

**CoRWM Meeting with Westinghouse,  
20 January 2010, Preston**

***Purpose of Meeting***

1. The meeting was held to discuss disposability and other aspects of the management of spent fuel and intermediate level wastes (ILW) from AP1000 reactors, to provide input to CoRWM's work on new build wastes.

***Participants***

2. The participants were:

CoRWM: Marion Hill, Mark Dutton, Fergus Gibb, David Broughton (by telephone).

Westinghouse: Geoff Anderson, Simon Marshall, Larry Eisenstatt, Helena Wall, Paul Russ, Dennis Popp.

***CoRWM Work on New Build Wastes***

3. Marion Hill outlined CoRWM's 2009-10 work on new build wastes (see Annex).

***Westinghouse Role in UK New Build***

4. Westinghouse is a worldwide reactor vendor and provider of support services. In the UK it is one of the Requesting Parties for the regulators' Generic Design Assessment (GDA) and could be described as a "surrogate operator". It is working closely with the potential operators of the AP1000 in the UK, ie Horizon (a joint venture between E.ON and RWE), Suez, Iberdrola and Vattenfall. These potential operators are invited to key meetings between Westinghouse and the regulators. Westinghouse also expects to be heavily involved in training operators' staff.
5. As a Requesting Party, Westinghouse is required by the regulators to show that there is a viable cradle-to-grave approach for all AP1000 wastes and this includes having appropriate understandings with NDA. This has meant that Westinghouse has had to provide the regulators with much more information about AP1000 wastes and their management than would be the case in the US, where waste management is typically carried out by contractors to the reactor operators.

***Management of AP1000 Spent Fuel***

6. The reference fuel cycle for the AP1000 involves replacing 60-70 fuel assemblies out of the core content of 157 assemblies every 18 months. The length of the cycle can be from 12 to 24 months, depending on the operator's requirements. The average fuel burn-up is 50 GWd/t but there is considerable variation from one part of the core to another and within each fuel assembly. The burn-up of the lead assembly is 60 GWd/t.
7. The replacement procedure generally involves moving all the fuel in the core into the pond in the auxiliary building that is adjacent to the reactor and connected with it. This has the advantage that more people can be present in the containment during outages, thus shortening them. The pond is sized to hold spent fuel from 18.5 years of reactor operation plus one core. It is expected that spent fuel will be held in the pond for about 15 years before being moved to a dry store.
8. For the GDA, Westinghouse had to demonstrate that there is one potentially acceptable method for the storage and disposal of spent fuel. The regulators assume that operators will decide on the method to be used at each new power station during licensing and operation.

9. Westinghouse put forward a method for dry storage of spent fuel that uses helium filled Holtech casks in a facility just below ground level. There is a similar facility already operating in the US (in Sacramento) but with casks of a slightly different design. Holtech casks are used at Farley. When the plan was to dispose of US spent fuel at Yucca Mountain, it was hoped that the Holtech casks would be acceptable as disposal containers.
10. The Westinghouse preference for the UK is for there to be a centralised encapsulation facility for new build spent fuel, located at the geological disposal facility (GDF). AP1000 spent fuel could then be transported to this facility in the Holtech casks, removed and placed in canisters for disposal. However, for the GDA Westinghouse had to show that there is a technique for encapsulation that could be carried out at each power station site. It assumed that copper or steel canisters would be used, with 4 assemblies per canister.
11. The NDA disposability assessment for AP1000 spent fuel concluded that fuel would need to be stored for 100 years after it had been removed from the reactor if it had a burn-up of 65 GWd/t and for 75 years if it had a burn-up of 50 GWd/t. Westinghouse is of the view that the Requesting Parties, potential operators, NDA and the regulators need to meet to discuss the optimisation of the management, including the disposal, of spent fuel.
12. CoRWM explained its concerns about the NDA and Government continuing to consider only one geological disposal concept in any detail. The Japanese CARE concept was mentioned as one that could entail only a few years storage of spent fuel before it is placed in a GDF. It was also thought that the Yucca Mountain concept involved disposal of new build spent fuel after cooling periods of much less than 100 years but no-one present at the meeting was aware of any specific studies on this.
13. Westinghouse is currently carrying out work to satisfy OCNS about security requirements for the AP1000. OCNS is reviewing the security plan that has been submitted to the USNRC but is basing its requirements on the UK design basis threat. Westinghouse explained that the same AP1000 design will be used in the US and the UK (and other countries) but the analysis to demonstrate compliance with security requirements may differ.

### ***Operational ILW***

14. AP1000 operational ILW consists mainly of filters and ion exchange resins. The dominant radionuclide is cobalt-60 (half-life 5.27 years). With good fuel design and/or appropriate periods of decay storage of waste to reduce cobalt-60 levels, the filters and resins can be disposed of as low level waste (LLW).
15. However, for the GDA it is assumed that fuel cladding defects will cause some of the filters and resins to have to be dealt with as ILW. A best available techniques (BAT) assessment has shown that in this case the preferred option is to encapsulate the filters and resins in cement, using a mobile plant, and package them in 3m<sup>3</sup> boxes. The packages would then be stored in the ILW interim store. A further BAT assessment may be carried out during site licensing, before the final choice of management method for operational ILW is made.

### ***Decommissioning ILW***

16. Decommissioning ILW includes the pressure vessel and core internals such as control rods and in-core instrumentation. Modern decontamination techniques can reduce contamination of other plant and equipment to very low levels, allowing management as

non-radioactive waste or as LLW. Activation will be the main concern for the ILW and particularly the presence of nickel-63 (half-life 96 years).

17. Control rods, and possibly also in-core instruments, will be placed in canisters with the fuel assemblies. The pressure vessel will be cut up and packaged as ILW for disposal in a GDF.

***Completion of the GDA***

18. Westinghouse has to complete its GDA submissions by the end of 2010, so that the regulators can finish the GDA in mid-2011. There is only a little work to finish on ILW and spent fuel, including some work on fuel clad integrity in dry storage.

## **ANNEX**

### **CoRWM's 2009-10 Work on New Build Wastes**

1. CoRWM's work on new build wastes in 2009-10 is described in the workplan for Task Group 5 (CoRWM doc. 2665TG5). In summary it plans to:
  - respond to the current Government consultation on the draft nuclear National Policy Statement (NPS) (DECC, 2009a-d)
  - prepare a statement of the current CoRWM position on new build wastes
  - respond to the forthcoming Government consultations on:
    - the cost model and the methodology for establishing a fixed unit price for disposal of new build spent fuel and ILW
    - the draft Regulations for implementing the waste and decommissioning funding arrangement provisions in the Energy Act 2008.
2. CoRWM provided informal comments to DECC on two drafts of the NPS and held meetings with DECC to discuss the comments, which covered only factual accuracy and clarity of expression in the draft documents. After the consultation began CoRWM discussed at its December plenary meeting the preparation of its response, including timing, structure and initial ideas on content (CoRWM doc. 2733).
3. During discussion of the preparation of the response to the NPS consultation, CoRWM decided to produce a statement of its current position on new build wastes (CoRWM doc. 2733). This statement is needed because there have been a number of developments since the statement made in CoRWM's 2006 Recommendations to Government (CoRWM doc. 700).
4. Drafts of the CoRWM current position statement and the response to the NPS consultation will be discussed at CoRWM's plenary meeting on 27 January 2010. These drafts (CoRWM docs. 2749, 2748) were placed on the CoRWM website on 20 January. The drafts will be revised after the plenary meeting and the revised versions will be discussed at the 25 February 2010 plenary meeting, then finalised and published.
5. To make sure it is properly informed about the waste management aspects of the Generic Design Assessment (GDA) (HSE, 2009a-f), CoRWM held a meeting with the Nuclear Installations Inspectorate (NII) and the Environment Agency. A note of this meeting is in draft (CoRWM doc. 2747). Prior to the meeting CoRWM reviewed the NDA disposability reports (NDA, 2009a, b) and the requesting parties statements (EDF/AREVA, 2009; Westinghouse, 2009).
6. CoRWM has discussed the security of new spent fuel stores with the Office for Civil Nuclear Security (OCNS) (CoRWM doc. 2746, in draft). It has submitted a number of questions to OCNS and NII about their approach to requiring protection against a 9/11 style attack on such stores. CoRWM has also discussed the transport of new build spent fuel and ILW with the Department for Transport.
7. CoRWM held a meeting with EDF/AREVA on 22 January, with an agenda similar to that of the meeting with Westinghouse.

### **References**

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CoRWM doc. 2733. *New Build Wastes: Preparation of CoRWM Response to DECC Consultation Draft National Policy Statement*. December 2009.

- CoRWM doc. 2746. *CoRWM Meeting with OCNS, Harwell, 7 December 2009*. (in draft).
- CoRWM doc. 2747. *CoRWM Meeting with Regulators' GDA Team, London, 8 December 2009*. (in draft).
- CoRWM doc. 2748. *Draft Response from CoRWM to the Government Consultation on the Draft National Policy Statements for Energy Infrastructure*. January 2010.
- CoRWM doc. 2749. *Draft CoRWM Statement of its Position on New Build Wastes*. January 2010.
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