Department for
Business, Energy
& Industrial Strategy

DISCUSSION PAPER ON:

REGULATION OF NUCLEAR SITES IN THE FINAL STAGES OF DECOMMISSIONING AND CLEAN-UP

November 2016

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The discussion paper can be found on the BEIS section of GOV.UK: https://www.gov.uk/beis

Any enquiries regarding this publication should be sent to us at [PRC.discussionpaper@beis.gov.uk].

Contents

General information

Purpose of this discussion paper

1.1. The Department for Business, Energy and Industrial Strategy (BEIS) is responsible for the development of policy, legislation and regulation of nuclear energy and nuclear installations across the UK. This includes the policy, legislative and regulatory framework that relates to nuclear site decommissioning and clean-up.

1.2. Working with the regulators[1] and the Nuclear Decommissioning Authority (NDA), the UK Government has identified an opportunity to improve current arrangements that apply to the regulation of the final stages of nuclear site decommissioning and clean-up. For example, to enable a more flexible approach to site clean-up that takes account of a range of possible site end states and opportunities to optimise waste management.

1.3. To realise these opportunities, the regulators and the NDA put forward a proposal that nuclear sites in their final stages of decommissioning and clean-up can be released from their regulation under the Nuclear Installations Act 1965 (NIA65) once the nuclear safety and security regulator (Office for Nuclear Regulation (ONR)) is satisfied they can do so. The environment agencies would continue to regulate these sites in accordance with environmental legislation. The health and safety of any work activities on such a site would be regulated by the Health and Safety Executive. Fundamentally, the proposal is consistent with radiological public protection standards established by Public Health England, which fully align with international standards.

1.4. Adopting a more flexible approach to nuclear site clean-up would enable those sites to be managed in ways that take account of a range of factors. These include the particular characteristics and features of any site, the implications of any plans for the generation and management of waste, and any future plans for land use. In some cases this might mean that there would be no need to remove low levels of radioactive contamination from the ground if leaving it in situ is demonstrated to be the optimal solution. The particular implication would vary from site to site depending on the local circumstances. More flexibility offers the potential for a more sustainable approach to clean-up work, thereby enabling earlier re-use of sites, avoiding unnecessary generation of radioactive waste (thus preserving the capacity at waste repositories elsewhere which are vital for radioactive waste that requires that level of control) and reducing the transportation of waste from the site to those other locations.

1.5. The UK Government is minded to agree with the proposals.

[1] Regulators are the Office for Nuclear Regulation (ONR) and the environment agencies (the Environment Agency in England, Natural Resources Wales in Wales, and the Scottish Environment Protection Agency in Scotland).

1.6. This discussion paper is being published by the UK Government. The proposals for change outlined here relate primarily to legislation and guidance concerning the regulation of safety on nuclear licensed sites under the NIA65, which is a reserved policy area (i.e. applies across the United Kingdom). However, these proposals would have implications for regulations and associated guidance in devolved policy areas such as environmental protection and radioactive waste management. The UK Government has therefore consulted the Devolved Administrations[2] during the development of the proposals and the Devolved Administrations support the objectives. The UK Government will continue to work closely with the Devolved Administrations in taking these proposals forward.

1.7. Recognising the sensitivities associated with nuclear activities and issues of radioactive waste management, the UK Government wishes to ensure that its consideration of these proposals is transparent and informed by a range of views. This document therefore describes UK Government's initial considerations on these proposals as a basis for engagement with interested parties.

1.8. The UK Government would welcome views from stakeholders to ensure any subsequent development of policy in this area is well informed prior to undertaking formal public consultation. While we welcome views from all interested parties, we expect the following stakeholders will have a particular interest: local communities in the vicinity of existing nuclear sites, nuclear operators and liability owners, local authorities and members of the nuclear industry (including the radioactive waste management supply chain). In addition to considering written responses to this discussion paper, the UK Government intends to meet with interested parties to discuss the proposals, for example, via stakeholder workshops and existing stakeholder fora.

How to respond

1.9. This paper is being made available on the BEIS website. Responses can be returned by email (preferable) or post. In order to help us analyse responses, please provide details of your organisation.

Issued: 3 November 2016

Respond by: 29 December 2016

Enquiries to:
Nuclear Decommissioning and Radioactive Waste Policy Team
Civil Nuclear and Resilience Directorate
Department for Business, Energy and Industrial Strategy
Floor Area 2E,

[2] The UK Government has consulted with Scotland and Wales during the development of these proposals. Whilst Northern Ireland is also a devolved administration, with different environmental and safety regulators and planning legislation, it does not currently have any nuclear installations. Thus, Northern Ireland has been sighted on the proposals but not closely involved in their development.

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Confidentiality and data protection

1.10. Information provided in response to this informal consultation, including personal information, may be subject to publication or disclosure in accordance with the access to information legislation (primarily the Freedom of Information Act 2000, the Data Protection Act 1998 and the Environmental Information Regulations 2004).

1.11. If you want information that you provide to be treated as confidential please say so clearly in writing when you send your response. It would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded by us as a confidentiality request.

1.12. When the informal consultation period ends, we may publish or make public any information or evidence submitted. If it is referenced in a document for example, this would only be at an organisation level and would not include people's personal names, addresses or other contact details.

Further consultation

1.13. Having considered responses to this informal discussion paper, if the UK Government decides to take forward the proposals, BEIS would expect to publish a formal public consultation in early 2017.

Introduction

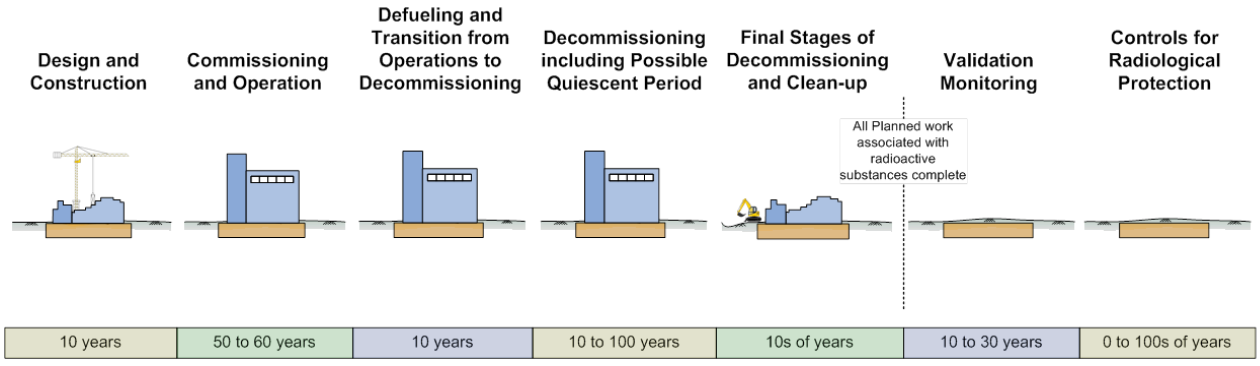
Status of nuclear decommissioning in the UK

1.14. There are 37 licensed nuclear sites located across England, Wales and Scotland, each comprising one or more nuclear facilities. A subset of these sites (17 sites including Sellafield) have been designated by UK Government to the Nuclear Decommissioning Authority (NDA) for decommissioning and clean-up. Other sites to be decommissioned in the future include the operational nuclear power stations owned by the private sector, such as the nuclear power stations owned by EDF Energy and other installations in the nuclear fuel cycle, defence, pharmaceutical, research and waste treatment sectors. There is also the potential for new nuclear facilities to be built in England and Wales which would in turn need to be decommissioned at some future date.

1.15. Many of the existing nuclear facilities are currently undergoing various stages of decommissioning which follow the end of the operational phase on a site. Decommissioning and clean-up is a staged process (see Figure 1), the final stages of which typically involve the remediation of land and final dismantling and demolition of redundant buildings, such that a suitable site end state is achieved.

1.16. During the final stages of decommissioning and clean-up significant volumes of waste can be generated. Most of the waste volume is ‘conventional waste’ in the form of rubble, concrete, brick, soil, drains and pipelines as buildings and structures are demolished, and the site cleaned up. However, a small percentage of this waste is radioactive; mostly Low Level Waste (LLW) and Very Low Level Waste (VLLW). The volume of waste generated depends heavily on the selected level of clean-up.

Figure 1: Nuclear power station lifecycle



1.17. UK Government policy[3] (relevant to all existing and new UK nuclear facilities) states that the "objective of decommissioning is to remove the hazard the facility poses progressively, giving due regard to security considerations, the safety of workers and the general public and protecting the environment, while in the longer term reducing the number of sites and acreage of land which remain under regulatory control". Amongst other things, the policy notes that decommissioning should be carried out as soon as is reasonably practicable, in a transparent manner, taking account of the views of stakeholders and any proposed future use of the site. UK Government policy also recognises the importance of site optimisation and states that operators should establish an optimised decommissioning programme with the objective of getting "the best solution overall, taking into account the needs of the environment and the safety of workers and the local community".

1.18. Optimising the level of clean-up requires that people's exposure to radiation is kept as low as reasonably achievable, taking account of environmental, societal and economic factors[4]. In other words, optimisation of decommissioning and clean-up requires that the many benefits and detriments are balanced in an attempt to deliver the greatest net benefit.

1.19. Aligned with UK Government policy, the NDA's strategy[5] notes that it has worked with the regulators to explore ways in which the final stages of decommissioning and clean-up might be optimised, in particular, to explore how the regulatory regime might allow a range of potential end states to be considered.

1.20. Whilst this work has involved the NDA, the proposals and their potential implications are relevant to other parts of the nuclear industry, for example, the operational nuclear power stations owned by EDF Energy when they enter the decommissioning phase in future decades. It also has the potential to impact on future planning for nuclear new build (in particular the provision of suitable funds for decommissioning and clean-up).

1.21. This paper summarises the proposals that have resulted from this work. It describes:

- the current regulatory arrangements that apply and the implications and consequences if they continue to apply as now;
- the proposal for changes to improve current regulatory arrangements, and the potential benefits and downside of any such changes; and
- Government's views on developing and implementing the proposals.

[3] Statement of the UK Government and devolved administrations' policy on the decommissioning of nuclear facilities, 2004: https://www.gov.uk/government/publications/the-decommissioning-of-the-uk-nuclear-industrys-facilities

[4] This is a fundamental radiological protection principle to which the UK Government is committed as part of its Basic Safety Standards Directive obligations.

[5] NDA Strategy, April 2016: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/512836/Nuclear_Decommissioning_Authority_Strategy_effective_from_April_2016.pdf

1.22. The proposals are consistent with the radiological public protection standards established by Public Health England which are aligned with international standards. Therefore, the UK Government is minded to agree with the proposals. However, UK Government would first like to seek early views from stakeholders to ensure any proposals taken forward are suitably well informed for the formal public consultation that will follow next year. This paper provides a basis for discussion as part of such engagement.

Current situation and its implications

Regulating nuclear decommissioning and clean-up

1.23. The Office for Nuclear Regulation (ONR) regulates nuclear and conventional safety and security at nuclear licensed sites and the transportation of radioactive material by road and rail off site[6]. The ONR regulates the site primarily via the nuclear site licence granted under the Nuclear Installations Act 1965 (NIA65), and also under the Health and Safety at Work etc. Act 1974 (HSWA) for conventional health and safety issues and the Nuclear Industries Security Regulations 2003. The relevant environment agency regulates environmental protection, with their main responsibility being the regulation of radioactive waste disposals on or from the site, so as to protect both the public and the environment (under the Environmental Permitting (England and Wales) Regulations 2010 (EPR) and the Radioactive Substances Act 1993 (RSA) in Scotland). Issues of development control are a matter for the relevant planning authority.

1.24. The protection of the public and workers from hazards arising from activities on nuclear sites is the responsibility of the licensee who is subject to high levels of regulatory scrutiny by ONR. Regulation under the NIA65 is intended to ensure proper control by the licensee of such hazards, providing a stringent regime of regulation delivered by the ONR.

1.25. The nuclear site licensing regime in NIA65 fulfils two purposes: it makes provision for nuclear safety regulation, but also underpins the legal framework for nuclear third party liability in the UK[7]. The liability regime makes licensees responsible for nuclear occurrences on site, and requires licensees to take out insurance or provide other financial security. The period of time during which the licensee is subject to the requirements of the liability regime is described in NIA65 as the licensee's 'Period of Responsibility'. When ONR is satisfied that there has ceased to be any danger from ionising radiations from anything on the site, it has the power to end the licensee's Period of Responsibility.

1.26. The ONR and environment agencies work together to deliver a coordinated regime of regulation throughout the nuclear lifecycle. The completion of decommissioning and clean-up, and the cessation of a nuclear site operator's responsibilities, occurs only when the licence is revoked and the ONR is satisfied that the licensee's Period

[6] ONR does not regulate security at nuclear licensed sites owned by the Ministry of Defence, or the transport of nuclear material owned by the Ministry of Defence.

[7] The UK is a signatory to the Paris Convention on Third Party Liability in the Field of Nuclear Energy and the supplementary Brussels Convention. The Conventions establish an international framework for compensating victims of a nuclear incident and form one of the cornerstones of international nuclear liability law. The 'no danger' criterion is used by ONR as the basis for deciding when the licensee's 'period of responsibility' under the Conventions can be ended.

of Responsibility[8] under NIA65 is ended, and the relevant environment agency is content that the environmental permit (or authorisation, in Scotland) for the management of any radioactive substances can be surrendered (revoked, in Scotland).

1.27. Once nuclear activities at sites have ceased and all fuel and the bulk of the radioactive substances have been removed, the levels of hazard and risk associated with the site are significantly reduced. At some point, during the decommissioning and clean-up process, the hazards and risks associated with the site diminish to a point whereby they no longer warrant regulation by ONR in accordance with a nuclear site licence. At that point the focus of work on the site is on environmental remediation, land use control and conventional worker safety.

1.28. Regulation of the equivalent decommissioning and clean-up activities at non-nuclear industrial sites across the UK, including the final stage clean-up, is a matter for the relevant environment agency together with the relevant Health and Safety Executive. In such situations (including sites that may also have issues of residual radioactive and non-radioactive contamination) the environmental regulators seek to ensure, amongst other things, that the sites are returned to a satisfactory state taking account of a range of factors, which may include the suitability of the site for the next planned use of the land[9].

1.29. In contrast, at nuclear sites, irrespective of any reduction in hazard, the NIA65 continues to apply until the licensee has in practice demonstrated that 'there has ceased to be any danger from ionising radiations from anything on the site[10]' (sometimes referred to as the 'no danger' criterion). 'No danger' is achieved once the site is suitable for any reasonable foreseeable future use. This is well beyond the point at which a site warrants 'nuclear' regulation and leaves little room for optimisation. It typically translates into removing most, if not all, waste and residual contamination from the site for disposal or management elsewhere, irrespective of any other factors that may be relevant (which may include plans for any subsequent development on the site).

1.30. The 'no danger' wording for final site clean-up was originally chosen because detailed consideration had not yet been given to the point at which a nuclear installation undergoing decommissioning and clean-up was no longer required to be covered by nuclear third party liability provisions. There was also no suitable

[8] The "Period of Responsibility" is the period from the date a nuclear site licence is granted until the earliest of the date when:
(a) ONR provides written notice that there has ceased to be any danger from ionising radiations from anything on the site; or
(b) a new licence has been granted for the site; or
(c) the site is used or occupied by the Crown and no longer requires a licence.

[9] This can involve the return of a site to its original condition, the removal as far as is practical of any contamination to return the site to its original condition, or, where removal is not practical, treating or immobilising contamination, remedying any harm the contamination may have caused, and mitigating the effects of any harm.

[10] Under section 5(15)(a) of the NIA65 the licensee's period of responsibility will end once the ONR has given notice in writing to the licensee that in its opinion there has ceased to be any danger from ionising radiations from anything on the site.

alternative regulatory framework at that time. The continued obligations under the nuclear site licensing regime were, therefore, vital to ensuring regulatory control of the site until it was cleaned up and also for ensuring that responsibilities for nuclear third party liability were met.

1.31. Since this time other regimes for health and safety regulation, including the Health and Safety at Work Act, and the Ionising Radiation Regulations, have been established, together with regimes for environmental regulation (which include the EPR and RSA).

1.32. The environment agencies have recently consulted on their draft Guidance on the Requirements for Release of Nuclear Sites from Radioactive Substances Regulation (GRR)[11]. This GRR Guidance builds on lessons learned from the clean-up of non-nuclear sites and describes the environment agencies' requirements for optimising nuclear site end states and radioactive waste management (see Annex). This approach to nuclear site clean-up emphasises the importance of sustainable remediation, it aligns well with UK Government policy and is also reflected in recent international guidance[12].

Implications and consequences

1.33. In summary, the **implications** of continuing to regulate the final stages of decommissioning and clean-up at nuclear sites in accordance with the existing regulatory framework are that:

i. regulatory control under the NIA65 endures beyond the point at which it is needed; and

ii. the sites' final clean-up would be carried out to a greater extent than that sought by the UK Government decommissioning policy.

1.34. As a **consequence**:

a) the site continues to bear the 'nuclear' label, and the perception that nuclear hazards and risks remain even though they have long since been removed and the site is equivalent, in hazard and risk, to a non-nuclear industrial site undergoing clean-up;

b) the final stages of decommissioning and clean-up, dominated by issues of environmental remediation, continue to be regulated by specialist *nuclear*

[11] The GRR consultation document is available at https://consultation.sepa.org.uk/operations-portfolio/grr/user_uploads/2016_02_01-grr-published-consultation-document.pdf

[12] Strategic Considerations for the Sustainable Remediation of Nuclear Installations, NEA#7290, May 2016. Available at: http://www.oecd-nea.org/rwm/pubs/2016/7290-strategic-considerations.pdf

regulators (ONR) rather than specialist *environmental* regulators (the environment agencies);

c) the standards required for clean-up of nuclear sites are inconsistent with the requirements applicable to equivalent situations of radioactive contamination and risk in the clean-up of non-nuclear sites;

d) in cases where an optimum site end-state solution would not necessarily meet the current interpretation of the “no danger” criterion, there is unnecessary generation of radioactive waste, requiring transporting off site. This in turn leads to additional environmental permitted (or authorised) radioactive waste disposal facilities being required. Moreover, this could mean that other materials have to be imported onto the site for infilling of voids, in situations where waste materials being removed from the site could potentially be used for this same purpose;

e) the current legal framework leads to dual-regulation of certain issues on nuclear sites e.g. land quality management where ONR has responsibility for radiological land contamination and the environment agencies for non-radiological contamination, etc. Whilst potential conflicts between the regulators are managed through their joint working arrangements, this has the potential to lead to additional work by licensees;

f) where an engineered disposal facility is required, operators are inclined to build these next to the nuclear licensed site (typically on greenfield land) rather than within the existing site so that these off-site facilities are regulated under the relevant environmental protection regime rather than the existing nuclear site licence.

The Proposals for Change

1.35. The UK Government asked regulators and the NDA to consider how the regulatory framework for the final stages of decommissioning and clean-up could be improved on licensed nuclear sites.

1.36. Together, the regulators and the NDA proposed that legislation be amended such that ***ONR relinquishes regulation of a site once content that it is no longer needed.*** Such a site would, in effect, no longer be a 'nuclear' site and would therefore be released from 'nuclear' regulation by ONR. The health and safety of any work activities on the site would then be regulated by the HSE. Remaining environmental issues (e.g. land contamination and waste management) would continue to be regulated by the relevant environment agency. The Annex provides more detail about the approach that would be taken by the environment agencies to regulate final site clean-up. Development control relating to changes in land use and any planning permissions for waste disposal would continue to be a matter for the relevant local planning authority.

1.37. The proposals would:

- result in the final stages of decommissioning and clean-up being regulated under the existing environmental and health and safety legislation that applies to radioactive and non-radioactive substances at all non-nuclear sites; and
- enable the optimisation of both site end states and waste management.

1.38. A number of legislative and other changes would be required to effect this. The primary change would be to amend the NIA65 to enable the Period of Responsibility to end when a site has been decommissioned to the extent that any residual hazards and risks arising from the site are sufficiently low to warrant this. ONR would also consider other criteria that may be relevant prior to revoking the nuclear site licence.

1.39. The UK Government is mindful of the sensitivities associated with nuclear site activities and the fact that concerns may exist about the status of the site and the veracity of its clean-up long after the need for any specific regulatory controls has gone. Therefore, the proposals would also seek to strengthen the requirements for the provision and keeping of relevant information relating to site clean-up, once the nuclear site licence has been revoked, and to provide a means for the relevant planning authority to have access to the advice of the relevant environment agency in considering any future developments at such sites.

1.40. None of the proposals would involve the relevant environment agency passing on any of their regulatory remit for environmental protection and improvement to the local authority. Also, the proposals would not amend the environmental impact assessment and consenting under the Nuclear Reactors (Environmental Impact for Decommissioning) Regulations 1999.

1.41. Implementing these proposals would primarily involve changes to the NIA65, which is reserved legislation (i.e. UK wide) and, therefore, a matter for the UK

Government. However, it is expected that there would need to be small consequential changes to other regulatory regimes, including some devolved policy areas. For example, potential amendments to environmental legislation to strengthen the transfer of records and information to the local planning authority following site clean-up. The UK Government has consulted with the Devolved Administrations during the development of the proposals and will continue to do so as the proposals are taken forward.

1.42. The proposals will not change the fact that to succeed, optimisation requires good communication, both within the site operator's own organisation and with supplier organisations, as well as with the regulators and members of the public, especially the local community.

What are the outcomes and benefits of the proposals for change?

1.43. By regulating the final stages of decommissioning and clean-up under existing environmental and health and safety legislation, this would:

- eliminate the potential for dual regulation during the final stages of decommissioning and clean-up; and
- ensure that a single set of standards apply to final site clean-up.

1.44. Changing the legislation will also allow the site operators to work with their stakeholders to consider and compare a range of end states depending on the particular issues at the site, and so determine the optimal approach on a site-by-site basis.

1.45. This should yield a wide range of benefits. Of particular interest is the potential for avoiding unnecessary remediation work thereby:

- enabling earlier re-use of sites;
- avoiding unnecessary generation of waste (thus, preserving capacity at national waste repositories vital for waste that requires that level of control)[13]; and
- significantly reducing the cost of clean-up which could be re-invested for other benefits.

1.46. There may be a range of other benefits, including: a net reduction in regulatory effort; reduced transportation of waste off site to waste repositories; avoidance of construction of new off-site disposal facilities; reduced risk to workers and reduced extraction and transportation of clean material on to site to fill voids. These benefits will be assessed in more detail as work on the proposals continues.

[13] Current UK radioactive waste inventory estimates waste volumes of approximately 4.5M m^3 arising predominantly from the decommissioning and clean-up of existing nuclear legacy sites. This figure does not include potential volumes from site remediation. Existing UK disposal capacity is circa 1.5M m^3. The UK inventory forecast does not include much of the waste that might arise from management of land contamination. Estimates however for Sellafield alone indicate that this could generate 13M m^3.

Is there any downside to the proposals?

1.47. The proposals are intended to enable site operators to optimise the clean-up of their sites and associated waste management. This might result in proposals to leave some residual radioactive contamination, including buried structures, on the site. It is possible that local communities may be concerned that this would mean the site being left in an unacceptable or hazardous state.

1.48. This would not be the case. The UK Government would not proceed with the changes discussed here if they were not consistent with the radiological protection standards for members of the public established by Public Health England, which are aligned with international standards.

1.49. Any proposals by a site operator to leave residual contamination (whether radioactive or non-radioactive) at the site, or to undertake any disposal of radioactive waste at the site, would be regulated by the relevant environment agency until such time a permit (or authorisation) is no longer needed. The relevant environment agency would need to be satisfied that the plans represent the optimum proposals for waste management, and that the long-term safety of people and environmental protection has been demonstrated by means of a site wide environmental safety case (see Annex for more details).

1.50. The paramount consideration in the assessment would be the safety of the public, the workers and the environment, taking into account the relevant regulatory standards for their long-term protection. Any proposal will need to demonstrate that human health and the environment will be protected. The relevant environment agency would expect to see evidence that the site operator had engaged meaningfully with the local community prior to submitting its plans and requesting any permission for waste disposal, and would take note of the views of the community when assessing the request.

1.51. Similarly, existing conventional health and safety legislation would continue to apply as would the requirements of the current land use planning regime. The suitability of the site for development or for a new use would require consideration by the local planning authority in accordance with the relevant Town and Country Planning legislation.

Why adopt the proposals now?

1.52. Whilst the proposals relate to the regulation of the final stages of decommissioning and clean-up, a number of nuclear site operators need to make decisions now about the end states of their sites. For example at Winfrith and Dounreay, site operators are aiming to complete decommissioning and clean-up to enable the sites to reach a quiescent state by 2022/23 and between 2030 and 2033 respectively.

1.53. At other sites, current work is focused on delivering the appropriate preparatory works needed well before final clean-up, for example as part of preparations for quiescence at Magnox sites. The current plan is for all Magnox sites to enter their quiescent state by the end of 2029.

1.54. It is, therefore, timely to consider the proposals now in order that, if deemed suitable, the benefits can influence work at existing sites without undue delay to current decommissioning and clean-up programmes.

Government’s view and next steps

1.55. Having identified this opportunity, to improve current arrangements that apply to the regulation of the final stages of nuclear site decommissioning and clean-up, the UK Government is now considering how the proposals could be implemented. The UK Government appreciates the time and effort invested in the work to date by the ONR, the Environment Agency, SEPA, NRW, the HSE and the NDA.

1.56. In light of the nature of the changes the UK Government believes that stakeholder engagement and support will be fundamental. The UK Government is keen to both develop proposals in consultation with stakeholders and to test the proposals with stakeholders as they develop. This will be both through informal consultation, such as this discussion paper, and formal public consultation if specific proposals are brought forward. There has already been some limited engagement with stakeholders, discussing ideas for change and potential regulatory approaches at workshops and meetings. This engagement will continue, for example, through further workshops with interested stakeholders (such as representatives of local communities, nuclear operators, nuclear liability owners, local planning authorities, NGOs and members of the public) later this year.

1.57. Alongside this, UK Government is also keen to learn lessons from three ‘lead and learn’ NDA sites (Winfrith, Dounreay and Trawsfynydd). These sites are at various stages of decommissioning and are currently considering what a more flexible approach might mean for each of their sites. As well as helping to inform thinking on any revised regime, this work should also ensure that the sites are ready to adopt any revised approach, sooner rather than later, should the proposals for change be implemented, thereby minimising the risk of delays to existing decommissioning and clean-up programmes.

1.58. Any early lessons learned through the ‘lead and learn’ sites and other engagement activities will be incorporated within the development of the proposals.

Questions for stakeholders to consider

1.59. As discussed in this document, there does appear to be an opportunity to optimise the current regulatory regime for the final stages of decommissioning and clean-up. The UK Government is keen to test our proposals with interested stakeholders at an early stage to inform the development of proposals.

1.60. The UK Government would welcome any views on the issues set out in this paper, and, in particular, responses to the following questions:

- Do you agree that the UK Government proposals set out in this paper should enable a more flexible approach to nuclear site clean-up that takes account of a range of possible site end states and opportunities to optimise waste management? If not, why not?
- What should the UK Government be mindful of when developing proposals to implement the changes discussed in this paper?
- Do you agree that legislative changes are likely to be needed to realise the opportunity set out in this paper? If not, what more could be done under the existing regulatory regime?
- What other changes could be made to realise the opportunity set out here?

1.61. Section 1.9 of this paper provides information on ‘how to respond’ should you wish to.

Annex: Environment Agencies' guidance on nuclear site clean-up

1.62. The Environment Agency, SEPA and NRW have developed and consulted on draft guidance on their requirements and expectations for cleaning up a nuclear site to the point where controls on radioactive substances (by means of a Radioactive Substances Permit or Authorisation) are no longer needed. They refer to this work as the Guidance on the Requirements for Release of Nuclear Sites from Radioactive Substances Regulation (GRR)[14]. The GRR document describes what the operator of a nuclear site needs to do before the site can be released from radioactive substances regulation, in terms of the condition of the site to be achieved and the process by which the site is brought to that condition. It adopts a principles-based approach and more detailed requirements describing how the objective and principles should be met.

1.63. The GRR:

- requires site operators to develop optimised solutions for clean-up and associated waste management;
- allows site operators to consider a range of site end-states depending on the particular issues at the site and so to determine the optimal approach on a site-by-site basis;
- defines the clean-up and radiological protection standards for the public and the environment now and in the future; and
- requires compliance to be demonstrated through a site wide environmental safety case.

1.64. If site end states were determined with reference to the requirements of GRR, rather than the NIA65, this would then enable consideration of how site clean-up and waste management arrangements should be optimised. The extent of clean-up of radioactivity would probably vary from nuclear site to nuclear site depending on particular local circumstances.

1.65. For some sites, this might mean clean-up equivalent to a state suitable for any future use, whilst for others it may involve leaving some residual contamination on site thereby limiting the range of potential uses for a period of up to 300 years. At other sites it may also accommodate the disposal of radioactive waste at the site (e.g. in-situ disposal of radioactively contaminated pipework, or disposal of waste into basements or other voids on the site). Any such proposal would need to demonstrate to the satisfaction of the relevant environment agency that it represents the optimal solution for the site, and that the waste will be managed

[14] The GRR consultation document is available at https://consultation.sepa.org.uk/operations-portfolio/grr/user_uploads/2016_02_01-grr-published-consultation-document.pdf

safely (in accordance with a site wide environmental safety case). Regulation by the relevant environment agency would remain in place until such time that it can be demonstrated that the standards set out in the GRR have been met.

What is Optimisation?

1.66. The GRR says that, in addition to meeting the radiological protection standards, the nuclear site operator should bring the site to a condition at which it can be released from radioactive substances regulation, by means of a process of optimisation. Optimisation is about finding the best way to bring the site to a condition such that the radiological risks to individual members of the public and the population as a whole are kept as low as reasonably achievable (see the GRR for more information). Optimisation is one of the fundamental principles of radiological protection.

How to achieve Optimisation

1.67. Optimisation requires both the site operator and the regulator to make value judgements as to what is optimised at the time when relevant clean-up actions and decisions are taken. Therefore, the GRR is not prescriptive but does require that the relevant environment agency takes into account economic and societal factors and the need to manage radiological risks to other living organisms and any associated non-radiological hazards when they decide whether the final site condition is the optimum one.

1.68. Therefore, optimisation should seek to keep the radiological exposure of people as low as possible, consistent with keeping the detriments (environmental, societal, economic, etc.) of managing that exposure at acceptable levels.

1.69. This consideration of many factors means that a process of optimisation should ensure a suitably low level of risk from radiological exposure, but does not necessarily require the lowest possible risk. Applying optimisation to nuclear site decommissioning and clean-up should ensure that radioactive contamination and waste are managed in a way that is safe, but may not necessarily lead to all radioactivity being removed from a site.

1.70. Finally the 'optimal' approach to delivering the site end state and managing waste must be *demonstrably* safe. This requires a suitable site-wide environmental safety case to be presented to the satisfaction of the relevant environment agency, taking account of the site setting and characteristics, and all radioactive waste and/or contamination still remaining on or adjacent to a site.

1.71. To identify the best way forward, the environment agencies expect the site operator to carry out options studies where there are choices to be made from significantly different alternatives. The operator should present the results to the regulator and make them publicly available. The studies will inform the operator's decisions.

1.72. In these option studies, the operator should consider in relation to the management of the generation and disposal of waste:

- the extent and manner of decommissioning and clean-up;
- the arrangements to manage radioactive and other waste;
- whether wastes are to be disposed of on site or consigned for disposal elsewhere; and,
- the effort and cost of retrieving, transporting and disposing radioactive waste off-site.

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