

## RESPONSE FROM THE COMMITTEE ON RADIOACTIVE WASTE MANAGEMENT TO THE GOVERNMENT CONSULTATION ON THE DRAFT NATIONAL POLICY STATEMENTS FOR ENERGY INFRASTRUCTURE

### INTRODUCTION

1. This response is from the Committee on Radioactive Waste Management (CoRWM). Its scope is limited to those aspects of the draft National Policy Statement (NPS) suite of documents that deal with the management, including the disposal, of higher activity radioactive wastes (HAW) from new nuclear power stations (DECC, 2009a-e). New build HAW is taken to include operational and decommissioning intermediate level wastes (ILW) and spent fuel.
2. CoRWM's Terms of Reference are to

*“provide independent scrutiny and advice to UK Government and devolved administration Ministers on the long-term management, including storage and disposal, of radioactive waste. CoRWM's primary task is to provide independent scrutiny on the Government's and Nuclear Decommissioning Authority (NDA) proposals, plans and programmes to deliver geological disposal, together with robust interim storage, as the long-term management option for the UK's higher activity wastes.”*
3. CoRWM's position on new build wastes is given in full in a recent statement (CoRWM doc. 2749). The Committee is neither for nor against nuclear new build. Its work on new build wastes consists of carrying out scrutiny of and providing advice on:
  - consideration of waste issues in the public assessment process for new build power stations
  - formulation of plans to ensure that, if new build wastes are created, they are safely and securely managed
  - prevention and, where that is not possible, minimisation of adverse impacts on the management of existing and committed wastes
  - maintenance of public confidence in plans for the long-term management of new build wastes, in addition to existing and committed wastes.
4. CoRWM's response to the consultation deals only with questions that are within its remit. It does not deal with questions about the “designation” of the draft Nuclear NPS (question 16), about the need and urgency for new nuclear power stations (question 18) or about specific sites for new nuclear power stations (questions 21 and 22).
5. The response begins with general comments. These are followed by responses to consultation questions 19, 17, 20, 23, 24, 25 and 26.
6. CoRWM's response draws on some material not contained or referenced in the draft NPS suite of documents. This includes reports produced by the regulators during their Generic Design Assessment (GDA) (HSE, 2009a-f) and material submitted to us by stakeholders (CoRWM doc. 2755). The response also takes into account information received during CoRWM's discussions with regulators and prospective reactor vendors and operators about new build wastes (CoRWM docs. 2746, 2747, 2764, 2765, 2767).
7. CoRWM has not consulted its stakeholders or the public about any draft of this response document. This is because these organisations and individuals are themselves able to respond to the draft NPS consultation and by this means express their views directly to

Government. CoRWM has formulated its response independently and the views expressed in it are entirely the Committee's own.

8. Annex A contains references. A glossary of terms and acronyms is given in Annex B. This is included so as to make this response a self-contained document and because CoRWM uses some terms in a slightly different way to the Department of Energy and Climate Change (DECC) in the draft NPS documents.

## **GENERAL COMMENTS**

9. The suite of documents produced for the consultation is extensive and some of the documents are complex. The suite does not seem to have been devised and written to facilitate comment by a wide range of stakeholders. It would have been better if the Government had produced one comprehensive document describing the relevant features of nuclear power stations, which is then referred to in other documents. Instead, material about nuclear power stations and their radioactive wastes is scattered throughout several documents and their annexes.

## **QUESTION 19**

### ***The Question***

*Do you agree with the Government's preliminary conclusion that effective arrangements exist or will exist to manage and dispose of waste that will be produced by new nuclear power stations in the UK?*

### ***CoRWM's Response***

10. CoRWM agrees that some arrangements exist that would be effective for the management of HAW from new nuclear power stations. For example, the policy and regulatory frameworks for the management of all HAW largely exist and there is technology available for the conditioning, packaging and storage of ILW.
11. Whether there will be effective arrangements for all the steps in the management, including the disposal, of new build HAW is a matter of judgement. It is for the Government to make this judgement, based on the information available to it.
12. CoRWM considers that the Government should take into account when making this judgement that, while the current UK process for siting a geological disposal facility (GDF) for HAW is sound, it is at an early stage. Its success depends on finding a combination (or combinations if more than one GDF is needed) of a willing host community and a site that is technically suitable to hold enough HAW. At present, it is uncertain whether the appropriate combination (or combinations) of community and site can be found in this country. This uncertainty applies to existing and committed HAW, as well as to new build HAW, and is likely to persist for many years.
13. In addition, CoRWM considers that the Government should recognise the need for optimisation of the management, including the disposal, of new build HAW. To meet legal and regulatory requirements, it is necessary for prospective operators of new nuclear power stations, with the assistance of NDA, to identify, assess and compare options for the management of new build spent fuel, including the design and location of stores, the storage period and a range of possible geological disposal concepts.
14. CoRWM also considers that it is essential for the public to have confidence in the management of new build HAW. The need for public confidence is being taken into account in the implementation of geological disposal. To date, insufficient attention has

been paid to it in planning for storage of new build spent fuel. This needs to be rectified in future, particularly by prospective operators of new nuclear power stations.

15. CoRWM notes the Government commitment (para. 3.8.22 in DECC, 2009b) to keep arrangements for managing and disposing of new build HAW under review and to revisit its conclusion about the effectiveness of these arrangements if there is new evidence that provides grounds for doing so.

### **CoRWM's Reasoning**

16. Reasons are given separately for the various stages in the management of spent fuel and ILW.

#### *Spent Fuel – Disposal*

17. It is assumed in the draft NPS documents that spent fuel from new nuclear power stations will be disposed of by emplacement in a GDF. In order to establish a GDF it is necessary to find a site that is technically suitable in an area where the local community is willing to host a GDF. The current siting process in the Managing Radioactive Waste Safely (MRWS) programme is designed to achieve this combination of willing community and technically suitable site (Defra *et al.*, 2008). The process is sound but it is at an early stage (CoRWM doc. 2550).
18. Only one part of the country has expressed an interest in entering the siting process and it has not yet taken a "Decision to Participate". If and when it does so, there is no guarantee that a technically suitable site can be found in the area, either for a GDF to hold existing and committed HAW and new build HAW, or for two or more GDFs each of which would hold some of these wastes. Surface-based investigations must be carried out to identify potentially suitable sites. If one or more such sites are found, it will only be after underground investigations that will take many years that a decision can be taken as to whether to construct a GDF (or GDFs) (CoRWM doc. 2543).
19. Government has encouraged other parts of the country to express an interest in entering discussions about hosting a GDF but so far none has done so. It is important that Government demonstrates that it recognises, and can manage, the risk of the current siting process failing for any reason or at any stage (see also para. 78).
20. Compared to the uncertainties about siting a GDF, the technical uncertainties about whether new build spent fuel could be safely disposed of in any GDF are small. New build spent fuel will be similar in its physical and chemical characteristics, including its radioactive content, to spent fuel that has been and is being produced in a number of countries and for which geological disposal concepts have been developed. Enough safety assessment work has been carried out to be confident that there are several concepts, for different geological settings, that are viable (Baldwin *et al.*, 2008a, b).
21. The draft NPS documents make extensive reference to geological disposal work in Sweden and Finland. While these are useful examples, it is unwise to place too much reliance on them. Both countries have for many years focused on one disposal concept that is only relevant to a limited number of geological settings. This concept may not be the best one for potential UK sites or for this country's high level waste (HLW) and existing, committed and new build spent fuel. Once the siting process is further advanced, it will be necessary to develop and compare geological disposal concepts for UK HAW (CoRWM doc. 2550).
22. The Nuclear Decommissioning Authority (NDA) disposability assessments (NDA, 2009a, b) are based on only one geological disposal concept. For this reason, they add little to

studies carried out in other countries for disposal of spent fuel from existing and prospective new pressurised water reactors (PWRs). It would have been preferable to carry out a wider-ranging assessment of disposability in which several geological disposal concepts were considered.

23. It is also necessary to bear in mind that disposal in deep boreholes could be a viable option for new build spent fuel. CoRWM has already encouraged NDA to keep up to date with developments in deep borehole disposal and to reassess its viability and costs at intervals (CoRWM doc. 2550).
24. NDA's Radioactive Waste Management Directorate (RWMD) is the organisation that will implement geological disposal. It has made good progress since its formation and has recently become a prospective Site Licence Company (SLC). However, considerable further development is required before RWMD will be ready to become an actual SLC (EA *et al.*, 2009). In CoRWM's view, RWMD faces many challenges in progressing geological disposal from a science-based concept to an engineering project.

#### *Spent Fuel – Conditioning and Packaging for Disposal*

25. There are various options for conditioning and packaging ("encapsulation") of spent fuel for geological disposal. These involve canisters made of various materials, containing different quantities of spent fuel, with different filling materials. As with geological disposal concepts, it will be necessary to develop and compare options for UK spent fuels, including new build spent fuel. This need for optimisation of conditioning and packaging methods for spent fuel is not reflected adequately in the NPS documents.
26. There is uncertainty about where new build spent fuel would be encapsulated for disposal and by whom. For the regulators' GDA process, Westinghouse and EDF/AREVA (the Requesting Parties) are required to demonstrate that spent fuel could be encapsulated at each reactor site if necessary. However, the decision on where encapsulation will occur will be taken by reactor operators. It could occur at a central spent fuel store (see below) or, if RWMD agreed, at the site of a GDF (CoRWM doc. 2767).

#### *Spent Fuel – Storage*

27. It is intended that new build spent fuel will be stored for 10-20 years in ponds near the reactor buildings then moved to other facilities for further storage prior to disposal. No decisions have been taken as to the design of these longer term storage facilities (*e.g.* whether they will be wet or dry, whether they will be above or below ground). Various options are being considered for the location of these facilities, including a spent fuel store at each reactor site, stores at some reactor sites to hold the fuel from several reactors, and a central store to hold the fuel from all new build reactors. In the GDA process it is envisaged that no decisions will be taken on how and where spent fuel will be stored until after consent for reactor construction has been given and possibly not until after construction has started. It is possible that store designs will not be finalised until after reactors have begun operating (CoRWM doc. 2747).
28. It is also not known how long spent fuel will need to be stored for before disposal. NDA estimates of the storage time are 75-100 years after discharge from the reactor (NDA, 2009a, b). These estimates are based on one option for conditioning and packaging spent fuel and one geological disposal concept. NDA acknowledges that the storage period could be reduced by reducing the fuel burn-up or placing less fuel in each disposal canister. It also expresses its view that further R&D (on bentonite behaviour) may show that higher heat outputs per canister at the time of disposal are acceptable. However, there is inadequate recognition that other geological disposal concepts could entail much

shorter storage times (e.g. because backfilling is delayed until after spent fuel has cooled within a GDF or because an alternative to bentonite is used).

29. CoRWM has concluded that there is a need for a comparison of options for the management of new build spent fuel in which fuel burn-up, store design, store location, storage period and geological disposal concept are all considered. Ideally, the comparison would involve all the relevant stakeholders and would include factors such as the burden imposed on future generations by spent fuel storage. It should be carried out by the prospective operators of new nuclear power stations, with the involvement of RWMD.
30. Such a comparison would assist regulators to determine whether risks from spent fuel management will be as low as reasonably practicable. Although further work is about to begin related to optimisation of spent fuel management (CoRWM doc. 2767), at present there seem to be no plans to carry out an option comparison of the type CoRWM envisages (or comparisons, if one is needed for each new reactor type).
31. This comparison should take into account a range of geological disposal concepts for spent fuel but its results should not be used to choose between them. The optimisation of geological disposal, including comparisons of geological disposal concepts and GDF designs, is a matter for RWMD (CoRWM doc. 2550). It cannot begin until the GDF siting process is further advanced
32. CoRWM is aware that there are stakeholder concerns about a potential 9/11 style attack on a spent fuel store. It requested information from the Nuclear Installations Inspectorate (NII) and the Office of Civil Nuclear Security (OCNS) about the principles and standards they will apply in judging whether proposed store designs will adequately mitigate the consequences of a malicious attack involving a large commercial aircraft. The response is incorporated in a document that sets out CoRWM's understanding on the subject (CoRWM doc. 2740). The key point is that regulators will require a similar, high degree of protection for new spent fuel stores as they will for new reactors and fuel ponds.
33. CoRWM's understanding (CoRWM doc. 2767) is that applicants for development consent for new nuclear power stations will provide some clarification about where and how spent fuel will be stored when they consult local communities and other key groups, as they are required to do by the Planning Act 2008 before they submit applications to the Infrastructure Planning Commission (IPC). In CoRWM's view it is important that applicants provide as much clarification as is practicable before they finalise and submit their applications.
34. Clarification of spent fuel storage arrangements would make it simpler for applicants for development consent to prepare Environmental Impact Assessments (EIAs) and Habitats Regulations Assessments (HRAs) for new nuclear power stations. It would also benefit Local Authorities by providing them with more information to use in their Local Impact Reports for the IPC. In CoRWM's opinion, the longer the arrangements for spent fuel storage remain unclear, the more difficult it will be to gain public confidence that acceptable arrangements will be forthcoming.

#### *Spent Fuel – Reprocessing*

35. It is assumed in the draft NPS documents that new build spent fuel will not be reprocessed. While CoRWM understands the reasons for this assumption, it considers that it is important to recognise that policies and practices may change over the decades for which new build reactors will operate and spent fuel will be stored.

36. Reprocessing would create a number of different types of HAW, including various sorts of operational and decommissioning ILW, and HLW formed by vitrification of highly active liquor (or by immobilising this liquor in another way). There would also be HAW from the re-use of the plutonium and uranium generated by reprocessing, for example spent mixed oxide (MOX) fuel. Re-use could take place in the UK or in other countries.
37. Most of the HAW from reprocessing and re-use would require geological disposal. Spent fuel and HLW would require storage prior to disposal to allow them to cool. Many of the points made above about spent fuel disposal and storage are equally applicable to HAW from reprocessing and re-use.

#### *ILW – Disposal*

38. In operation PWRs produce relatively small volumes of ILW and most of this is short-lived, *i.e.* contains small quantities of radionuclides with half-lives greater than that of caesium-137 (30.2 years) (CoRWM docs. 2419, 2489). In much of the operational ILW produced by new PWRs the dominant radionuclide will be cobalt-60, which has a half-life of 5.27 years (CoRWM docs. 2765, 2767).
39. Much of the ILW from decommissioning PWRs is also short-lived. The activity of decommissioning ILW will be minimised by use of appropriate materials for reactor components (*e.g.* low cobalt steels) and by use of advanced decontamination techniques. This will allow many decommissioning wastes to be disposed of as low level radioactive wastes (LLW) or to be recycled as non-radioactive wastes (CoRWM docs. 2765, 2767).
40. All new build ILW could be disposed of in a GDF if one were available (NDA, 2009a, b). For short-lived ILW, near-surface disposal would also be a viable option. Short-lived operational ILW is routinely disposed of in near-surface facilities in many countries (*e.g.* the US, France, Japan, Finland, Sweden). Short-lived ILW from decommissioning PWRs has also been disposed of in this way (*e.g.* in the US). For ILW in which cobalt-60 is the dominant radionuclide, near-surface disposal could be preceded by decay storage, enabling the waste to be disposed of as LLW rather than ILW (CoRWM docs. 2765, 2767).
41. Near-surface disposal would be less costly than geological disposal. One option being considered at sites where there are Magnox or AGR stations is to establish near-surface facilities to take low level and very low level decommissioning wastes (*i.e.* LLW and VLLW). It might be feasible to extend such facilities to take short-lived ILW from new power stations constructed at such sites, either before or after it has decayed to LLW. Another possibility is that, if a new central LLW disposal facility is established to take over from the LLWR, this new facility could be designed to take new build LLW and short-lived ILW. The draft NPS documents make no mention of such possibilities.

#### *ILW – Conditioning, Packaging and Storage*

42. New build operational and decommissioning ILW is similar in many respects to existing and committed ILW. Conditioning and packaging methods in use or under consideration for existing and committed ILW in the UK could be used for new build ILW, as could methods developed in other countries. The methods used to condition and package new build ILW for near-surface disposal could differ from those used if waste is to be placed in a GDF.
43. Storage of new build operational ILW will take place at each reactor site. Initially wastes will be stored in raw form. If ILW has decayed to LLW by the time of conditioning and packaging, it could be sent to a near-surface disposal facility without further storage. Storage systems for ILW that has been conditioned and packaged for geological disposal

will be similar to those in use or under consideration for existing and committed ILW (CoRWM doc. 2500). If possible, most new build decommissioning ILW would be disposed of as soon as it is conditioned and packaged, which would avoid the need to construct any storage facilities specifically for it.

44. The regulators require detailed proposals for conditioning, packaging and storage of new build operational ILW to be available for assessment during the GDA process (CoRWM doc. 2747). These proposals will be based on the assumption that ILW is to be disposed of in a GDF. The conditioning, packaging and storage methods that are subsequently included in applications for nuclear site licences and environmental permits for new nuclear power stations may differ from these early proposals. There are also likely to be changes in conditioning and packaging methods during reactor operation, for example as a result of improved technology becoming available (CoRWM doc. 2767).

#### *Transport of HAW*

45. Spent fuel from existing reactors is routinely transported by road and rail in the UK and in other countries. There is also spent fuel transport by sea. There is essentially no transport of ILW in the UK but ILW is routinely transported from reactors to disposal facilities in other countries. It is thus not anticipated that transport of new build HAW would pose any significant new technical issues (CoRWM doc. 2764).
46. Logistical transport issues are covered in the NPS documents in the context of power station construction and delivery of fresh nuclear fuel. The logistics of transport of spent fuel and ILW from reactor sites to disposal facilities or, in the case of spent fuel, to regional or central storage facilities do not seem to be mentioned.

#### *Funding of HAW Management*

47. CoRWM is aware that there are to be public consultations in 2010 about funding arrangements for decommissioning and waste management for new nuclear power stations. It may respond to these consultations and reserves any comments it may have on funding until then.

#### *Public Confidence*

48. For arrangements for the management of HAW to be acceptable to the public they need to inspire public confidence. This is being taken into account in the Government and NDA programme to implement geological disposal, on which CoRWM has provided advice (CoRWM doc. 2550).
49. In CoRWM's view, the need to gain and maintain public confidence has not yet been given enough attention in the development of arrangements to store new build spent fuel prior to disposal. The lack of clarity about store designs and locations (paras 33 and 34) is one instance of this. Another is the implicit assumption in the NPS documents (and the GDA) that it would be acceptable for spent fuel to be stored on reactor sites for many decades after electricity generation has ceased and when there are essentially no direct benefits to the local community from the nuclear power station. The Committee considers that it is important that this deficiency is rectified. It notes that the responsibility for engendering public confidence in the arrangements for the storage of new build spent fuel now rests largely with the prospective operators of new nuclear power stations.

#### *Optimisation*

50. The term 'optimisation' is used here as a shorthand for all the principles that require risks to be reduced to the point where, on a balance of factors, further reductions would not be

worthwhile.<sup>1</sup> Optimisation has been a fundamental principle of radioactive waste management in the UK for many years (UK Government, 1995; RWPG, 2007). Its key requirement is that options for the management of radioactive wastes are identified, assessed and compared.

51. It is a deficiency of the draft NPS documents that they do not pay adequate attention to optimisation. CoRWM would have expected a demonstration that there will be effective arrangements for the management, including the disposal, of radioactive wastes to contain:

- a description of one option for each step in the management of ILW and spent fuel that is actually or potentially both technically achievable and publicly acceptable
- an indication that other options are available or will be developed
- a brief description of the processes that will be used to compare options, both for each step in the management of ILW and spent fuel and for the whole management system, including the means by which stakeholders will be involved in the comparisons.

52. The draft NPS documents focus on the first of the above items. Although there is some material on the second item, alternative options are not covered to a sufficient extent for each HAW management step. The third item is not covered at all. What is required is a commitment to the principle of optimisation and an outline of when and how optimisation will be carried out by the prospective operators of new nuclear power stations, with the involvement of NDA and overseen by the relevant regulators.

## **QUESTION 17**

### ***The Question***

*Does the draft Nuclear National Policy Statement provide the Infrastructure Planning Commission with the information it needs to reach a decision on whether or not to grant development consent?*

### ***CoRWM's Response***

53. The context for CoRWM's response is the statement in para. 3.8.20, page 25 of the draft nuclear NPS (DECC, 2009b) that:

*Having considered this issue, the Government is satisfied that effective arrangements will exist to manage and dispose of the waste that will be produced from new nuclear power stations. As a result the IPC need not consider this question.*

54. CoRWM agrees that the IPC should not revisit the question of whether the Government is right to be satisfied that effective arrangements will exist. That is the purpose of Question 19 in this consultation.

55. However, CoRWM notes that the IPC will inevitably have to consider some HAW management issues. There will be site-specific issues in the "project level" EIAs and HRAs that will be required when applications for development consent are submitted to the IPC (DECC, 2009d). In addition, the Committee considers that there are generic issues of which the IPC needs to be aware.

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<sup>1</sup> These principles include those of reducing risks to as low as reasonably achievable (ALARA) and of reducing risks so far as is reasonably practicable (SFAIRP) or, equivalently, to as low as reasonably practicable (ALARP). They also include the principles of choosing the best available techniques (BAT), the best practicable environmental option (BPEO) or the best practicable means (BPM) to achieve an objective or carry out an operation.

### **CoRWM's Reasoning**

56. The storage of spent fuel (paras. 27-34) will be an important site-specific issue for the IPC. As stated in the response to question 19 (para. 33), CoRWM considers that it is desirable that there is clarification about spent fuel storage arrangements before applications for development consent are made. If this is done, the IPC will be able to receive EIAs, HRAs and Local Impact Reports for new power stations that fully address spent fuel storage, including evidence to show that local communities have been adequately consulted about this issue.
57. The main generic issue of which the IPC needs to be aware is the status of the implementation of geological disposal, because this has implications for the length of time for which spent fuel will need to be stored. Another generic issue could be the location of plants to encapsulate spent fuel for disposal.

### **QUESTION 20**

#### **The Question**

*Does the draft Nuclear National Policy Statement appropriately cover the impacts of new nuclear power stations and potential options to mitigate those impacts?*

#### **CoRWM's Response**

58. CoRWM is of the view that the draft NPS should contain more information about the potential impacts of flooding caused by climate change and of aircraft crash on HAW management facilities.

#### **CoRWM's Reasoning**

59. The NPS does not distinguish adequately between reactor buildings, with their adjacent fuel storage ponds, and longer term spent fuel storage facilities. The possibility that there will be regional stores or a central store for spent fuel is mentioned but without assessing the impacts of such options and potential mitigation measures. The NPS does not mention at all the possibility of near-surface disposal of short-lived ILW at reactor sites and the possible impacts of this.
60. The text on flood risks in the draft nuclear NPS (Section 4.2, pages 32-34, DECC, 2009b) does not seem to be entirely consistent with that in the Appraisal of Sustainability (AoS) (DECC, 2009d). For example, the main text of the draft nuclear NPS does not mention the possible impacts (positive as well as negative) of flood protection at power station sites on flood protection for nearby areas. These impacts are the subject of a specific recommendation in the AoS (para. 7.2.63, page 119, DECC, 2009d).
61. For aircraft crash, mention is made of the need to revise the regulations on flight exclusion zones (SI 2007 No. 1929) to include new nuclear power stations. However, there are no references to where to find information about how regulators will ensure that the design of power stations and HAW management facilities will mitigate the consequences of aircraft crashes, whether accidental or malicious. As noted above (para. 32) potential 9/11 style attacks are of concern to stakeholders. The NPS should contain references to documents that describe the regulatory approach to mitigating their consequences by design.

## QUESTION 23

### **The Question**

*Do you agree with the findings from the Appraisal of Sustainability reports for the draft Nuclear National Policy Statement?*

### **CoRWM's Response**

62. CoRWM is of the view that the findings of the AoS for HAW are correct but incomplete.

### **CoRWM's Reasoning**

63. The AoS for spent fuel and ILW (DECC, 2009f) is inconsistent in its coverage of HAW management facilities. In the appraisal matrices for spent fuel, the possibility of storage at regional and central locations is mentioned for some types of effect but not others. Effects of disposal of spent fuel and ILW at a GDF (or GDFs) are assessed in some instances but not others. The possibility of near-surface disposal of short-lived ILW is not mentioned at all.

64. Overall, too much of the AoS material is left for inclusion in project level EIAs (and in the case of a GDF its SEA). There are strategic issues that should have been addressed in this AoS, particularly for storage of spent fuel.

65. CoRWM notes that the AoS recommends that the NPS should:

*suggest to the NDA that the effects of the additional volume of spent fuel and ILW from new nuclear power stations should be taken into account in their design and evaluation of a GDF, including transportation.*

66. This is not what is required. It is not merely the volume of HAW that matters and no decision has yet been taken as to whether there should be one GDF or more. There is a need for NDA to consider new build spent fuel and ILW in all its implementation work for geological disposal, so that the potential implications of including new build wastes are assessed at an early stage.

## QUESTION 24

### **The Question**

*Do you think that any findings from the Appraisal of Sustainability reports for the draft Nuclear National Policy Statement have not been taken account of properly in the draft Nuclear National Policy Statement?*

### **CoRWM's Response**

67. CoRWM considers that the AoS findings have been taken into account properly but notes that the AoS is not complete.

### **CoRWM's Reasoning**

68. See reasoning for Question 23.

## QUESTION 25

### **The Question**

*Do you have any comments on the Habitats Regulations Assessment reports for the draft Nuclear National Policy Statement?*

### **CoRWM's Response**

69. CoRWM acknowledges that a thorough Appropriate Assessment of the impacts on Natura 2000 sites has been carried out at a strategic level in relation to new nuclear power stations. It notes the conclusion that there are possible significant impacts for all of the ten prospective power station sites, hence the need to rely on Imperative Reasons of Overriding Public Interest (IROPI). It agrees that there is no need to consult the European Commission on the criteria for this decision. However, CoRWM has some concerns as to how conclusive an assessment can be when it is made at this stage. In particular it notes that it has not been possible to give full consideration to the possible impacts of storage facilities for spent fuel, because the locations and other details of these facilities are not yet finalised.

### **CoRWM's Reasoning**

70. The Government concludes that there are IROPI for as much as possible of the estimated 25GW generation capacity that is needed to be provided by nuclear power. It further concludes that it is necessary to include ten prospective sites in the NPS because (para. S4.36, DECC, 2009g):

*the inclusion of ten sites in the NPS will allow energy companies to fill a significant proportion of 25GW even if a number of sites fall at the project level, and that it is a sufficient number at this stage when balanced against the potential harm to European Sites and other factors like planning blight.*

71. As noted elsewhere in this response, all, some or none of the sites where new nuclear power stations are built may have facilities for storage of spent fuel prior to disposal. CoRWM considers that there may be further strategic issues to consider in an Appropriate Assessment once the locations of spent fuel storage facilities are known.

72. CoRWM considers that the NPS should explain clearly that the strategic Appropriate Assessment of the plan that has been carried out is not a substitute for, and is different from, the Appropriate Assessments that will be required at the project stage. The conclusion of a negative assessment for each site is a useful pointer for the IPC that an Appropriate Assessment will be necessary. The conclusion of IROPI may also be helpful to the IPC in its consideration of the impacts of the Appropriate Assessment but it would be useful to point out that a decision on whether a project is IROPI must be made in the light of considerations at the time of the application and circumstances may change by then.

## **QUESTION 26**

### **The Question**

*Do you have any comments on any aspect of the draft Nuclear National Policy Statement or its associated documents not covered by the previous questions?*

### **CoRWM's Response**

73. Our comments are as follows.

### **Impact of the NPS on the Long-Term Management of Existing and Committed HAW**

#### *Voluntarism Approach to Geological Disposal*

74. The draft nuclear NPS states that (para. 3.8.15, DECC, 2009b):

*The Government is committed to making the voluntarist and partnership approach to site selection work through the MRWS process. However, the Government recognises that it*

*has a responsibility to deal with long-term higher activity waste management and is committed to geological disposal as the technical solution, such that it will seek to develop alternative ways to implement that solution if the current framework, as set out in the MRWS White Paper, ultimately proves to be unsuccessful in the UK.*

75. The MRWS White Paper states (para. 6.5, Defra *et al*, 2008):

*In the event that at some point in the future, voluntarism and partnership does not look likely to work Government reserves the right to explore other approaches.*

76. The draft NPS statement carries a greater implication that, if the current approach fails, the Government will find some other way to implement geological disposal. This could raise the fear of imposition of a GDF, both in areas that have already submitted an Expression of Interest in entering discussions about hosting a GDF and in areas that may be thinking of doing so.

77. CoRWM wishes to emphasise to Government the importance of the voluntarist approach and to remind Government of the view expressed in CoRWM's 2009 report on geological disposal (para. 2.11, CoRWM doc. 2550):

*CoRWM considers that it would be helpful if Government were to restate its commitment to the voluntarism approach and to indicate that it would consult stakeholders before adopting any other approach.*

#### *Managing the Risks to the Implementation of Geological Disposal*

78. CoRWM considered the management of risks to the implementation of geological disposal in a 2009 report to Government (CoRWM doc. 2550). This was in the context of existing and committed wastes. The inclusion of new build wastes in the inventory for geological disposal may introduce new risks and makes it more important that the Government has, and is seen to have, appropriate risk management procedures.

#### *Integration of Arrangements for the Long-Term Management of Existing, Committed and New Build Higher Activity Wastes*

79. In the course of its work on new build HAW, CoRWM has reached the conclusion that there is a need for greater integration in planning for the long-term management of existing, committed and new build HAW. This need for more integration has already been mentioned for geological disposal (para. 66). Greater integration is also required in areas such as the storage and encapsulation of spent fuel, and consideration of near-surface disposal for short-lived ILW. In 2010-11, CoRWM plans to consider how this might be achieved, including whether there is a need for Government to clarify the remit and role of the NDA with respect to new build HAW.

#### *Co-Disposal*

80. CoRWM welcomes the various statements in the NPS documents that it recognises that more than one GDF may be needed to hold existing, committed and new build HAW.

81. CoRWM notes the statement that the MRWS site selection process is flexible enough to accommodate the situation where more than one GDF proves to be needed (para. 3.8.13, DECC, 2009b).

## ANNEX A

### REFERENCES

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**ANNEX B**

**GLOSSARY**

<b>Advanced gas cooled reactor (AGR)</b>	A UK designed, gas-cooled reactor with a graphite moderator. <i>[It uses enriched uranium oxide fuel with steel cladding and graphite sleeves. The primary coolant is carbon dioxide.]</i>
<b>ALARA</b>	as low as reasonably achievable <i>[A fundamental, international principle of radiological protection.]</i>
<b>ALARP</b>	as low as reasonably practicable <i>[A basic principle of health and safety regulation in the UK. ALARP and SFAIRP are taken to be equivalent for regulatory purposes.]</i>
<b>Appraisal of Sustainability (AoS)</b>	An appraisal required by the Planning Act 2008 of the likely social, economic and environmental effects of a National Policy Statement.
<b>Appropriate Assessment (AA)</b>	A stage in Habitats Regulation Assessment in which consideration is given to how adverse effects might be avoided or mitigated through alterations to the plan or project.
<b>BAT</b>	best available techniques <i>[A basic environmental protection principle in the European Union and other countries. Now used by the Environment Agency in place of BPEO and BPM in radioactive substances regulation.]</i>
<b>BPEO</b>	best practicable environmental option <i>[Until recently, a basic environmental protection principle used throughout the UK. Still used in Scotland and Northern Ireland.]</i>
<b>BPM</b>	best practicable means <i>[Until recently, a basic environmental protection principle used throughout the UK. Still used in Scotland and Northern Ireland.]</i>
<b>Co-disposal</b>	Generally, disposal of wastes with differing physical and chemical characteristics in the same facility. Now specifically used in the UK by Government, CoRWM and others to mean disposal of new build waste in the same facility as existing and “committed” waste. <i>[Often used in radioactive waste management literature to mean “co-location”.]</i>
<b>Co-location</b>	Disposal of “high level waste”, “intermediate level waste” and other types of “higher activity waste” in a combined “geological disposal facility” in which there are separate parts of the facility for the various types of waste. <i>[For example, there could be one part of the facility for intermediate level waste and another part for high level waste and “spent fuel”.]</i>
<b>Committed waste</b>	Radioactive waste that will arise in future from the operation or decommissioning of existing nuclear facilities. <i>[As distinct from existing waste, which already exists, and new build waste, which will only arise if new facilities are built.]</i>

<b>Conditioning</b>	Any process used to prepare waste for long-term storage and/or disposal. <i>[Usually by converting it into a suitable solid form e.g. incorporation in glass (vitrification), encapsulation in cement.]</i>
<b>CoRWM</b>	Committee on Radioactive Waste Management
<b>DECC</b>	Department of Energy and Climate Change
<b>Decision to Participate</b>	A decision by a community to participate in the geological disposal facility siting process, without commitment to eventually host a facility.
<b>Deep borehole disposal (DBD)</b>	Disposal of waste in boreholes more than 1000m deep.
<b>Defra</b>	Department for Environment, Food and Rural Affairs
<b>Development</b>	Progressive, systematic use of knowledge and understanding gained from research directed towards the production or improvement of materials, devices, systems or methods. <i>[Includes the design and development of processes.]</i>
<b>Disposal</b>	Emplacement of waste in an appropriate facility without the intention of retrieving it. <i>[Retrieval may be possible but if intended the appropriate term is "storage".]</i>
<b>Disposable</b>	A waste package is disposable if it can be safely removed from a store, transported to a disposal facility and emplaced in that facility, and if it will play its planned role in ensuring the post-closure safety of that facility.
<b>EA</b>	Environment Agency
<b>Encapsulation</b>	A process in which radioactive waste is physically enclosed in a material with the aim of preventing radionuclides from escaping. <i>[For spent fuel encapsulation is likely to entail placing the fuel in an inner canister that is then placed in an outer, disposal canister. The canisters could be made of different metals (e.g. cast iron for the inner canister and copper or steel for the outer canister) and might be filled with metal. For ILW encapsulation is a type of conditioning. The most commonly used encapsulants are types of cement; others include polymers.]</i>
<b>Environmental Impact Assessment (EIA)</b>	An assessment carried out under Town and Country Planning legislation of the environmental impacts of a proposed development.
<b>Environmental Permit</b>	A permit issued by the Environment Agency under the Environmental Permitting Regulations. <i>[When the Environmental Permitting Regulations 2010 come into force, Environmental Permits will replace registrations and authorisations under the Radioactive Substances Act 1993 in England and Wales.]</i>
<b>Expression of Interest</b>	A notification to Government by a community that it is interested in entering discussions about involvement in the geological disposal facility siting process, without commitment.

<b>Generic Design Assessment (GDA)</b>	The generic assessment being undertaken by the Health and Safety Executive and the Environment Agency of the suitability of new reactor designs for use in the UK.
<b>Geological disposal</b>	Generally, emplacement in the Earth's crust with no intent to retrieve. Used specifically in the MRWS programme to mean "disposal" of radioactive waste in an underground facility, where the geology (rock structure) provides a barrier against escape of radioactivity and where the depth, taken in the particular geological context, substantially protects the waste from disturbances arising at the surface. <i>[In the MRWS programme the minimum depth for "geological disposal" (also called "deep geological disposal") is taken to be about 200m.]</i>
<b>Geological disposal concept</b>	Any variant of geological disposal, including the use of a "mined repository", "deep boreholes" and more than one "geological disposal facility".
<b>Geological disposal facility (GDF)</b>	Any facility used for geological disposal. <i>[Includes mined repositories, natural caverns, disused man-made caverns or mines, and deep boreholes.]</i>
<b>Geological disposal facility design</b>	The detailed drawings and specifications that will allow construction of a "geological disposal facility". <i>[Includes nuclear, civil, mechanical, electrical, materials, chemical, geotechnical and geological engineering aspects.]</i>
<b>Geological repository</b>	See "mined repository".
<b>Habitats Regulations Assessment (HRA)</b>	The process of fulfilling the requirements of the European Habitats Directive and the UK Habitats Regulations.
<b>Higher activity waste (HAW)</b>	Radioactive waste with activity above the thresholds for low level waste (LLW), <i>i.e.</i> above 4 GBq/tonne alpha activity or above 12 GBq/tonne beta gamma activity. <i>[It is usually also taken to include LLW unsuitable for near-surface disposal.]</i>
<b>High level waste (HLW)</b>	Radioactive waste in which the temperature may rise significantly as a result of its radioactive content, so that this factor has to be taken into account in the design of waste storage or disposal facilities. <i>[In practice the term is only used in the UK for the nitric acid solutions arising from reprocessing spent fuels and for the vitrified form of the solutes in these solutions.]</i>
<b>Historic waste, historical waste</b>	See "legacy waste".
<b>Host community</b>	A community in which a geological disposal facility will be built. <i>[It is a community in a small geographically well-defined area, such as town or village, and includes the population of that area and the owners of the land.]</i>
<b>HSE</b>	Health and Safety Executive

<b>Immobilisation</b>	A conditioning process in which radioactive waste is chemically incorporated into a material so that radionuclides cannot move. [ <i>"Vitrification" and incorporation in ceramics are types of immobilisation processes.</i> ]
<b>Interim storage</b>	Storage of radioactive waste prior to implementing a final management step, such as "geological disposal".
<b>Intermediate level waste (ILW)</b>	Radioactive waste exceeding the upper activity boundaries for "low level waste" ( <i>i.e.</i> over 4 GBq/tonne alpha activity or 12 GBq/tonne beta gamma activity) but for which its heat output need not be taken into account in the design of storage or disposal facilities. [ <i>"Short-lived ILW" is the term used for ILW that contains mostly radionuclides with half-lives less than about 30 years and only trace quantities of radionuclides with longer half-lives. "Long-lived ILW" contains substantial quantities of radionuclides with half-lives longer than 30 years.</i> ]
<b>IPC</b>	Infrastructure Planning Commission
<b>IROPI</b>	Imperative Reasons of Overriding Public Interest [ <i>A concept in the Habitats Directive and Regulations. IROPI can be invoked to justify adopting a plan when no alternatives are available.</i> ]
<b>Legacy facility</b>	A nuclear facility constructed several decades ago where waste has been generated or stored.
<b>Legacy waste</b>	Radioactive waste that arose several decades ago. [ <i>A subset of existing waste; sometimes called "historic waste" or "historical waste". The term is usually reserved for wastes kept in, or that have arisen in, legacy facilities.</i> ]
<b>Low level waste (LLW)</b>	"Radioactive waste" with activity levels that do not exceed 4 GBq/tonne alpha activity or 12 GBq/tonne beta gamma activity. [ <i>Subsets of LLW include "very low level waste" (VLLW) and exempt waste (i.e. "radioactive waste" with activity levels below those in the various Exemption Orders made under the Radioactive Substances Act).</i> ]
<b>Low Level Waste Repository (LLWR)</b>	The UK national disposal facility for low level waste. [ <i>Located near the village of Drigg in Cumbria.</i> ]
<b>Magnox reactor</b>	A UK designed gas-cooled reactor with a graphite moderator. [ <i>It uses uranium metal fuel with a magnesium alloy cladding.</i> ]
<b>Mined repository</b>	A facility specifically excavated and constructed for the "geological disposal" of radioactive waste. [ <i>"Mined and engineered repository" is a more correct description. Most designs consist of shafts or adits leading to tunnels and vaults.</i> ]
<b>MOX</b>	mixed oxide fuel (a mixture of plutonium and uranium oxides)

<b>Natura 2000 sites</b>	A network of protected areas in the European Union that contain natural habitats and species of plants or animals that are rare, endangered or vulnerable. <i>[The name comes from the European Habitats Directive, which created the network. It was intended to symbolise the conservation of habitats and species for the year 2000 and the 21<sup>st</sup> century.]</i>
<b>NDA</b>	Nuclear Decommissioning Authority
<b>Near-surface disposal</b>	Disposal at or close to the surface of the Earth. <i>[Includes underground disposal in the Earth's crust at depths less than a few tens of metres, and emplacement in engineered structures at or just below ground level. Formerly called "shallow land burial" or emplacement in a "near surface repository".]</i>
<b>NII</b>	Nuclear Installations Inspectorate (the nuclear safety regulator, part of HSE)
<b>NPS</b>	National Policy Statement
<b>OCNS</b>	Office of Civil Nuclear Security (the nuclear security regulator, part of HSE)
<b>optimisation</b>	A process of showing that risks have been reduced to a level beyond which, on a balance of factors, no further reduction would be worthwhile. <i>[The optimisation principle encompasses ALARA, ALARP, BAT, BPEO, BPM and SFAIRP. In the radioactive waste management context it always implies a need to identify, assess and compare options for achieving an objective or carrying out an operation.]</i>
<b>Package</b>	See "Waste package".
<b>Packaging</b>	Placing waste into a container for long-term storage and/or disposal. <i>[In most cases this includes conditioning but sometimes waste is simply placed in containers, with or without compaction to reduce its volume.]</i>
<b>Pond</b>	A water-filled structure in which nuclear fuel is stored. <i>[Usually made of concrete, the water provides cooling and shielding.]</i>
<b>Pressurised water reactor (PWR)</b>	A nuclear reactor in which water is used as the coolant and moderator. <i>[The fuel is enriched uranium oxide with zircaloy cladding. PWRs operate above atmospheric pressure to prevent the water boiling. ]</i>
<b>Public</b>	People who have no particular interest in, and are not affected by, radioactive waste management. <i>[CoRWM distinguishes between "stakeholders" and the public.]</i>

<b>Radioactive waste</b>	<p>Radioactive waste is defined in the Radioactive Substances Act 1993. In essence it is any substance for which there is no further use and in which artificial radionuclides are present at any level and/or natural radionuclides are present above the levels given in Schedule 1 of the Act.</p> <p><i>[Note that spent fuels, plutonium and uranium are not radioactive wastes unless it has been decided that there is no further use for them and they are declared to be wastes. The Radioactive Substances Act definition of radioactive waste is under review and it is expected that a revised definition will be put in place in 2010.]</i></p>
<b>Radioactive waste management</b>	<p>All the activities involved in managing radioactive wastes.</p> <p><i>[Includes minimising arisings, all types of treatment (e.g. decontamination, sorting, segregation), "conditioning", "packaging" and "disposal".]</i></p>
<b>Raw waste</b>	<p>Waste that has not been conditioned.</p>
<b>Repository</b>	<p>A facility where waste is emplaced for disposal.</p> <p><i>[Often used as shorthand for "mined repository", but also used in other contexts, e.g. the UK's Low Level Waste Repository (LLWR).]</i></p>
<b>Requesting Parties</b>	<p>The companies that have requested that regulators include their reactor designs in the "Generic Design Assessment".</p> <p><i>[The Requesting Parties whose designs are currently being considered in the GDA are Westinghouse (the AP1000 design) and EDF/AREVA (the EPR design).]</i></p>
<b>Research</b>	<p>An investigation directed to the discovery of some fact or principle by a course of study or scientific enquiry.</p>
<b>RWMD</b>	<p>Radioactive Waste Management Directorate (of the Nuclear Decommissioning Authority)</p>
<b>RWPG</b>	<p>Radioactive Waste Policy Group</p> <p><i>[A group with members from government departments and regulators that advises on radioactive waste policy and corresponding regulatory processes and arrangements.]</i></p>
<b>Safety assessment</b>	<p>An assessment of whether a nuclear facility or operation is or, if particular actions are taken, will be safe.</p>
<b>Safety case</b>	<p>The complete set of arguments that demonstrates that a nuclear facility or operation is or, if particular actions are taken, will be safe.</p>
<b>Site Licence Company (SLC)</b>	<p>A company that runs an NDA site, under contract to the NDA, and holds the nuclear site licence.</p>
<b>SFAIRP</b>	<p>so far as is reasonably practicable</p> <p><i>[A basic principle of health and safety regulation in the UK. SFAIRP and ALARP are taken to be equivalent for regulatory purposes.]</i></p>
<b>Spent fuel</b>	<p>Fuel that has been used in a nuclear reactor and for which there is no further use as fuel.</p>

<b>Stakeholder</b>	<p>A person or organisation who has an interest in or is affected by radioactive waste management.</p> <p><i>[In the context of CoRWM's work, stakeholders include waste producers, regulators, non-governmental organisations, local authorities and communities near existing nuclear sites and potential disposal sites.]</i></p>
<b>Storage</b>	<p>Placing wastes or other materials in a facility with the intention of retrieving them at a later date.</p>
<b>Surface-based investigations</b>	<p>Investigations of a potential geological disposal site that are carried out from the surface, rather than underground.</p> <p><i>[For example, seismic investigations and boreholes.]</i></p>
<b>Very low level waste (VLLW)</b>	<p>Very low level radioactive waste (VLLW) is LLW that has radioactivity levels well below the maximum for the category. It can be disposed of with non-radioactive waste, rather than being placed in the Low Level Waste Repository or other specialised facility.</p> <p><i>[There are two types of VLLW: low volume and high volume. Low volume VLLW is radioactive waste that can be disposed of safely to an unspecified destination with municipal, commercial or industrial waste (so-called "dustbin disposal"). It has an activity not exceeding 400 kBq in any 0.1m<sup>3</sup> and no individual item in the waste should have an activity above 40 kBq. These levels are increased by a factor of ten for tritium or carbon-14 (i.e. 4 MBq in 0.1m<sup>3</sup> and 400 kBq per item, where the limits apply to tritium and carbon-14 taken together). High volume VLLW is radioactive waste that can only be disposed of to a specified landfill site. Its activity level must not exceed 4 MBq/tonne or 40 MBq/tonne for tritium.]</i></p>
<b>Vitrification</b>	<p>The process of converting wastes into a glass or glass-like form.</p>
<b>Voluntarism</b>	<p>An approach to siting geological disposal facilities that involves communities voluntarily expressing an interest in holding discussions with Government, then deciding whether to participate any further.</p>
<b>Waste package</b>	<p>A container and all its contents .</p> <p><i>[Includes the waste, any encapsulating material, any capping grout, etc.]</i></p>