. Indeed it was reported in late November that Iran had vowed to construct 10 more nuclear enrichment facilities as a direct response to the IAEA's censure. It remains to be seen how the UN Security Council will take matters forward in 2010: the US seems likely to press for a package of sanctions to be imposed, and it appears following the EU Summit held in Brussels in December 2009 that this will find support in the EU Council.

## *Chapter 11: Decommissioning*

A potential new dimension to decommissioning what have become, in some cases, iconic industrial buildings was highlighted in October 2009 when it was reported that the Twentieth Century Society has applied for the twin towers of the Trawsfynydd nuclear power station to be listed as of historic and architectural interest. They were designed by modernist architect Basil Spence, who also designed Coventry Cathedral.

The work of the NDA has continued: in September 2009 the competition to secure a Parent Body Organisation for the Site Licence Company at Dounreay (Dounreay Site Restoration Limited) was launched. The NDA also initiated consultation on a Supply Chain Charter intended to foster good working relations across the supply chain within the NDA estate, dealing with principles on relationships between NDA and suppliers, planning for the procurement process, and applying and demonstrating rigorous safety, security and environmental protection standards.

More controversially, in November 2009 *The Times* published an article entitled 'Cuts loom over UK's nuclear clean-up budget' in which it was suggested that the NDA's budget was to be reassessed and that big spending cuts were likely, with particular concern expressed over the figure of almost £800 million spent on NDA administration and support costs. The NDA moved very rapidly to respond to these points, confirming that NDA is, along with other agencies, taking part in the Government-wide review to identify options for savings, known as the Public Value Programme. A range of 'scenarios' is being considered by the NDA Board, including deferral of some non-essential work, bringing forward work which offers particular value for money, deletion of scope of some work where alternative plans can be formed, increasing income generation from remaining assets, and looking at opportunities for further efficiency savings. This review is due to be completed in February 2010.

## *Chapter 12: Radioactive Waste*

The original intention was to couple the application of the environmental permitting regime (EPR) to radioactive waste regulation with a review of exemptions from authorisation. It now appears that the environmental permitting changes will take effect in advance of completion of the exemption order review, with EPR taking effect possibly as soon as April 2010 and the exemption reforms at some point thereafter.

A number of important assessments and decisions have been made on various aspects of radioactive waste management. In September 2009 the NDA's public consultation on the UK strategy for the Management of Solid Low Level Waste from the Nuclear Industry closed; this will seek to ensure best use is made of remaining national capacity at the Low Level Waste Repository at Drigg and reduce the need for an additional facility in future. According to NDA estimates, even with extra capacity at Drigg (some 700,000 cubic metres subject to planning and regulatory controls) there will be a major shortfall in capacity given the likely amount of waste which will be generated over the next 120 years (some 3 million cubic metres). In respect of reprocessed nuclear fuel, which has accumulated since 1976, the contracts now rest with NDA, and provide the option (which the Government has exercised) for return to the country of origin. NDA announced at the end of September 2009 that it has been advised by Sellafield Limited, the SLC responsible for the Vitrified Residue Returns programme that the infrastructure is now in place for the VRR programme to commence in the 2009/2010 financial year, subject to agreement on detailed timings with the relevant authorities and customers. This will begin a new chapter in the reprocessing saga, which over 10 years will return some 1,850 canisters of vitrified waste to overseas customers and will greatly reduce the amount of highly active waste currently stored in the UK. Another significant announcement was made by the NDA in October 2009, that given recent improvements in the performance of the MOX plant at Sellafield, and positive discussions with customers, the best course of action was the continued operation of the MOX plant in pursuance of completing its current campaign of fuel manufacture. This position was advised to Sellafield Limited as operators of the plant; Nuclear Services (the commercial subsidiary of the NDA) is continuing to explore new commercial arrangements that would make longer term continuation of the plant's operation acceptable to the NDA.

Finally, an assessment which is of great significance to the new build programme was announced by the NDA on 9 November 2009. NDA's Radioactive Waste Management Directorate issued summary reports on the disposability of higher activity solid radioactive waste and spent fuel generated by the proposed reactors designs (the UK EPR and the AP1000) currently undergoing generic design assessment. In respect of both types of reactor, the NDA has concluded that compared with legacy wastes and spent fuel, no new issues arise that challenge the fundamental disposability of these wastes in a geological disposal facility, given a disposal site with suitable characteristics. The conclusion is strengthened by the similarity of the anticipated wastes with those produced by the existing PWR at Sizewell B. The issue is controversial because Greenpeace has already suggested that wastes from the EPR design are significantly more hazardous than previous reactors because of the concentration of the long-lived isotope Iodine-129. The disposability issue is fundamental because of the Government's commitment made in the 2008 White Paper on Nuclear Power that before development consents for new nuclear power stations are granted, the Government will need to be satisfied that effective arrangements exist or will exist to manage and dispose of the waste they will produce.

# LIST OF ABBREVIATIONS

| Abbreviation | In full |
|---|---|
| ACSNII | Advisory Committee on the Safety of Nuclear Installations |
| AGR | Advanced Gas-Cooled Reactor |
| ALARA | as low as reasonably achievable |
| ALARP | as low as reasonably practicable |
| AWE | Atomic Weapons Establishment |
| BAT | Best Available Techniques |
| BNFL | British Nuclear Fuels Limited |
| BNG | British Nuclear Group |
| BPEO | Best Practical Environmental Option |
| BPM | Best Practicable MeansBSS Basic Safety Standards |
| CEGB | Central Electricity Generating Board |
| CNS | Civil Nuclear Constabulary |
| COMARE | Committee on Medical Aspects of Radiation in the Environment |
| CoRWM | Committee on Radioactive Waste Management |
| DBERR | Department for Business, Enterprise and Regulatory Reform |
| DECC | Department of Energy and Climate Change |
| DEFRA | Department for the Environment, Food and Rural Affairs |
| DETR | Department of the Environment, Transport and the Regions |
| DSRL | Dounreay Site Restoration Limited |
| DTI | Department of Trade and Industry |
| EAEC | European Atomic Energy Community |
| EIA | environmental impact assessment |
| EPR | environmental permitting regime |
| Euratom | European Atomic Energy Community |
| GDA | Generic Design Assessment |
| HASS | High-Activity Sealed Sources |
| HEU | highly enriched uranium |
| HLW | High Level Waste |
| HMIP | Her Majesty's Inspectorate of Pollution |
| HSC | Health and Safety Commission |
| HSE | Health and Safety Executive |
| IAEA | International Atomic Energy Agency |
| ICAO | International Civil Aviation Organization |
| ICRP | International Commission on Radiological Protection |
| ILW | Intermediate Level Waste |
| IMO | International Maritime Organisation |
| INES | International Nuclear Event Scale |
| INRA | International Nuclear Regulators Association |

| | |
|---|---|
| IRCP | International Commission on Radiological Protection |
| IRR | Ionising Radiations Regulations |
| JRC | Joint Research Centre |
| LLW | Low Level Waste |
| MAFF | Ministry of Agriculture, Fisheries and Food |
| MOX | Mixed Oxide |
| ND | Nuclear Directorate |
| NDA | Nuclear Decommissioning Authority |
| NEA | Nuclear Energy Agency |
| NII | Nuclear Installations Inspectorate |
| NNC | National Nuclear Company |
| NNL | National Nuclear Laboratory |
| NORM | naturally-occurring radioactive materials |
| NPS | National Policy Statement |
| NPT | Non-Proliferation Treaty |
| NRI | Nuclear Risk Insurers Ltd |
| NuSAC | Nuclear Safety Advisory Committee |
| OCNS | Office for Civil Nuclear Security |
| OECD | Organisation for Economic Co-operation and Development |
| PBO | Parent Body Organisation |
| PSR | Periodic Safety Reviews |
| PWR | pressurised water reactor |
| RBMK | reactor, high-power, boiling, channel type |
| RIMNET | Radioactive Incident Monitoring Network |
| RWMAC | Radioactive Waste Management Advisory Committee (RWMAC) |
| SAP | Safety Assessment Principles |
| SEA | Strategic Environmental Assessment |
| SEPA | Scottish Environment Protection Agency |
| SGHWR | steam generating heavy water reactor |
| SLC | Site Licence Company |
| SSA | Strategic Siting Assessment |
| START | Strategic Arms Reduction Treaty |
| TAG | Technical Assessment Guide |
| THORP | Thermal Oxide Reprocessing Plant |
| TRANSEC | Transport Security and Contingencies Directorate |
| TRCL | The Radiochemical Centre Limited |
| UKAEA | United Kingdom Atomic Energy Authority |
| UNAEC | UN Atomic Energy Commission |
| UNECE | United Nations Economic Commission for Europe |
| UNSCEAR | UN Scientific Committee on the Effects of Atomic Radiation |
| WENRA | Western Nuclear Regulators Association |

# TABLE OF CASES

# TABLE OF NATIONAL LEGISLATION

## United Kingdom

*Statutes*