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The construction & energy law specialists

Nuclear
Law & Regulation

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Introduction

This note provides an overview of:

1. the new nuclear programme;
2. the English regulatory regime in connection with that programme;
3. considerations for contractors; and
4. civil liability under English Law (and briefly, the interrelationship between English Law and International Law) for third party nuclear damage.

The new UK nuclear programme

The election of the Conservative-Liberal Democrat Coalition Government (the Coalition Government) earlier this year has given the green light to the new nuclear build programme in the UK and a new era in British energy policy has begun.

In particular, new planning and design regimes have been introduced to pave the way for the substantial new build and these legislative measures have been met by a proactive response from the industry which is also gearing up for the new build. British Energy has been acquired by EDF[1]; a 20% stake in British Energy was subsequently sold on by EDF to Centrica; EDF sold off its network division to the Cheung Kong Group and various joint ventures and commercial collaborations have been announced.

The reasons behind the reforms are both regulatory and need driven. The government is obliged by the EU to generate 15% of UK energy from renewable sources by 2020 and has a commitment to a 30% reduction in carbon emissions by the same date[2]. In addition to this, the UK currently has 19 reactors which generate about 18% of its electricity and all but one of these will have reached the end of its natural life by 2023[3].

The cost of the new build will be enormous. Alan Key, Chief Operating Officer of Costain, estimates that the likely spend per nuclear power station will be around £5bn with a total estimated spend for the new build of £40bn, the contracts for most of which will probably be awarded to UK contractors.

It is expected that around 80% of the finance will come from private sources and the Coalition government has therefore taken steps in a new Energy Bill to try and give greater certainty to those who invest in nuclear power. The 2008 Energy Act[4] compels nuclear developers to have sufficient funds available to decommission nuclear facilities at the end of their natural life and to manage the associated nuclear waste. The provisions of the new Bill are hoped to provide some commercial certainty as to how this might operate in practice.

Further comfort ought to be provided to investors by the completion of the design of the proposed £1 billion Green Investment Bank in the spring of 2011, which will fund the early and risky construction phases of complex infrastructure projects such as the new build.

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1 EDF is heavily involved in the nuclear build and is working towards the first of its four proposed reactors being operational and up and running by 2025. Its current focus is on Hinckley Point which is the first nuclear power station to be built in the UK for 25 years.

2 The effect of this obligation is that nuclear energy will be required to provide between 35% and 40% of the UK's electricity needs onwards of 2030.

3 By the late 1990's, nuclear power plants contributed to around 25% of total electricity generation in the UK but this has declined as obsolete plants have been closed and age-related problems have affected plants' productivity.

4 The 2008 Energy Act was introduced by the former Labour Government to justify the new nuclear programme, provide for generic design approval, regulatory review and the funding of decommissioning and waste management.

Nuclear industry legislative framework

The key enabling legislation is the 2008 Energy Act (the Energy Act) and the 2008 Planning Act (the Planning Act) which were introduced by the Labour Government to provide the framework for the new nuclear build.

The 1965 Nuclear Installations Act (the 1965 Act) deals with liability and governs the construction and safe operation of nuclear plants. The 1965 Act makes provision for licensing, liability and insurance in relation to the installation and operation of nuclear reactors and nuclear installations in general. The 1965 Act is supported by the Ionising Radiations Regulations 1999 which require employers to ensure radiation exposure of workers and the general public remains within specified safe limits.

Design

The HSE has adopted a Generic Design Assessment (GDA) process under the Planning Act whereby the safety and environmental impact of each of the industry's preferred reactor designs is assessed by the regulators at the request of the reactor vendor. This is the stage the nuclear new build is at in the UK in that GDA's are currently underway in respect of Areva's European Pressurised Reactor and Westlinghouse's AP100 reactor designs. The results are expected in June 2011.

The purpose of the GDA process is to provide developers and promoters of new nuclear power stations with an indication as to whether the design will be accepted and a site licence obtained (as to which please see paragraphs 3.11 to 3.15 below) prior to committing significant sums to the planning, licensing and build stages. Most potential operators will probably wait for the outcome of any GDA prior to submitting an application to the HSE for a site licence (which is needed in addition to planning consent).

Planning / siting

The planning enquiry for Sizewell B took 27 months and cost around £30 million and the Labour Government was therefore forced to take steps to ensure that there would not be a repeat for the new build. The Labour government implemented the Planning Act for the purposes of the new build[5] and eleven sites were originally nominated by the former Labour Government with a view to nuclear reactors being built on them. Most of the proposed new build sites are in areas with a pre-existing nuclear presence, such as Sellafield, which, coupled with the new planning regime ought to make siting relatively uncontentious.

The Coalition Government has continued to reform the planning system to improve its speed and efficiency for the new build and has continued the Planning Act system of unified consent for Nationally Significant Infrastructure Projects. This system is essential in light of the short timescales for the new build.

The cornerstone of unified consent is the Nuclear National Policy Statement (the Policy Statement) which was drafted by the Labour Government and subsequently revised by the Colation Government to exclude two of the sites that had previously been earmarked for nuclear development. The revised Policy Statement further provides assurance from the Coalition government that it is satisfied that there are sufficient measures in place for the disposal of nuclear waste in respect of the developments that are to proceed. The public were provided with the opportunity to comment on the siting proposals, and

[5] Albeit the Planning Act has the scope to create obstacles as it provides limited opportunities to challenge decisions which might contravene the Convention on Human Rights.

following consultation, eight sites were approved for the new build in the revised Policy Statement. The Coalition government expects the final version of the Policy Statement to be ratified by Parliament in spring 2011.

The key difficulty with the new planning regime is that it is in its infancy and it has not been tested or fully implemented. How effective it will be at permitting the new nuclear build will remain to be seen.

If planning issues do hold up nuclear development, funding might become difficult. Funders will want to see an early return on their investment failing which they might choose to invest in markets such China whose nuclear build programmes are much shorter than those in the West.

Licensing

Under the 1965 Act, a licence is required for the installation and operation of a nuclear reactor or any nuclear installation prior to the placement of the first structural concrete.[6] Licences may only be granted to a body corporate and are not transferrable.

In order for a licence to be granted, the developer's site licence application must demonstrate that there are no geological or other conditions present that could affect the safety of the nuclear plant. Ground conditions must be suitable and potential licensees will have to carry out preliminary site investigation works (which will usually take the form of geological mapping, boreholes and shallow trenches) prior to a formal application for a licence being made.

The IAEA Guide[7] NS-G-3.6 and the NII SAPs gives some guidance as to the type of ground conditions that might be rendered unsuitable for nuclear development. The existence of these conditions would preclude an application for a license from being made.

Power is granted under the 1965 Act to the HSE to attach any conditions to a nuclear license as it might consider fit in the interests of safety. There are currently 36 standard conditions to which a licensee should pay attention (for example, the requirement to establish a nuclear safety committee) and the conditions may be varied or revoked at any time. Licences might also include site specific safety requirements dependant upon the HSE's site assessment and requirements in relation to the handling, treatment and disposal of nuclear matter.

The HSE enforces the licensing regime and a division of the HSE, the Nuclear Installations Inspectorate, carries out inspections and regulatory checks to ensure compliance. The manner of compliance is flexible in that the licence only sets out goals for the licensee and leaves the licensee to comply as it considers fit.

Health & safety

Health and safety considerations are paramount to those who work and live in the vicinity of nuclear power plants. In the UK, operators of nuclear power plants must comply with the standards set out in the Health and Safety at Work Act 1974.

The HSE is the UK's nuclear installation licensing authority and it is responsible for ensuring sign off of nuclear developments. The Coalition Government has announced in the nuclear context that the HSE is to be replaced by an independent statutory body, the Office for Nuclear Regulation, which will assume the HSE's obligations in respect of the regulation of the nuclear industry.

[6] It may therefore be possible for a developer to undertake excavation of building foundations and placement of the blinding layer before a nuclear site license is granted.

[7] The IAEA Guide is a catalogue of nuclear data information available from the IAEA Nuclear Data Section.

Considerations for contractors

Forms of procurement

The three main options that are currently under consideration for the new nuclear build are:

1. EPC Turnkey
2. Trade package or Multi-contract
3. Hybrid or split EPC

EPC turnkey

EPC is the traditional model used by the energy industry for the delivery of projects under which the contractor is obliged to deliver the works on a turnkey basis which makes this form of procurement relatively expensive. EPC contracts have fixed programmes with certain completion dates, a fixed price and guaranteed performance levels.

Because all major risks are assumed by the contractor, it is imperative for there to be a realistic work schedule, a completed design before works start on site, a detailed knowledge of the regulatory regime and a competent workforce to prevent problems further up the line.[8]

Trade package or multi-contracting

Under trade package or multi-contracting, construction is divided into various contractual work packages.[9] This form of procurement tends to be used by very experienced clients such as EDF who are accustomed to nuclear build and who wish to retain a greater influence over the project management side than would be the case under a turnkey contract.

The client assumes responsibility for co-ordinating the various work packages and manages the interface and lines of communication between them. Multi-contracting works well only if properly managed, as a lack of co-ordination could lead to significant delays, additional construction costs and performance problems, all of which are particularly difficult to analyse in the nuclear context in light of the technical complexity of power plants.

These risks can however be reduced and mitigated by limiting the number of sub-contractors and providing single (as opposed to multi) contract packages wherever possible so as to provide a single point of responsibility.

Hybrid or split EPC

A hybrid or split EPC aims to divide a traditional EPC contract into two or more separate contracts and to have parallel work streams. The aim is to achieve a delivery method that has as few contracts as possible, and therefore less co-ordination risk to facilitate easy project management by the client.[10]

Wrap-around or umbrella guarantees

It is common in non-nuclear energy projects for a single entity to effectively stand as guarantor to the obligations of the various contractors. The contractors then enter into separate agreements to apportion responsibility between them.

[8] Delay to the construction of The Olkiluoto 3 Project in Finland was understood to have been caused in part by an absence of these requirements.

[9] EDF used this method for the construction of Flamanville 3 in Normandy, France and has advised that it is to be repeated for Hinckley Point in the UK.

[10] Element of split EPC's can be found in EDF's procurement strategy.

Preferred form of procurement

Given the novelty and technical complexity of the new nuclear build, and with companies such as EDF driving the build, the procurement route is most likely to be EPC or multi-contracting using NEC3. However, significant amendments to NEC3 would be necessary to make the contract project specific and ensure it complies with the regulatory regime discussed above.

Umbrella guarantees should be avoided, at least in the early stages of the new nuclear build as the technical complexity of nuclear work would make the guarantee and the various apportionments of liability difficult to unwind in practice in the event of a dispute.

Contract forms

There are two main contenders for nuclear work, FIDIC and NEC.

FIDIC

The current FIDIC suite is well suited to nuclear work in that it includes contracts for building and engineering works (Red Book), electrical and mechanical plant (Yellow Book) and EPC / Turnkey contracts (Silver Book).

Where the main responsibility for design is to rest with the contractor, the Yellow and Silver books are most appropriate and generally contain a fair allocation of risk between the employer and contractor. These books are also well known to funders.

NEC

Compared to FIDIC, NEC is relatively simple and brief, with fewer terms and conditions and clauses. Its intention is to provide a new collaborate model based on modern project management, risk management and problem solving by the client. The project manager under FIDIC has a key role and it essential for the smooth operation of a FIDIC contract for the client to select an appropriate contract manager / organisation to carry out this role.

During the preparation of the contract, it is vital that the works information is adequate for nuclear work and this means that it should contain more information than the standard bills of quantities or employer's requirements documents. The extent to which the contractor is responsible for the design,[11] the works which are to be carried out by the client or third parties and procedures for the submission and review of information must be clear and success is therefore dependant upon detailed and early preparation at the pre-contract stage.

NEC3 has been approved by the Office of Government Commerce and is being used by the NDA for nuclear decommissioning. It should probably therefore be regarded as the first choice form of contract for nuclear build.

Further, EDF has made the following comments in relation to NEC3:

> *"We recognise the UK supply chain operates differently to France (where the company is building a nuclear power station at Flamanville). The French way is to go for large lump sum turnkey contracts. The UK supply chain is more complex and relationship based. We'll use the NEC form as it is more collaborative and what we want on these plants is good solid relationships.*
>
> *We'll be looking closely at how main contractors collaborate with their supply chain.*
>
> *Nuclear work is about getting it right first time, every time. What we are doing is running a marathon. We need to train for the marathon. So getting the right people is a key issue".*

[11] See the Sellafield case of in Shawton Engineering Ltd v DGP International Ltd and Others, CA, 18 November 2005 in which the failure of the contract to make clear whether the contractor was responsible for the development of the initial design or was to produce manufacturing drawings resulted in termination of the contract by reason of delay in the absence of a contractual provision for an extension of time.

Testing & commissioning

It goes without saying that safety is paramount in nuclear build and any contractual testing and commissioning regime must be effective and properly implemented. A very detailed testing regime should be agreed with the benefit of appropriate technical advisers prior to the contract documents being entered into to ensure that the regime forms part of the contractual undertakings of the parties and to ensure that everyone is aware of what is required in order for the build to be 'complete'.

Third party liability for nuclear damage

Operators of nuclear power plants are liable for any damage caused by them regardless of fault pursuant to the 1965 Act which adopts the provisions of the Paris Convention on Third Party Liability in the Field of Nuclear Energy and the Brussels Convention Supplementary to the Paris Convention to which the UK is a contracting state.

The principles of that legislation include the following:

1. Liability rests with the client / operator / licensee of the nuclear installation.

2. That liability is absolute and therefore fault is irrelevant other than in cases of acts of war, civil war or armed conflict, hostilities, or insurrection.

3. The duty under the 1965 Act is to ensure that the licensee of a nuclear site causes no "injury to any person or damage to any property of any person…" arising from radiation or from a combination of radiation and the toxic, explosive or other hazardous properties of nuclear matter.[12] The damage to property must be physical and relate to tangible property or property rights as opposed to pure economic loss which is not recoverable.[13]

4. Where damage is not covered by the 1965 Act, under English law it would fall to be covered by the common law and would be subject to issues of causation. Whereas it would be relatively straightforward to establish a causal link between a major nuclear incident and persons who suffer physical symptoms such as radiation sickness shortly after, it would be much more difficult for a casual link to be established if a person contracted cancer some years later and sought then to allege that the cancer was caused by the same nuclear incident.[14]

5. "Damage" does not presently extend to environmental damage.

6. Liability is currently limited to €320 million special drawing rights per nuclear site, £140m of which must be insured by the licensee under the Paris / Brussels Conventions. The government is proposing legislation which would require operators' insurance to provide total coverage of €1.2 billion in line with amendments that have been made to the Paris and Brussells Conventions and this legislation is currently under consultation. The consultation is due to come to an end at the end of April 2011.

7. In addition to raising the limit of liability, the Paris and Brussels Conventions have amended the definition of nuclear damage to broadly include:

    - economic loss arising from loss of life / personal injury and loss or damage to third party property;

    - the cost of re-instating an impaired environment;

[12] Section 7. Section 12 imposes the liability for breach of this statutory duty. See also Merlin – British Nuclear Fuels Ltd [1990] 3 All ER 711 which considers the meaning of "damage" under the 1965 Act at first instance and the later Court of Appeal decision in Blue Circle Industries Plc v Ministry of Defence [1998] 3 All ER 711. There is no reported decision on the meaning of "injury to any person" but it is likely that difficulties of causation and the nature of nuclear harm and the onset of symptoms will make personal injury claims very difficult to prove. See paper by Maria Lee at tab 20 of the bundle to this note entitled Civil liability of the Nuclear Industry, Oxford University Press, 2000 for a discussion on the issues that arise out of nuclear related environmental harm.

[13] See Merlin supra.

[14] See the Sellafield personal injury cases of Reay v British Nuclear Fuels [1992] 4 LMELR 195 and Hope v British Nuclear Fuels [1993] 5 ELM 178 in which it was found that the requisite causal link had not been established to prove that radiation had caused cancer notwithstanding the increase in cancers in the Sellafield area.

- the loss of income from a direct economic interest in any use or enjoyment of the environment incurred as a result of significant impairment of that environment; and

- the cost of preventative measures (and the costs of implementing those measures).

8. Whether the UK will ratify these further amendments remains to be seen but any ratification would increase the potential liability to which an operator might be exposed in the event of a nuclear accident.

9. The limitation period for bringing a claim under the 1965 Act is 30 years from the occurrence giving rise to the claim, or where the occurrence is continuing, 30 years from the last occurrence. Any claims made within the first 10 years of the occurrence are backed by insurance with the remaining claims being met by the state. Any government payout would only be intended to meet immediate claims and the taxpayer would expect much or all of the government's outlay to be the subject of a subrogated recovery from the operator in due course.

10. The licensee must maintain insurance or other financial security for an amount which corresponds to its liability (10 years following the period of responsibility under the licence and any earlier period of responsibility for which a claim is pending).

How contractors might manage risk

Limiting liability

Strict liability for the new nuclear build is undoubtedly a daunting prospect and one which developers might seek to pass down to contractors in the form of contract amendments. As daunting as this might seem, in fact only around 20% of nuclear build work is actually nuclear in nature[15] and therefore the overwhelming majority of construction work that is undertaken in the course of nuclear build is in fact standard to all construction projects.[16] The risks for the nuclear aspect however remain and the consequences of any mistake would be severe.

If some liability does have to be assumed by contractors, the extent and type of liability should be managed through contractual negotiation, with a view to limiting liability to the contract price. This is something that nuclear developers are used to seeing, since nuclear suppliers commonly limit any contractual liability that they might owe to the nuclear operator.

Insurance

It is a common misconception that nuclear build is not currently insurable on grounds of availability and cost. As an indentified broker who had been responsible for a nuclear insurance pool quoted in 2006:

> *"It is wrong [to believe] that insurers will not touch nuclear power stations. In fact, wherever they are available to private sector insurers, Western-designed nuclear installations are sought-after business because of their high engineering and risk management standards. This has been the case for fifty years."*

He went further and added:

[15] According to a study released by the Nuclear Industry Association entitled The UK capability to deliver a new nuclear build programme, 2008 Update.

[16] For example, site investigations, site preparation works, temporary workers' accommodation etc.

> *"My comment refers very much to the world scene and is not contentious. Apart from Three Mile Island, the claim experience has been very good. Chernobyl was not insured. Significantly, because Chernobyl was of a design that would not have been an acceptable risk at the time, notably the lack of a containment structure, the accident had no impact on premium rates for Western plants.*

He continued that:

> *"The structure of insurance of nuclear installations is different from ordinary industrial risks. It involves international conventions, national legislation channelling liability to the operators, and pooling of insurance capacity in more than twenty countries. The national nuclear insurance pool approach was particularly developed in the UK in 1956 as a way of marshalling insurance capability for the possibility of [serious accidents]. Other national pools that followed were modelled on the UK pool – now known as Nuclear Risk Insurers Limited*[17]*, and based in London."*[18]

Whilst insurance is therefore available, in the event that there was a major nuclear incident in the UK, the uninsured losses would be extensive. Not least because the insurance cover which is required to be held by the licensee under the 1965 Act relates to claims in aggregate whereas the limit on liability is per occurrence.

By 1991, the very lowest estimate of the total costs associated with Chernobyl was $6 billion US and the highest was £200 Billion[19] which is far in excess of the current compulsory insurable limits. The costs to countries outside the former USSR has been estimated at between $1.5 to $4 billion making Chernobyl the most expensive industrial accident in modern history.

One of the key difficulties in the fall out post Chernobyl was the drive to try and make the populated areas affected by the accident habitable and this is reflective of the problems that the UK might suffer in the event of a nuclear incident. Estimates of the early cancer deaths and short term costs alone of a major nuclear incident in the UK have been estimated by Earth Resources Research and Friends of the Earth as being around £15 billion.

Given the considerable likely under-insurance in the event of a nuclear incident in the UK, it is more important than ever that a contractor gets it right first time.

[17] The majority of this insurance is provided by a pool of UK insurers which comprises 8 insurance companies and 16 Lloyd's syndicates.
[18] The original quote is cited in the "Liability for Nuclear Damage" section of www.world-nuclear.org.
[19] See page 11 of the Greater London Authority Liability Paper.