

NII

Questions Arising from the PBMR White Paper "Pebble Bed Modular Core Structures Design"

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1. Given the PBMR desire to use AGR fuel sleeve graphite for the replaceable and permanent graphite structures in the PBMR core, what information is available in the UK for the production history of fuel sleeve graphite? Particularly, is the current material (Nitetsu pitch coke) substantially different from the earlier material (VFT coke) with respect to physical properties and property variability (NII and BNFL)?
2. Is the irradiation behavior of the new fuel sleeve graphite (Nitetsu coke), as observed from post irradiation examination of discharged fuel sleeves (CEGB/Nuclear Electric data), similar to that of the earlier VFT pitch coke graphite (NII and BNFL)?
3. What creep stress has been employed in prior UK graphite irradiation creep experiments (NII)?
4. Should the carbon/graphite dust arising from attrition/abrasion of the fuel pebbles be treated separately in air ingress accident studies, i.e., should a separate oxidation kinetic data set be established for the dust/deposit arising from the fuel pebbles?
5. Given that the UK approach to probabilistic assessment of graphite performance is to be adopted by PBMR, (i) what do the NII consider to be the most important factors to be in the graphite design (biggest uncertainties), and (ii) what do the NII consider "sufficient" graphite materials property data to define property distributions for the purpose of these analysis?
6. What sampling programs and property tests should be required for the new graphite (based on AGR fuel sleeve) to be used for the PBMR (NII and BNFL)?
7. What product QA requirements are imposed on the suppliers of AGR fuel sleeve graphite (BNFL)?
8. Does NII consider the assertion that sufficient graphite irradiation data (presumably from fuel sleeves) exists for fifteen years of PBMR operation credible?
9. Would NII consider a graphite materials test program as necessary, i.e., post turnaround irradiations in the temperature range 500-950°C?
10. Should irradiation samples be taken from large (production) blocks of fuel sleeve graphite or from smaller, pilot plant scale billets (NII and BNFL)?
11. Are there high dose ( $>1 \times 10^{22}$  n/cm<sup>2</sup> EDN) data for fuel sleeve graphite from MTR experiments available in the UK (NII and BNFL)?

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