

## **DECC CONSULTATIONS ON FUNDING NEW BUILD DECOMMISSIONING AND WASTE MANAGEMENT**

### **Marion Hill**

#### ***Introduction***

1. Two DECC consultations on funding decommissioning and waste management for new nuclear power stations started on 25 March 2010 and will end on 18 June 2010. CoRWM needed to decide at its April 2010 plenary meeting whether to respond to either or both consultations and, if it was going to respond, how the response or responses would be prepared.
2. The first draft of this paper was discussed at the April plenary meeting. It was updated after the meeting to form a record of the decision on whether to respond and the reasons for it.

#### ***The Consultations and the Issues they Raise***

3. The consultations are about:
  - the methodology to determine a Fixed Unit Price for waste disposal and updated cost estimates for nuclear decommissioning, waste management and waste disposal (DECC, 2010a)
  - the Financing of Nuclear Decommissioning and Waste Handling Regulations (DECC, 2010b).
4. The Government's proposals for the methodology for determining a Fixed Unit Price (FUP) for waste disposal, its updated cost estimates and the consultation questions are summarised in Annex A. The consultation document is quite complex and assumes some familiarity with the issues. Annex A presents the information in it in a slightly different order and with a little more background on some topics.
5. Based on Annex A, there seem to be a number of issues on which CoRWM could comment if it decided to respond to the consultations. These include:
  - Does the FUP methodology make adequate allowance for uncertainties about how and when new build spent fuel and intermediate level waste (ILW) will be disposed of? In particular, does it deal appropriately with:
    - uncertainties about geological setting and the design of a geological disposal facility (GDF)
    - whether there will need to be more than one GDF
    - the timing of GDF construction and of the emplacement of new build spent fuel and ILW
    - the fallback position if it does not prove to be possible to implement geological disposal in the UK
    - the possible near-surface disposal of much new build ILW?
  - Is the relationship between the funding mechanisms for geological disposal of new build wastes and for geological disposal of existing and committed wastes clear? In particular:

- is it correct that there is to be no cross-subsidy between geological disposal of new build wastes and geological disposal of existing and committed wastes?
  - if so, what is the status of the part of the FUP for new build wastes that represents a contribution to the fixed costs of a GDF?
  - will Government require payment for geological disposal of new build wastes before the date of transfer of title of and liability for those wastes from operators to Government?
- How are R&D and GDF design costs for new build wastes to be funded and by whom? (These costs are not in the FUP or the additional costs to be paid by operators to Government.)
6. The consultation on the Regulations is summarised in Annex B. It is much simpler than the FUP consultation and is specific to matters to be covered in Regulations to be made under the Energy Act 2008. An issue on which CoRWM might comment is the definition of the waste management actions to be taken during the generating lifetimes of new build stations that are to be funded in the same way as decommissioning (*i.e.* from the Fund that the operator must set up), rather than from operating revenues.

#### ***Points made in Discussion of the Issues***

7. Members noted at the April plenary meeting that the consultation document gives no details of the key assumptions and data that will be used in deriving the values of FUPs for spent fuel and ILW. In particular, the document contains very little information about the NDA RWMD Parametric Cost Model and the input data for the model are not provided or referenced. Without this information and data it is not possible to judge whether the Monte Carlo calculations give an adequate indication of the possible range of costs of geological disposal. There are also no details of the assumptions and data that would be used in calculating the contingency allowance portion of the FUPs.
8. It is unclear whether the Government intention is that funding of geological disposal of existing and committed wastes will rely on a contribution from new build. If it did, this could introduce additional risks for GDF funding and might be seen as contrary to Government commitments to deal with its nuclear liabilities.
9. There seems to be nothing in the proposed funding arrangements that would cover the situation of failing to implement geological disposal. In such a case it would be necessary to fund long-term storage but there would be no financial provision for this.

#### ***Responding to the Consultations***

10. The Committee agreed at its April plenary meeting that it did not wish to respond formally to the consultations. However, it could comment on the issues the consultations raised. Before doing so, the Committee would need to hold discussions with DECC (to make sure its understanding of the various issues was correct) and with RWMD (to obtain details of its model and input data). The Committee might also wish to have input from an independent expert (or experts) on financial aspects. There might also be merit in talking

to other stakeholders to inform itself about their views (*e.g.* regulators, prospective new build operators).

11. Arranging meetings would take time. It would also be preferable to discuss a draft of CoRWM's proposed comments at a plenary meeting. This would mean that comments would not be ready to send to DECC until the end of August 2010. The secretariat checked with DECC whether this would be too late for the comments to be taken into account in finalising the FUP methodology and the regulations. The response was that it would be too late because DECC planned to publish the Government response to the points raised by consultees in late July 2010. The Committee therefore decided not to prepare any comments on the issues raised in the consultations.

## **References**

BERR, 2008a. *The Energy Bill 2008. Consultation on Funded Decommissioning Programme Guidance for New Nuclear Power Stations*. February 2008.

BERR, 2008b. *Meeting the Energy Challenge. A White Paper on Nuclear Power*. Cm 7296. January 2008.

DECC, 2010a. *Consultation on a Methodology to Determine a Fixed Unit Price for Waste Disposal and Updated Cost Estimates for Nuclear Decommissioning, Waste Management and Waste Disposal*. March 2010.

DECC, 2010b. *The Energy Act 2008. Consultation on the Financing of Nuclear Decommissioning and Waste Handling Regulations*. March 2010.

DECC, 2009a. *The Energy Act 2008. Pre-consultation Discussion Paper No. 3: establishing a fixed unit price for the disposal of intermediate level waste and spent fuel from new nuclear power stations – a worked example*. May 2009.

DECC, 2009b. *The Energy Act 2008. Pre-consultation Discussion Paper No. 2: on a methodology for establishing an indicative fixed unit price for the disposal of intermediate level waste and spent fuel from new nuclear power stations*. January 2009.

DECC, 2008. *The Energy Bill 2008. Pre-consultation Discussion Paper No. 1: on a methodology to determine how the fixed costs of building a geological disposal facility should be apportioned to and shared between operators of new nuclear power stations*. October 2008.

**ANNEX A**  
**CONSULTATION ON THE FUP METHODOLOGY AND UPDATED COST ESTIMATES**

***Scope of and Background to the Consultation***

- A1. Most of this consultation (DECC, 2010a) is about determining Fixed Unit Prices (FUPs) for geological disposal of new build spent fuel and ILW. It also contains the Government's latest cost estimates for decommissioning and managing the wastes from a generic PWR. FUPs form the basis of the payments new build operators will make to the Government for geological disposal and are important in the operators' financial provisioning for decommissioning and waste management. The cost estimates for decommissioning and waste management are intended to be useful benchmarks.
- A2. The funding arrangements for new build decommissioning and waste management are set out in the Energy Act 2008. New build operators must, before construction starts, have a Funded Decommissioning Programme (FDP), approved by the DECC Secretary of State. The Nuclear Liabilities Financing Assurance Board (NLFAB) has been set up to advise the Secretary of State on the adequacy of the proposed FDPs submitted to him.
- A3. An FDP will consist of a Decommissioning and Waste Management Programme (DWMP), which sets out what is to be done, and a Funding Arrangements Plan (FAP), which sets out how the operator will set up and maintain a Fund to cover decommissioning and waste management costs. There was a consultation on Statutory Guidance on FDPs in 2008 (BERR, 2008a); the Guidance is to be finalised and laid before Parliament later in 2010 (DECC, 2010a).
- A4. The FUP consultation was preceded by three pre-consultation discussion papers (DECC, 2008; DECC, 2009a, b). The current consultation document (DECC, 2010a) indicates how comments received on those papers have been taken into account. It is evident that some comments, for example from prospective new build operators, have had a significant influence on Government proposals.

***Concept of an FUP***

- A5. The concept of an FUP for geological disposal of new build wastes dates from the 2008 White Paper on nuclear power (BERR, 2008b). It is intended to provide clarity for new build operators on the amount they will be expected to pay Government to take responsibility for disposing of their spent fuel and ILW in a GDF.
- A6. The certainty about costs provided by an FUP will enable new build operators to take investment decisions and seek financing. In return for this certainty, Government will include in the FUP a significant "risk premium" over and above the expected costs of geological disposal. The risk premium is intended to protect the tax payer from having to make up any difference between the actual costs of geological disposal and the costs estimated as the basis for the new build operators' financial provisioning (BERR, 2008a).
- A7. The FUP concept is only for geological disposal. It does not apply to near-surface disposal of new build ILW. It is unclear from this consultation document (DECC, 2010a)

and the pre-consultation discussion papers (DECC, 2008; DECC, 2009a, b) how near-surface disposal of ILW would be financed.

A8. In accepting an FUP for spent fuel, an operator is not irrevocably committed to its geological disposal. The consultation document (DECC, 2010a) states that the agreement between the operator and Government will cover issues such as the termination costs that an operator would have to pay Government if the operator chose not to use the Government's geological disposal service.

### ***Deriving a Value for an FUP***

A9. In the Government's methodology, an FUP has three components:

- the Estimated Costs of geological disposal of new build ILW or spent fuel
- the Optimism Bias Adjustment
- the Contingency Allowance.

### ***Estimated Costs of Geological Disposal***

A10. The Estimated Costs of geological disposal are calculated using NDA RWMD's Parametric Cost Model. A Monte Carlo method is used to obtain a distribution of costs over a range of geological disposal scenarios (including inventory, depth and GDF layout, see Annex A of DECC, 2010a).

A11. The Estimated Costs include:

- full variable costs (*e.g.* of the construction of tunnels and vaults to take new build wastes, of emplacement of new build wastes)
- a contribution to fixed costs (*e.g.* construction of surface facilities and the access shaft and drift).

A12. The contribution to fixed costs is calculated in proportion to the new build waste share of the total variable costs of geological disposal. The calculation contains assumptions about the inventories of existing and committed wastes and new build wastes in a GDF (Annex D, DECC, 2010a). The baseline assumption is that there is a single GDF but the methodology is flexible enough to change this assumption if necessary.

A13. A financing charge is added to the fixed cost contribution. This is to cover the situation in which a GDF has to be constructed to a timetable driven by new build operators. For example, if new build spent fuel would not be ready for emplacement in a GDF when emplacement of existing and committed wastes would have been completed, construction of the parts of the GDF to hold new build spent fuel would be delayed and the surface facilities and access shaft and drift would stand idle. In the worked example given in the consultation document (DECC, 2010a), the financing charge adds 38% to the fixed cost contribution.

### ***Optimism Bias Adjustment***

A14. The Optimism Bias Adjustment allows for uncertainties in calculating the costs of a specific disposal scenario using the Parametric Cost Model. Such uncertainties are mainly those about the scope, timing and duration of disposal activities. The methodology uses the HM Treasury "Green Book" guidance to derive the adjustment. The consultation

document states that the appropriate range for the Optimism Bias Adjustment is 6-66% and uses 66% in the worked example (DECC, 2010a).

### *Contingency Allowance*

A15. The Contingency Allowance is for wider uncertainties than those covered in the Estimated Costs and Optimism Bias Adjustment. The methodology includes two types of uncertainties (Annex C, DECC, 2010a):

- incorrect basic assumptions in the Parametric Cost Model, *e.g.*
  - a very different geological disposal concept is used (*e.g.* not KBS-3 for spent fuel in “strong rock”)
  - co-disposal in a single GDF of vitrified HLW, spent fuel and ILW proves not to be technically possible
  - a GDF is not closed immediately after the end of waste emplacement
- incorrect assumptions about new build waste in the Parametric Cost Model, *e.g.*
  - additional fixed costs for new build wastes (*e.g.* a second GDF is needed to hold some or all new build wastes)
  - a delay in the start of emplacement of new build wastes
  - less spent fuel per canister.

A16. The Contingency Allowance is also calculated using Monte Carlo methods. There is no Contingency Allowance in the worked example in the consultation document (DECC, 2010a).

### *Units for the FUP*

A17. The Parametric Cost Model calculates geological disposal costs per canister of spent fuel and per cubic metre of packaged ILW. The Government proposes to set the FUP for spent fuel in terms of £/kWh(e) and the FUP for ILW in terms of £/m<sup>3</sup>.

### *Inflation*

A18. FUPs will be indexed for inflation.

### *Illustrative FUP Values*

A19. In the worked examples in the consultation document the FUP for spent fuel disposal is £1.645 million to £2.014 million per canister and the FUP for ILW disposal is £32,000 to £48,400 per cubic metre.

### ***When the FUP is Set***

A20. The consultation document (DECC, 2010a) gives two options for the time at which an FUP is set:

- at the time the FDP is first agreed, that is before the construction of the power station
- at a later time, up to 10 years after the station begins to generate electricity.

A21. If deferred then an “expected Fixed Unit Price” (eFUP) will be derived at the time that the FDP is agreed and this eFUP will be used by the operator as the basis of financial provisioning. The eFUP will be derived using the same methodology as the FUP but will

contain a lower risk premium because it will be based on best estimates of what uncertainties will be at the end of the deferral period.

A22. The eFUP will be reviewed and revised during the deferral period and could increase or decrease. If, when the FUP is finally set, it is greater than the eFUP, the operator must increase the Fund for decommissioning and waste management to make up the difference.

### ***Transfer of Title to and Liability for Waste to Government***

A23. A schedule for transfer of the title to and liability for new build spent fuel and ILW to Government will be agreed when the FUP is set. Government proposes that the Transfer Date in the schedule is linked to the operator's decommissioning programme, not to the availability of a GDF. The rationale for this is that decommissioning of new build stations is likely to be completed before a GDF is ready to take their wastes, and the Government is better placed to manage the costs incurred after electricity generation has ceased and the operator has no revenues from the station.

### ***Waste Management Costs after Transfer***

A24. The Government will need to be compensated for the possible waste management costs after the transfer date, other than disposal costs. These potential costs are for interim storage of spent fuel and ILW (including decommissioning stores), transport of ILW and spent fuel to a GDF and encapsulation of spent fuel.

A25. These potential costs will not be included in the FUP for disposal. Instead, the costs will be included in the operators' FDP and paid to Government as a lump sum at the Transfer Date. The sum to be paid will be fixed shortly before the Transfer Date. It will be made up of the estimated costs of waste management post-transfer and a risk premium to protect the taxpayer from having to meet any shortfall. The Government will provide an "Assumed Disposal Date" to the operator, to facilitate financial provisioning.

### ***Discounted FUP***

A26. The operator must pay the Government for geological disposal before the Transfer Date.<sup>1</sup> The Government proposes to make allowance for the difference between the Transfer Date and the Assumed Disposal Date by charging operators discounted FUPs rather than full FUPs. This procedure will reflect the greater certainty provided to the Government by early payment. In principle, the Government will be able to invest the money and so meet the full costs of disposal when it needs to do so. The discount rate will be set nearer to the Transfer Date.

A27. In the worked examples in the consultation document (DECC, 2010a), the discounted FUPs are £554,000 to £679,000 per canister of spent fuel and £10,800 to £16,300 per cubic metre ILW. These discounted FUPs are about a third of the full FUPs (para A19).

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<sup>1</sup> In the FDP Guidance consultation document (BERR, 2008a) it was stated that the Government was considering requiring early payments, during the generating life of the stations, and if this was the case there would be a payment schedule. This possibility is not mentioned in the FUP consultation document.

### ***Costs of Decommissioning and Waste Management***

A28. The consultation document also contains updated estimates of costs for decommissioning a generic PWR, managing its wastes and geological disposal of its spent fuel and ILW. These estimates are intended to provide an example to operators of how to estimate their own costs, for use in setting up their Fund. The estimates will also be a benchmark for use by Government, NLFAB and those responsible for managing the operators' Funds (DECC, 2010a).

A29. The decommissioning and waste management costs given in the consultation document exclude the costs that are to be met from operational expenditure. They are for demolishing the power station, remediating the site, storage, packaging and transport of spent fuel and ILW, and managing and disposing of decommissioning LLW.

A30. The estimated costs given in the consultation document for a 1.35 GW generic PWR are £800 million to £1,800 million for decommissioning and waste management and £299 million to £372 million for geological disposal of ILW and spent fuel. These correspond to 59p-£2.65 per MWh for decommissioning and waste management and 18p-38p per MWh for geological disposal.

### ***Consultation Questions***

- A31. The six consultation questions (page 10 of DECC, 2010a) are about:
- the deferral of setting FUPs, the deferral period and the method of determining an eFUP
  - setting the Transfer Date and Government recovery of additional costs
  - the methodology for determining an FUP
  - the new build wastes contribution to the fixed costs of a GDF
  - the units for FUPs
  - whether the cost estimates for decommissioning, waste management and geological disposal are credible.

**ANNEX B**  
**CONSULTATION ON FINANCING OF NUCLEAR DECOMMISSIONING**  
**AND WASTE HANDLING REGULATIONS**

B1. This consultation (DECC, 2010b) is about draft Regulations, derived from the Energy Act 2008, to:

- enable Government to recover costs associated with considering new build operators' Funded Decommissioning Programmes (FDPs), including the costs of obtaining independent advice
- define the procedures to be used to verify an FDP
- amend the procedure set out in the Energy Act 2008 for modifying an approved FDP
- add to the definition of an FDP, by including steps to be taken during the generating lifetime of a power station
- put in place requirements on new build operators to report on decommissioning and waste management liabilities.

B2. The consultation document contains drafts of two Statutory Instruments (Annex A of DECC, 2010b):

- the Financing of Nuclear Decommissioning and Waste Handling Regulations 2010
- the Energy Act 2008 (Designated Technical Matters) Order 2010.

B3. The proposed cost recovery procedures are based on operators paying fees to Government at various stages in the submission, verification and approval of FDPs. The verification procedures include the use of independent third parties, commissioned and paid for by the operators.

B4. For modification of FDPs the key issue is the threshold above which modifications must be submitted to Government for approval (the "materiality threshold"). The proposal is that the threshold be set at  $\pm 5\%$  for decommissioning and waste management liability and  $\pm 5\%$  for geological disposal liability.

B5. Decommissioning and waste management steps that are to be included in an FDP and paid for out of the new build operator's Fund are known as "designated technical matters". The major designated technical matters are set out in the Energy Act 2008. The Government proposal is to add to these matters three activities to be carried out during the generating lifetime of the station:

- the construction and maintenance of ILW stores not initially constructed as part of the station
- the construction and maintenance of spent fuel stores not initially constructed as part of the station
- preparatory steps for decommissioning taken before the station ceases to generate electricity.

B6. The rationale for adding these activities is to ensure that money is available to carry them out. Otherwise they might compete with revenue generating activities and not be prioritised (DECC, 2010b).

B7. The reporting requirements cover annual and quinquennial reports on decommissioning and waste management liabilities. There is also a question about undertaking the in-depth review of liabilities more frequently than every five years.

B8. The five consultation questions (page 34, DECC, 2010b) are about:

- cost recovery
- independent third party verification
- modifications to an approved FDP
- designated technical matters
- reporting requirements.